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## Overview of Australian Indigenous health status, 2014

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Australian Indigenous  
HealthInfoNet

# *Overview of Australian Indigenous health status 2014*



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# Australian Indigenous HealthInfoNet

The Australian Indigenous HealthInfoNet's mission is to contribute to improvements in Aboriginal and Torres Strait Islander health by making relevant, high quality knowledge and information easily accessible to policy makers, health service providers, program managers, clinicians and other health professionals (including Aboriginal and Torres Strait Islander health workers), and researchers. The HealthInfoNet also provides easy-to-read and summarised material for students and the general community.

The HealthInfoNet achieves its mission by undertaking research into various aspects of Aboriginal and Torres Strait Islander health and disseminating the results (and other relevant knowledge and information) mainly via its Internet site ([www.healthinfonet.ecu.edu.au](http://www.healthinfonet.ecu.edu.au)). The research involves analysis and synthesis of data and other information obtained from academic, professional, government and other sources. The HealthInfoNet's work in translational research aims at facilitating the transfer of pure and applied research into policy and practice to address the knowledge needs of a wide range of potential users.

## Recognition statement

The Australian Indigenous HealthInfoNet recognises and acknowledges the sovereignty of Aboriginal and Torres Strait Islander peoples as the original custodians of the country. Aboriginal and Torres Strait Islander cultures are persistent and enduring, continuing unbroken from the past to the present, characterised by resilience and a strong sense of purpose and identity despite the undeniably negative impacts of colonisation and dispossession. Aboriginal and Torres Strait Islander people throughout the country represent a diverse range of people, communities and groups each with unique identity, cultural practices and spiritualities. We recognise that the current health status of Aboriginal and Torres Strait Islander people(s) has been significantly impacted by past and present practices and policies. It is not our intention to homogenise in summary health data and where possible we endeavour to disaggregate analyses to recognise geographical, social and cultural diversity.

We acknowledge and pay our deepest respects to Elders past and present throughout the country. In particular we pay our respects to the Whadjuk Noongar people(s) of Western Australia on whose country our offices are located.

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# Overview of Australian Indigenous health status, 2014

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# 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 .....	3
<i>Historical context and social determinants of Indigenous health</i> .....	3
<i>The historical context of Indigenous health</i> .....	3
<i>The importance of contemporary social determinants and cultural concepts of Indigenous health</i> .....	4
<i>The shift to strengths based approaches</i> .....	4
<i>Indicators of Indigenous social disadvantage</i> .....	5
<i>Indigenous population</i> .....	6
Births and pregnancy outcome .....	7
<i>Age of mothers</i> .....	8
<i>Total fertility rates</i> .....	8
<i>Birthweights</i> .....	8
Mortality .....	9
<i>Age-standardised death rates</i> .....	10
<i>Expectation of life</i> .....	10
<i>Age at death</i> .....	11
<i>Infant mortality</i> .....	13
<i>Causes of death</i> .....	13
<i>Maternal mortality</i> .....	14
<i>Avoidable mortality</i> .....	15
Hospitalisation .....	15
<i>Separation rates</i> .....	16
<i>Age-specific separation rates</i> .....	16
<i>Causes of hospitalisation</i> .....	17
<i>Potentially preventable hospitalisations</i> .....	17
Selected health conditions .....	18
<i>Cardiovascular disease</i> .....	18
<i>Cancer</i> .....	21
<i>Diabetes</i> .....	23
<i>Social and emotional wellbeing (including mental health)</i> .....	26
<i>Kidney health (renal disease)</i> .....	29
<i>Injury</i> .....	32
<i>Respiratory disease</i> .....	33
<i>Eye health</i> .....	34

<i>Ear health and hearing</i> .....	36
<i>Oral health</i> .....	38
<i>Disability</i> .....	40
<i>Communicable diseases</i> .....	42
<i>Tuberculosis</i> .....	43
<i>Hepatitis</i> .....	44
<i>Haemophilus influenzae type b</i> .....	45
<i>Pneumococcal disease</i> .....	45
<i>Meningococcal disease</i> .....	46
<i>Sexually transmitted infections</i> .....	47
<i>HIV/AIDS</i> .....	48
<i>Skin diseases, infections and infestations</i> .....	49
Factors contributing to Indigenous health .....	50
<i>Selected health risk and protective factors</i> .....	50
<i>Nutrition</i> .....	50
<i>Physical activity</i> .....	51
<i>Bodyweight</i> .....	52
<i>Immunisation</i> .....	53
<i>Breastfeeding</i> .....	54
<i>Tobacco use</i> .....	54
<i>Alcohol use</i> .....	55
<i>Illicit substance use</i> .....	57
Concluding comments .....	59
Glossary .....	60
Abbreviations .....	62
References .....	64

## 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 Aboriginal and Torres Strait Islander peoples.<sup>1</sup> It has been prepared by the Australian Indigenous HealthInfoNet as a part of our contribution to 'closing the gap' in health between Aboriginal and Torres Strait Islander people and other Australians by making relevant, high quality knowledge and information easily accessible to policy makers, health service providers, other health professionals including Health workers, program managers, clinicians, researchers, students and the general community.

The initial sections of this *Overview* provide information about the context of Aboriginal and Torres Strait Islander health, Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander people. Information is provided for state and territories and for demographics such as gender and age when it is available and appropriate.

While the *Overview* provides a comprehensive review of key indicators across a range of health topics, it is beyond the scope 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](http://www.healthinonet.ecu.edu.au)).

There are a number of additions to this *Overview*. We have included a recognition statement, a note on the use of appropriate terminology that introduces our guidelines on the matter, and a statement of commitment to enhancing our strengths based approach to reporting.

We welcome your comments and feedback about the *Overview*.



Neil Drew, Director, on behalf of the HealthInfoNet team

1 See Box 1 for terminology

## 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 2014, the estimated Australian Indigenous population was 713,600 people.
- For 2014, it was estimated that NSW had the highest number of Indigenous people (220,902 people, 31% of the total Indigenous population).
- For 2014, 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 2013, there were 18,368 births registered in Australia with one or both parents identified as Indigenous (6% of all births registered).
- In 2013, Indigenous mothers were younger than non-Indigenous mothers; the median age was 24.9 years for Indigenous mothers and 30.8 years for all mothers.
- In 2013, total fertility rates were 2,344 births per 1,000 for Indigenous women and 1,882 per 1,000 for all women.
- In 2012, the average birthweight of babies born to Indigenous mothers was 3,211 grams compared with 3,373 grams for babies born to non-Indigenous mothers.
- In 2012, the proportion of low birthweight babies born to Indigenous women was twice that of non-Indigenous women (11.8% compared with 6.2%).

### 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 73.7 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 1998 to 2012, there were significant declines in infant mortality rates for Indigenous infants.
- For 2012, the leading causes of death among Indigenous people were cardiovascular disease, neoplasms (almost entirely cancers), and injury.
- In 2006-2010, for direct maternal deaths the rate ratio was almost 4 times higher for Indigenous women than for non-Indigenous women.

### Hospitalisation

- In 2012-13, 4.0% of all hospitalisations were of Indigenous people.
- In 2012-13, the age-standardised separation rate for Indigenous people was 2.7 times higher than for other Australians.
- In 2012-13, the main cause of hospitalisation for Indigenous people was for care involving dialysis, responsible for 48% of Indigenous separations.

### Selected health conditions

#### Cardiovascular disease

- In 2012-2013, 13% 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 2012, hospitalisation rates for circulatory disease were 1.6 times higher for Indigenous people than for non-Indigenous people.
- In 2012, cardiovascular disease was the leading cause of death for Indigenous people, accounting for 25% of Indigenous deaths.
- In 2012, the age-adjusted death rate for Indigenous people was 1.6 times the rate for non-Indigenous people.

## Cancer

- In 2005-2009, age-adjusted cancer incidence rates were slightly lower 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 2012-13, 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 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 2013-14, age-adjusted hospitalisation rates for diabetes for Indigenous males and females were 3 and 5 times the rates for other males and females.
- In 2012, Indigenous people died from diabetes at 7 times the rate of non-Indigenous people.

## Social and emotional wellbeing

- In 2012-13, 69% of Indigenous adults experienced at least one significant stressor in the previous 12 months.
- In 2012-13, 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 2012-13, there were 16,393 hospital separations with a principal diagnosis of ICD 'Mental and behavioural disorders' identified as Indigenous.
- 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 2009-2013, after age-adjustment, the notification rate of end stage renal disease was 6.2 times higher for Indigenous people than for non-Indigenous people.
- In 2012-13, care involving dialysis was the most common reason for hospitalisation among Indigenous people.
- In 2008-2012, the age-standardised death rate from kidney disease was 2.6 times higher for Indigenous people than for non-Indigenous people.

## Injury

- In 2012-13, after age-adjustment, Indigenous people were hospitalised for injury at nearly twice the rate for other Australians.
- In 2012-13, 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 2012-2013, 31% of Indigenous people reported having a respiratory condition. After age-adjustment, the level of respiratory disease was 1.2 times higher for Indigenous than non-Indigenous people.
- In 2012-2013, 18% of Indigenous people reported having asthma.
- In 2012-13, after age-adjustment, rates for Indigenous people were 4.4 times higher for chronic obstructive pulmonary disease, 3.3 times higher for influenza and pneumonia, 1.8 times higher for asthma, 1.8 times higher for acute upper respiratory infections and 1.4 times higher for whooping cough, than for their non-Indigenous counterparts.

- In 2012, after age-adjustment, the death rate for respiratory disease 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 2012-13, the hospitalisation rate for ear/hearing problems for Indigenous children aged 0-3 years was 0.8 times lower the rate for non-Indigenous children and the rate for Indigenous children aged 4-14 years was 1.6 times higher than the rate for non-Indigenous children.

## Oral health

- In 2007-2008 in NSW, SA, Tas and the NT, Indigenous children had more dental problems than non-Indigenous children.
- 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 2006-2010, after age-adjustment, the notification rate for tuberculosis was 12.5 times higher for Indigenous people than for Australian-born non-Indigenous people.
- In 2011-2013, the crude notification rate for hepatitis B was 5 times higher for Indigenous people than non-Indigenous people.
- In 2011-2013, the crude notification rate for hepatitis C for Indigenous people was 3.7 times higher for Indigenous people than for non-Indigenous people.
- In 2007-2010, notification rates for *Haemophilus influenzae* type b were 12.9 times higher for Indigenous people than for non-Indigenous people.
- In 2011, the age-standardised rate of invasive pneumococcal disease was 8 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 for their non-Indigenous counterparts.
- In 2013, Indigenous people had higher crude notification rates for gonorrhoea, syphilis and chlamydia than non-Indigenous people.
- In 2013, age-standardised rates of human immunodeficiency virus (HIV) diagnosis were 1.3 times higher for Indigenous than 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 (42%) and only one-in-twenty ate enough vegetables (5%) on a daily basis.

### Physical activity

- In 2012-13, 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 1.2 times higher for Indigenous people than for non-Indigenous people.

## **Immunisation**

- In 2013, 93% 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 2012-13, 44% of Indigenous adults were current smokers; after age-adjustment, this proportion was 2.5 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 2012-13, 23% of Indigenous adults abstained from alcohol; this level was 1.6 times higher than 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 5 times and Indigenous females at 4 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 5 and 8 times higher respectively, than those for their non-counterparts.

## **Illicit drug use**

- In 2012-13, 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* provides a comprehensive summary of the most recent indicators of the health of Aboriginal and Torres Strait Islander people in Australia (states and territories are: New South Wales (NSW), Victoria (Vic), Queensland (Qld), Western Australia (WA), South Australia (SA), Tasmania (Tas), The Australian Capital Territory (ACT) and The Northern Territory (NT)). It draws largely on previously published information, some of which has been re-analysed to provide clearer comparisons between Aboriginal and Torres Strait Islander peoples 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. It is often difficult to determine whether original sources that use the term 'Indigenous' are referring to Aboriginal people only, Torres Strait Islander people only or to both groups. In these instances the terms from the original source are used.

## 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 with substantial detailed analyses, prepared by AHMAC since 2006.
- 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 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.

In addition to 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 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 relies 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<sup>2</sup> 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.

<sup>2</sup> The term 'Indigenous' is used in this *Overview* to refer generally to the two Indigenous populations of Australia - Australian Aboriginal people and Torres Strait Islander people. See Box 1 for a more detailed explanation regarding the appropriate use of terminology.

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 persistent 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 NT had the highest rate of consistent reporting (95%) and 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 2014* 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 Aboriginal people and Torres Strait Islander 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 Aboriginal and Torres Strait Islander 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 1788<sup>3</sup> 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, 18-20]. The initial responses of Indigenous people to the arrival of the First Fleet were apparently quite peaceful. It didn't take long, however, before conflict started to occur - initially over access to fish stocks and then over access to other resources as non-Indigenous people started to plant crops and introduce livestock. This pattern of conflict was almost certainly widespread as non-Indigenous people spread across the country.

Conflict escalated in many places, in some instances resulting in overt massacres of Indigenous people. The 1838 massacre at Myall Creek (near Inverell, NSW) is the most infamous [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.

3 The first Australian colony was formally proclaimed in 1788.

### Box 1: Aboriginal and Torres Strait Islander peoples: a note on terminology

Aboriginal and Torres Strait Islander people(s) are the original inhabitants of the country. Aboriginal people are distinctively different ethnically and culturally from Torres Strait Islander people [26].

Aboriginal people in Australia are recognised as one of the oldest living cultures in the world with estimates ranging from 50,000 to 120,000 years [27]. Aboriginal people occupied mainland and some surrounding islands of what is now Australia. They enjoyed a semi nomadic lifestyle in family or community groups. Around 260 language groups coexisted each with their own customs and cultural practices.

Torres Strait Islander peoples have lived on the 270 or so islands in the Straits between Australia and Papua New Guinea for approximately 2,500 years [27]. Today they live on 17 of the islands with two communities on the far northern Queensland coast. Community life was based on hunting fishing, gardening and trading. Being located in the Straits they have traditionally had close contact with Papuan New Guinean communities and Australian Aboriginal communities.

Despite their differences they have many shared experiences since colonisation including dispossession, marginalisation and racism, and the Stolen Generations, that have a significant impact on health outcomes to the present day. For many Aboriginal and Torres Strait Islander people the use of language to describe them individually and collectively is linked directly to the enduring experiences of colonisation and dispossession [26]. Language was used to promulgate the practices of subjugation and was based in racist ideologies. The HealthInfoNet has a publically declared commitment to use appropriate and non-offensive terminology when referring to Aboriginal and Torres Strait Islander people(s) in all published materials.

## 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, 28, 29]. 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 [30]. 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.

## The shift to strengths based approaches

In recent years there has been a marked shift in the rhetoric and the use of language to describe the experiences of Aboriginal and Torres Strait Islander peoples in a range of areas including health. It is now widely recognised that there is a need to shift from 'deficit' thinking to more strengths-based approaches. In response to calls from the community many authoritative institutions and organisations have made public commitments to promote strengths based approaches in the public discourse on Aboriginal and Torres Strait Islander issues [31, 32]. For example the *National Aboriginal and Torres Strait Islander Health Plan 2013-2023* defines a strengths based approach:

*A strengths based approach views situations realistically and looks for opportunities to complement and support existing strengths and capacities as opposed to a deficit-based approach which focusses on the problem or concern. [33, p.50-51]*

Similarly the *Overcoming Indigenous disadvantage* report (2014) declares a 'greater focus on strengths-based reporting with a reframing from "overcoming disadvantage" to "improving wellbeing"' [32, p.94]. The report also offers some relatively simple actions that have the capacity to shift the narrative in published materials from a deficit focus to a strengths focus including:

- greater emphasis on strengths based indicators
- giving more prominence to positive outcomes ahead of deficit outcomes in comparative data
- changing health nomenclature from negative to positive
- providing examples of 'things that work'.



Shifting from a deficit to a strengths based approach has the capacity to:

- recognise and honour the resilience, persistence, and importance of Aboriginal and Torres Strait Islander culture to positive health outcomes
- recalibrate the narrative and challenge stereotypical and racist views of Aboriginal and Torres Strait Islander people(s) and culture
- shift the public debate on Aboriginal and Torres Traits Islander health from a discourse of despair to a discourse of hope and resilience
- encourage open and productive work in the intercultural space between Aboriginal and Torres Strait Islander people and non-Indigenous Australians [34]
- provide clear pathways forward unobscured by the weight of negative expectations.

In this edition of the *Overview* we have adapted the recommendations from *the Overcoming Indigenous disadvantage* report to ensure that we infuse the *Overview* with an enhanced strength based narrative form and structure. Changes include:

- reporting positive outcomes ahead of deficit outcomes
- where possible and practical, adopting positive rather than negative nomenclature
- giving greater prominence to examples of evidence based practice, policies and procedures that deliver positive outcomes for Aboriginal and Torres Strait Islander health
- reporting where available, culturally appropriate comparative data such as regional and remote as well as other culturally meaningful geographical distinctions.

In subsequent publications we will be working with HealthInfoNet partners, consultants, and community stakeholder to identify and report on strengths-based indicators such as those identified in *the Overcoming Indigenous disadvantage* report and others.

It is important to note that the HealthInfoNet has an obligation to report honestly and openly on the evidence base for negative health outcomes. Access to and availability of data are crucial to a full appreciation of the health impacts for Aboriginal and Torres Strait Islander peoples. Nevertheless, as noted above, strengths-based reporting offers numerous benefits for workers in the sector.

## Indicators of Indigenous social disadvantage

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

### Education

According to the 2011 Australian Census [35]:

- 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 [36] 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 [37] showed:

- 75% of year 3 Indigenous students and 70% of year 5 Indigenous students were at or above the national minimum standard for reading, compared with 95% of year 3 non-Indigenous students and 94% of year 5 non-Indigenous students
- 76% of year 3 Indigenous students and 63% of year 5 Indigenous students were at or above the national minimum standard for persuasive writing, compared with 95% of year 3 non-Indigenous students and 92% of year 5 non-Indigenous students
- 74% of year 3 Indigenous students and 74% of year 5 Indigenous students were at or above the national minimum standard for spelling, compared with 94% of year 3 non-Indigenous students and 94% of year 5 non-Indigenous students
- 73% of year 3 Indigenous students and 68% of year 5 Indigenous students were at or above the national minimum standard for grammar and punctuation, compared with 95% of year 3 non-Indigenous students and 94% of year 5 non-Indigenous students

- 78% of year 3 Indigenous students and 71% of year 5 Indigenous students were at or above the national minimum standard for numeracy, compared with 96% of year 3 non-Indigenous students and 95% of year 5 non-Indigenous students.

## Employment

According to the 2011 Australian Census [35]:

- 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

The median real equivalised gross weekly household income for Aboriginal and Torres Strait Islander households in 2011-13 was \$465 compared with \$869 for non-Indigenous households [32].

## Indigenous population

ABS projections from the 2011 Census of the numbers of Aboriginal and Torres Strait Islander people suggest an Indigenous population of 713,600 people at 30 June 2014 [32, 38], this was 3% of the projected total population of 23.5 million [32, 39]. The projection for NSW is the highest (220,902 Indigenous people), followed by Qld (203,045), WA (93,778), and the NT (72,251) (Table 1). The NT has the highest proportion of Indigenous people among its population (29.7%) and Vic the lowest (0.9%).

Table 1. Estimated Indigenous population, by jurisdiction, Australia, 30 June 2014

Jurisdiction	Indigenous population (number)	Proportion of Australian Indigenous population (%)	Proportion of jurisdiction population (%)
NSW	220,902	31.0	2.9
Vic	50,983	7.1	0.9
Qld	203,045	28.5	4.3
WA	93,778	13.1	3.6
SA	39,800	5.6	2.4
Tas	25,845	3.6	5.0
ACT	6,707	0.9	1.7
NT	72,251	10.1	29.7
Australia	713,589	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 2014

Source: ABS, 2014 [38]

There was a 21% increase in the number of Indigenous people counted in the 2011 Census compared with the 2006 Census [3].<sup>4</sup> The largest increases were in the ACT (34%), Vic (26%), NSW (25%) and Qld (22%) [40]. For all jurisdictions, the 55 years and over age-group showed the largest relative increase (i.e. the Indigenous population is ageing) [41]. 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')
- 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.

<sup>4</sup> There is a difference between the Census 'counts' and 'estimates'. The 'estimates' adjust for a number of factors and are more accurate.

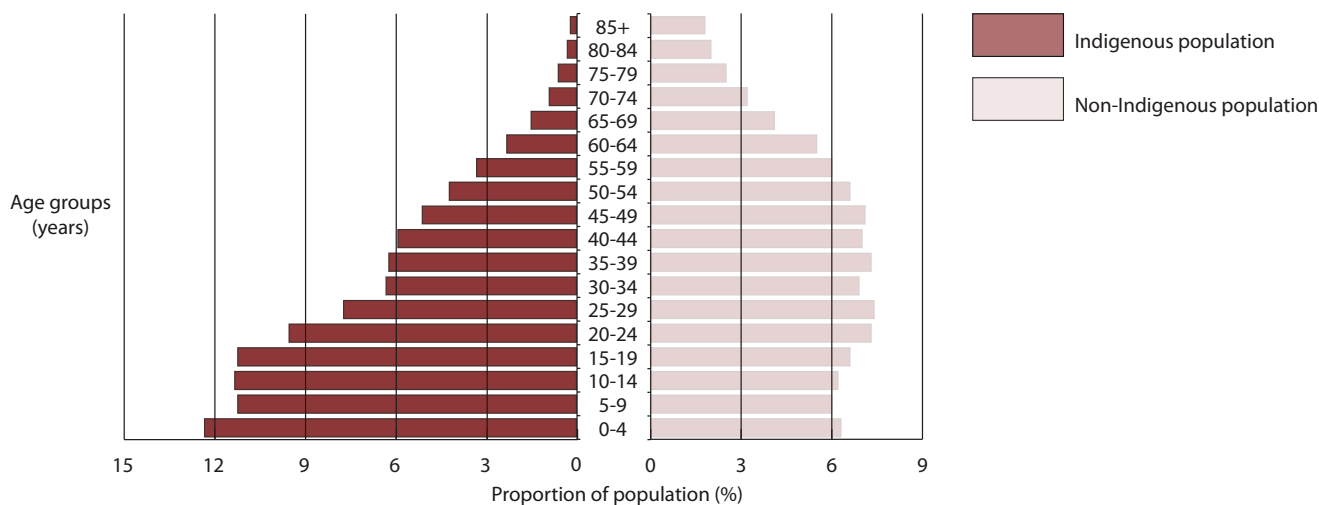
In 2011, about 35% of Aboriginal and Torres Strait Islander people (233,000 people) lived in major cities, 22% (148,00 people) lived in inner regional areas, and 22% (146,000) lived in outer regional areas [32]. About 8% (50,000 people) lived in remote areas and 14% (92,000) lived in very remote areas. Almost 90% of non-Indigenous people (over 19 million people) lived in major cities or inner regions.

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 [4]. The three largest regions were in eastern Australia (Brisbane, NSW Central and the North Coast, and Sydney-Wollongong), which accounted for 29% of the total Indigenous population.

According to the 2011 Census, around 90% of Indigenous people are Aboriginal, 6% are Torres Strait Islanders, and 4% people identified as being of both Aboriginal and Torres Strait Islander descent [4]. Around 63% of Torres Strait Islander people<sup>5</sup> 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) [42]. 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 [42].

Figure 1. Population pyramid of Indigenous and non-Indigenous populations, 30 June 2011



Source: ABS, 2012 [42]

## Births and pregnancy outcome

In 2013, there were 18,368 births registered in Australia with one or both parents identified as Aboriginal and/or Torres Strait Islander (6.0% of all births registered) [43]. This 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 [7]. Completeness of identification varied across the country, with only Vic, Qld, WA, SA and the NT having levels above 90%.

In 2013, both parents identified as Indigenous in 29% 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) [43].

<sup>5</sup> Includes people who identified as Torres Strait Islanders and those who identified as being of both Aboriginal and Torres Strait Islander descent.

### Box 2: 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 jurisdiction in which the birth occurred. The registration information is limited from a health perspective so health authorities have established parallel maternal/perinatal collections. These collections are based on data recorded by 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 is collated and reported nationally by the ABS (for registration information) and the AIHW's National Perinatal Statistics Unit (for maternal/perinatal information).

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.<sup>6</sup> 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.) 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.

<sup>6</sup> 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'.

## Age of mothers

In 2013, Indigenous women had more babies and had them at younger ages than non-Indigenous women; teenagers had one-fifth (18%) of the babies born to Indigenous women, compared with only 3.4% of those born to all mothers [43]. The median age of Indigenous mothers was 24.9 years, compared with 30.8 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 (63 babies per 1,000 women) was over four times that of all teenage women (15 babies per 1,000).

Table 2. Age-specific fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2013

Status of mother/age-group (years)	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Indigenous mothers							
15-19	54	52	65	92	55	74	63
20-24	138	100	137	174	138	119	134
25-29	129	116	124	144	124	110	124
30-34	95	86	89	101	63	73	88
35-39	46	72	49	52	42	32	48
40-44	11	11	13	6	7	11	11
All mothers							
15-19	13	9	20	17	14	41	15
20-24	51	38	65	56	52	92	52
25-29	102	88	108	98	104	108	100
30-34	129	124	120	123	124	111	125
35-39	75	76	63	66	63	58	71
40-44	17	17	13	14	13	14	15

Notes: 1 Rates per 1,000 women in each age-group; the 15-19 years age group includes births by girls aged 14 years or younger. Figures are not provided for the 45-49 years age group because of the small numbers involved  
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, 2014 [43]

## Total fertility rates

In 2013, total fertility rates were 2,344 births per 1,000 for Indigenous women and 1,882 per 1,000 for all women (Table 3) [43]. The highest total fertility rate for Indigenous women was for those in WA (2,847 babies per 1,000 women), followed by Qld (2,391 per 1,000) and NSW (2,370 per 1,000).

Table 3. Total fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2013

Status of mother	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Indigenous	2,370	2,190	2,391	2,847	2,149	2,092	2,344
All mothers	1,940	1,765	1,940	1,870	1,848	2,117	1,882

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 2)  
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, 2014 [43]

## Birthweights

The average birthweight of babies born to Indigenous mothers in 2012 was 3,211 grams, 162 grams less than the average for babies born to non-Indigenous mothers (3,373 grams) [44]. Babies born to Indigenous women in 2012 were nearly twice as likely to be of low birthweight (LBW) (11.8%) than those born to non-Indigenous women (6.0%). (LBW, defined as a birthweight of less than 2,500 grams, increases the risk of health problems and death in infancy.)

The proportions of LBW babies born to Indigenous women were highest in the ACT (14.9%)<sup>7</sup>, SA (14.8%), and WA (14.5%) [45]. The proportions of babies of LBW were higher for Indigenous mothers than for all mothers in all jurisdictions (Table 4).

<sup>7</sup> Information about LBW babies in the ACT includes information of non-ACT residents (24% of Indigenous women who gave birth in the ACT were non-residents). In 2012, 6.5% of babies born to Indigenous women who were ACT residents were of LBW.



Table 4. Mean birthweights and percentage of low birthweight for babies born to Indigenous and all mothers, selected jurisdictions, Australia, 2012

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Indigenous mothers									
Mean birthweight	3,245	3,298	3,233	3,128	3,131	3,313	3,133	3,128	3,211
% low birthweight	10.5	9.6	11.1	14.5	14.8	11.0	14.9	13.6	11.8
All mothers									
Mean birthweight	3,369	3,369	3,380	3,352	3,338	3,382	3,352	3,303	3,367
% low birthweight	5.7	6.1	6.6	6.1	7.2	7.1	7.4	8.2	6.2

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

Source: Hilder L, Zhichao Z, Parker M, Jahan S, Chambers GM 2014 [45]

Risk factors for LBW include pre-term birth, socioeconomic disadvantage, the age of the mother, and antenatal care [46]. 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, almost half (48%) of Indigenous mothers and 11% of non-Indigenous mothers reported smoking during pregnancy [45].

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%) as that among those who did not smoke during pregnancy (7.8%) [47]. Similarly, 10% of babies born to non-Indigenous mothers who smoked were of LBW, compared with less than 4.5% of those whose mothers did not smoke.

The mean birthweight of 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) [48]. 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 [49]. 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 Aboriginal and Torres Strait Islander mortality in Australia are the incomplete identification of Indigenous status in death records and the experimental nature of the recently adopted population estimates [50]. As a result of the incomplete identification of Indigenous status in death records, the 2,811 Indigenous deaths registered in 2013 are certainly an underestimate of the actual number of Indigenous deaths. Also, delays in registration of deaths are more common for Aboriginal and Torres Strait Islander people. For example, of all the Indigenous deaths which occurred in Australia in 2011, about 87% were registered in 2011 compared with 95% of non-Indigenous deaths [51].

Based on a linkage study of Indigenous identification in deaths registration and the 2011 Census, the ABS revised its estimates of life expectancy of Indigenous people (see 'Life expectancy') [51]. The levels of under-identification, which differed by age-group, jurisdiction and remoteness of residence, were taken into account for 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 [50]. This caution is reflected in recent ABS publications that do not include detailed tables of Indigenous deaths, nor information about overall death rates. As a result, there is no consistency about the extent of information available for recent years. Reflecting this, readers should be aware that the following sections vary in terms of the years to which they relate.

### Box 3: 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 [52]. (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). The SMR is the ratio of the numbers of deaths (or of other health measures) registered/observed to the number expected. 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.

## Age-standardised death rates

There were 2,811 deaths in Australia in 2013 where the deceased person was identified as Indigenous [50]. The age-standardised death rate of 9.6 per 1,000 population for Indigenous people was 1.7 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, Qld, WA, SA and the NT [47]. 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). 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 [47]

Between 1991 and 2010, there was a 33% reduction in the age-standardised death rates for Indigenous people in WA, SA and the NT; there was also a significant closing of the gap in death rates between Indigenous and non-Indigenous people during this time period [47, 53].

## Expectation of life

In 2013, the ABS published revised estimates for expectation of life at birth for Indigenous people [51]. 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). (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. These 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 [51]

## Age at death

The median age at death<sup>8</sup> in 2013 for Indigenous males ranged from 48.8 years for those living in SA to 58.5 years for those living in NSW (Table 7) [50]. These levels were around 20 years less than those for non-Indigenous males, which ranged from 69.9 years (NT) to 80.0 years (SA).

The median age at death for Indigenous females in 2013 ranged from 55.3 years for those living in SA to 66.2 years for those living in NSW (Table 7) [50]. These levels were also around 20 years less than those for non-Indigenous females, which ranged between 71.4 years (NT) and 85.5 years (SA).

**Table 7. Median age at death, by Indigenous status and sex, NSW, Qld, WA, SA and the NT, 2013**

Jurisdiction	Indigenous		Non-Indigenous	
	Male	Female	Male	Female
NSW	58.5	66.2	78.9	85.0
Qld	53.6	62.9	77.4	83.9
WA	53.9	57.8	77.8	84.2
SA	48.8	55.3	80.0	85.5
NT	52.5	58.0	69.9	71.4
All jurisdictions	54.6	61.6	78.5	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, 2014 [50]

In 2009-2013, 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) [50]. (The rate ratios, based on the numbers of deaths registered, vary according to the levels of Indigenous identification (see above).)

<sup>8</sup> 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, 2009-2013

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio	
	Male	Female	Male	Female	Male	Female
NSW						
0	4	4	4	3	1.0	1.2
1-4	25	23	16	16	1.6	1.5
5-14	10	11	9	7	1.1	1.5
15-24	67	31	47	20	1.4	1.5
25-34	161	83	70	31	2.3	2.7
35-44	324	183	118	67	2.7	2.7
45-54	664	357	273	165	2.4	2.2
55-64	1,153	846	642	383	1.8	2.2
65+	3,750	3,728	4,017	3,619	0.9	1.0
Qld						
0	9	6	5	4	1.8	1.5
1-4	41	47	20	17	2.0	2.8
5-14	20	11	12	9	1.6	1.2
15-24	105	59	55	26	1.9	2.2
25-34	219	107	83	34	2.6	3.1
35-44	451	260	130	71	3.5	3.7
45-54	851	511	266	167	3.2	3.1
55-64	1,536	1,203	630	374	2.4	3.2
65+	5,271	4,326	3,851	3,419	1.4	1.3
WA						
0	8	4	3	2	2.7	1.5
1-4	75	48	19	15	3.8	3.1
5-14	24	35	9	9	2.5	3.8
15-24	226	105	54	24	4.2	4.4
25-34	283	163	83	31	3.4	5.3
35-44	672	434	123	63	5.5	6.9
45-54	1,086	795	246	154	4.4	5.2
55-64	2,159	1,456	563	334	3.8	4.4
65+	6,161	4,707	3,703	3,273	1.7	1.4
SA						
0	7	7	4	3	1.9	2.6
1-4	32	35	23	17	1.4	2.1
5-14	23	19	7	9	3.1	2.1
15-24	139	87	49	21	2.9	4.2
25-34	255	127	82	36	3.1	3.5
35-44	664	426	146	84	4.6	5.1
45-54	1,096	719	309	183	3.5	3.9
55-64	1,629	1,205	663	395	2.5	3.1
65+	3,362	2,878	4,202	3,882	0.8	0.7
NT						
0	14	12	3	5	4.4	2.6
1-4	89	69	35	9	2.5	7.3
5-14	41	49	18	11	2.2	4.5
15-24	273	126	88	31	3.1	4.1
25-34	424	195	85	26	5.0	7.6
35-44	886	637	126	56	7.1	11.4
45-54	1,623	1,273	324	142	5.0	9.0
55-64	2,651	1,909	676	304	3.9	6.3
65+	6,350	5,818	3,260	2,458	1.9	2.4
All jurisdictions						
0	7	6	4	3	1.8	1.7
1-4	45	40	18	16	2.4	2.5
5-14	19	19	10	8	1.9	2.3
15-24	131	66	51	23	2.6	2.9
25-34	242	122	77	32	3.1	3.8
35-44	514	318	125	69	4.1	4.6
45-54	925	596	271	166	3.4	3.6
55-64	1,603	1,187	630	374	2.5	3.2
65+	4,738	4,209	3,948	3,549	1.2	1.2

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, 2014 [50]



## 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 2011-2013, the Indigenous IMR (6.1 per 1,000) was around twice as high as the non-Indigenous IMR [50]. The highest Indigenous IMR occurred in the NT (13.6); the lowest occurred in NSW (3.9).

**Table 9. Infant mortality rates, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2011-2013**

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio	
	Males	Females	Males	Females	Males	Females
NSW	3.7	4.1	3.9	3.1	0.9	1.3
Qld	7.1	5.9	4.3	4.2	1.7	1.4
WA	5.8	4.2	2.3	2.3	2.5	1.8
SA	7.8	8.1	3.0	2.4	2.6	3.4
NT	14.9	12.3	3.1	5.2	4.8	2.4

Notes: 1 Infant mortality rate is the number of infant deaths per 1,000 live births  
 2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate  
 3 The Indigenous rates are likely to be under-estimated, due to the incomplete identification of Indigenous status on births and deaths records  
 4 Due to the small number of deaths registered in Vic, Tas and the ACT, these jurisdictions have been excluded

Source: ABS, 2014 [50]

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 [47]. Indigenous infants died from these conditions 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 1998 to 2012, there have been significant national declines in IMRs for Indigenous infants from 13.5 to 5.0 deaths per 1,000 births [32]. Additionally, the gap between Indigenous and non-Indigenous IMRs decreased from 9.0 to 1.7 deaths per 1,000 births.

## Causes of death

Cardiovascular disease was the leading cause of death of Indigenous people in 2012, being responsible for 25.2% of the deaths of Indigenous people living in NSW, Qld, WA, SA and the NT [54]. The next most common causes of death were: ICD 'Neoplasms' (mainly cancers) being responsible for 21.2% of deaths; followed by ICD 'External causes' (injury) (15.4%); ICD 'Endocrine, nutritional and metabolic diseases' (including diabetes) (9.1%); and ICD 'Diseases of the respiratory system' (7.9%). 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.<sup>9</sup>

In terms of specific conditions, coronary heart disease (also known as ischaemic 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) [55]. 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, sign 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 [55]

<sup>9</sup> The list of specific causes, published in the Bulletin of the World Health Organization, was developed to enable comparisons between countries, but basic tabulation lists were acknowledged as better for monitoring disease over time. 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

Similarly, in the five-year period 2006-2010 for people living in NSW, Qld, WA, SA and the NT, cardiovascular disease was the most common cause of death for Indigenous people being responsible for 26% of Indigenous deaths, followed by neoplasms (almost entirely cancer; 19%), and external causes of death (injury; 15%) [47]. For all major causes of death, Indigenous people died at higher rates than 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 [47]

In 2012, the leading specific causes of death differed for Indigenous males and females living in NSW, Qld, WA, SA and the NT [55]. For Indigenous males and females, the two leading specific causes of death were coronary 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, dementia (including Alzheimer's disease), and cerebrovascular disease.

## Maternal mortality

### Box 4: Maternal deaths

Maternal deaths refer to pregnancy-related deaths occurring to women during pregnancy or up to 42 days after delivery [56]. Direct maternal deaths refer to those resulting from obstetric complications (including pregnancy, labour, and first few weeks after delivery) from interventions, omissions, and incorrect treatment. Indirect maternal deaths refer to those resulting from a previously existing disease, or a disease that developed during pregnancy, that were not a direct result of obstetrics but aggravated by pregnancy.

Maternal mortality ratios (MMRs) are calculated by dividing the number of maternal deaths (direct and indirect) by the number of women who gave birth to babies weighing at least 400 grams or that reached at least 20 weeks gestation; this result is then multiplied by 100,000. In Australia in 2006-2010, nine (11%) of the 84 maternal deaths where Indigenous status was known were of Indigenous women (Indigenous status was not reported in 13% of the deaths) [56]. The leading causes of maternal death among Indigenous women were sepsis and cardiac conditions.

Reflecting the higher rate of confinements among Indigenous women, the maternal mortality ratio for Indigenous women in 2006-2010 was 16.4 deaths per 100,000 confinements, more than three times higher than the ratio of 5.4 per 100,000 for non-Indigenous women (Table 12) [Derived from 56, 57, 58-61]. For direct maternal deaths, the ratio of 9.1 per 100,000 for Indigenous women was almost four times the ratio of 2.4 per 100,000 for non-Indigenous women.

Table 12. Numbers of women who gave birth and maternal deaths, and maternal mortality ratios, by Indigenous status, Australia, 2006-2010

Indigenous status	Women who gave birth	Maternal deaths	Maternal mortality ratio
Indigenous	55,032		
Direct and indirect maternal deaths		9	16.4
Direct maternal deaths		5	9.1
Non-Indigenous	1,393,413		
Direct and indirect maternal deaths		75	5.1
Direct maternal deaths		34	2.4

Notes: 1 Maternal mortality ratio is the number of maternal deaths divided by the number of women who gave birth (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 Laws, Li, 2008 [57], Laws, Sullivan, 2009 [58], Laws, Li, Sullivan, 2010 [59], Li, McNally, Hilder, Sullivan, 2011 [60], Li, Zeki, Hilder, Sullivan, 2012 [61], Johnson et al, 2014 [56]

## 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) [62].

In 2012, almost 1,500 of the deaths of Indigenous people living in NSW, Qld, WA, SA and the NT were avoidable [54]. After age-adjustment, the rate of avoidable deaths was 3.7 times higher for Indigenous people than for their non-Indigenous counterparts.

There were 7,079 deaths from avoidable causes among Indigenous people living in NSW, Qld, WA, SA and the NT in the five-year period 2008-2012 [32]. Age-adjusted rates for avoidable deaths of Indigenous people were highest in the NT (789 per 100,000) and lowest in NSW (304 per 100,000). Indigenous people died from avoidable causes at 3.0 times the rate of non-Indigenous people.

In 2008-2012, the most common conditions contributing to avoidable deaths among Indigenous people aged 0-74 years living in NSW, Qld, WA, SA and the NT were coronary heart disease (18.5%), cancer (18.0%), diabetes (10.4%), and suicide (8.9%) [32]. The death rates from avoidable causes were around twice as high for Indigenous people than for non-Indigenous people for cancer and suicide, four times higher for coronary heart disease, and 12 times higher for diabetes.

Between 1998 and 2012, after age-adjustment, there was a 27% decline in the death rate from avoidable causes for Indigenous people aged 0-74 years living in NSW, Qld, WA, SA and the NT [32]. 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 [63]. 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 [63]. 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 [64]. 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, 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 rates<sup>10</sup>

Of the 9.4 million hospital separations in Australia<sup>11</sup> during 2012-13, 384,638 (4.1%) were identified as Indigenous (Table 13) [65]. Around 93% of Indigenous hospital separations were of Aboriginal people, 4% were of Torres Strait Islander people, and 3% 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 2012-13, the overall age-standardised separation rate of 1,038 per 1,000 for Indigenous people was 2.7 times that for non-Indigenous people (Table 13) [65]. Nationally, around 86% of the difference between Indigenous and non-Indigenous rates was due to higher separations for Indigenous people admitted for kidney dialysis. The age-standardised separation rate for Indigenous people living in the NT (1,911 per 1,000) was 5.8 times the rate for non-Indigenous people.

**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, 2012-13**

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	78,647	678	2,720,642	358	1.9
Vic	19,280	779	2,353,554	403	1.9
Qld	94,505	917	1,883,167	420	2.2
WA	77,938	1,614	980,813	422	3.8
SA	24,092	1,233	687,823	383	3.2
NT	83,122	1,911	35,182	329	5.8
All jurisdictions	384,638	1,038	8,988,888	389	2.7

- 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 are 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, 2014 [65]

## Age-specific separation rates

The most recent national information available is from 2012-13 when hospital separation rates were higher for Indigenous people than for non-Indigenous people in all age-groups, with the highest rate ratios in the middle adult years (Table 14) [Derived from 65, 66-68].

**Table 14. Age-specific hospital separation rates, by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, Australia, 2012-2013**

Age-group (years)	Males			Females		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0-4	371	265	1.4	297	203	1.5
5-9	149	106	1.4	121	83	1.5
10-14	116	86	1.3	110	77	1.4
15-19	151	132	1.1	314	189	1.7
20-24	215	140	1.5	532	271	2.0
25-29	287	137	2.1	597	333	1.8
30-34	390	162	2.4	632	406	1.6
35-39	647	197	3.3	874	376	2.3
40-44	985	240	4.1	962	325	3.0
45-49	1,340	293	4.6	1,356	335	4.1
50-54	1,471	371	4.0	1,603	390	4.1
55-59	1,754	500	3.5	2,315	463	5.0
60-64	2,103	678	3.1	2,569	579	4.4
65+	2,179	993	2.2	2,420	893	2.7

- 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, 2014 [65], ABS, 2009 [68], ABS, 2013 [67], ABS, 2014 [66]

10 '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) [47]. Hospital separations are more widely known as 'admissions', but can also be referred to as 'hospitalisations'.

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

## Causes of hospitalisation

In 2012-13, the most common reason for the hospitalisation of Indigenous people in Australia was for ICD 'Factors including health status and contact with health services' which were mostly for care involving dialysis. This diagnosis was responsible for 48% of Indigenous separations (185,289 separations) [65]. 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 27,653 separations (7.2% of all separations).

Excluding separations for pregnancy-related conditions (most of which involved normal deliveries), the next leading causes of hospitalisation for Indigenous people in 2012-13 were respiratory conditions (responsible for 20,944 separations and digestive diseases (19,315 separations (Table 15) [65].

**Table 15. Numbers and proportions (%) for leading causes of Indigenous hospital separations, Australia, 2012-13**

Principal diagnosis (ICD)	Number of separations	Proportion of separations (%)
Injury, poisoning and certain other consequences of external causes	27,653	7.2
Pregnancy, childbirth and the puerperium	22,342	5.8
Diseases of the respiratory system	20,944	5.4
Diseases of the digestive system	19,315	5.0
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	18,616	4.8
Mental and behavioural disorders	16,393	4.3
Diseases of the circulatory system	11,588	3.0
Diseases of the genitourinary system	10,348	2.7
Diseases of the skin and subcutaneous tissue	8,310	2.2
Diseases of the musculoskeletal system and connective tissue	7,201	1.9
Certain infectious and parasitic diseases	6,601	1.7
Endocrine, nutritional and metabolic diseases	5,797	1.5
Neoplasms	5,394	1.4
Factors influencing health status and contact with health services	185,289	48
All causes	384,368	100

Note: Information for the NT are for public hospitals only

Source: AIHW, 2014 [65]

## Potentially preventable hospitalisations

Potentially preventable hospitalisations are admissions which 'could have been avoided with access to quality primary care and preventive care' [69]. 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.

From July 2012 to June 2013, potentially preventable hospitalisations for chronic conditions accounted for 6.7% of all Indigenous hospitalisations in Australia [32]. After age-adjustment, the hospitalisation rate for potentially preventable chronic conditions was 4.3 times higher for Indigenous people than for non-Indigenous people (Table 16). The largest proportion of potentially preventable hospitalisations for chronic conditions was for diabetes complications followed by COPD.

**Table 16. Age-standardised rates of top five diagnoses of potentially preventable hospitalisations for chronic conditions, by Indigenous status, Australia, 2012-13**

Diagnosis	Indigenous rate	Non-Indigenous rate	Rate ratio
Diabetes complications	4,476	731	6.1
Chronic obstructive pulmonary disease	1,119	252	4.4
Congestive heart failure	536	200	2.7
Angina	352	112	3.2
Asthma	300	162	1.9
All potentially preventable chronic conditions	6,713	1,549	4.3

Notes: 1 Rates per 100,000 population, directly age-standardised using the 2001 Australian standard population

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

Source: Steering Committee for the Review of Government Service Provision, 2014 [32]



In 2012-13, the age-adjusted rate for potentially preventable hospitalisations for acute conditions was 2.2 times higher for Indigenous people than for non-Indigenous people (Table 17) [32]. The majority of the Indigenous separations were due to kidney failure from bacterial infection (pyelonephritis), followed by convulsions and epilepsy.

**Table 17. Age-standardised rates of top five diagnoses of potentially preventable hospitalisations for acute conditions, by Indigenous status, Australia, 2012-13**

Diagnosis	Indigenous rate	Non-Indigenous rate	Rate ratio
Pyelonephritis	637	263	2.4
Convulsions and epilepsy	592	141	4.2
Cellulitis	465	182	2.6
Dehydration and gastroenteritis	385	266	1.4
Dental conditions	350	267	1.3
All potentially preventable acute conditions	2,931	1,349	2.2

Notes: 1 Rates per 100,000 population, directly age-standardised using the 2001 Australian standard population

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

Source: Steering Committee for the Review of Government Service Provision, 2014 [32]

The hospitalisation rates for all potentially preventable conditions increased with remoteness level for both Indigenous and non-Indigenous Australians [32].

## 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 [70]. CVD presents a significant burden for Aboriginal and Torres Strait Islander people in terms of prevalence, hospitalisation, and mortality [32, 71]. Coronary heart disease (or ischaemic heart disease), cerebrovascular disease (including stroke), hypertension (high blood pressure), and rheumatic heart disease (RHD) are of particular importance to Indigenous people.

Most types of CVD (excluding RHD) are subject to the same set of modifiable or non-modifiable risk factors [72]. Modifiable behavioural factors for CVD include tobacco use, physical inactivity, dietary behaviour, and excessive alcohol consumption [72, 73]. 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 that can influence the risk of CVD include, age, sex, family history, and ethnicity.

Unlike other types of CVD, RHD occurs when acute rheumatic fever (ARF) - an illness that affects the heart, joints, brain and skin - leads to permanent damage to the heart valves [74, 75]. ARF, which is rare among non-Indigenous Australians, is caused by an untreated bacterial (group A streptococci or GAS) throat infection.<sup>12</sup> Reducing ARF and RHD in Indigenous communities will require initiatives that address poverty, overcrowded housing and poor sanitation, all of which contribute to the spread of GAS infection.

The persistence of ARF in Indigenous communities highlights the impact of social determinants of health that underpin RHD [76, 77] and CVD more broadly.<sup>13</sup> As with other areas of Indigenous health, reducing the burden of CVD will require efforts to address the social, economic and environmental inequities that Indigenous people experience.

### Extent of cardiovascular disease among Indigenous people

#### Prevalence of cardiovascular disease

Around 13% of Indigenous people aged 2 years and over reported in the 2012-2013 *Australian Aboriginal and Torres Strait Islander health survey* (AATSIHS) that they had some form of CVD [71]. When the data for Torres Strait Islander people<sup>14</sup> and Aboriginal people<sup>15</sup> were analysed separately, the levels of CVD were similar (12% and 13% respectively) [78].

CVD was reported more frequently by Indigenous females (14%) than by Indigenous males (11%) [79]. After age-adjustment, CVD was reported 1.2 times more frequently 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 for non-Indigenous people in all age-groups except those aged 55 years or older (Figure 2) [80]. Indigenous people living in remote areas (18%) were more likely to report having heart disease than those living in non-remote areas (11%) [81].

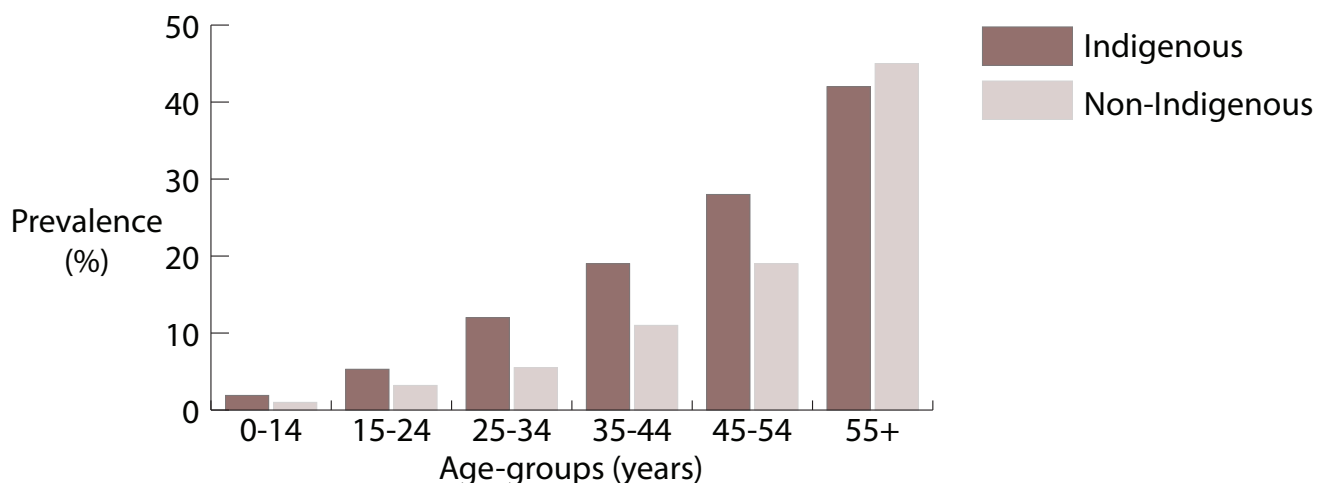
<sup>12</sup> Some research suggests that ARF might also be caused by a streptococcal skin infection.

<sup>13</sup> The effects of social determinants on Indigenous health are described in the section 'The context of Indigenous health'.

<sup>14</sup> People of Torres Strait Islander origin only or both Aboriginal and Torres Strait Islander origin.

<sup>15</sup> People of Aboriginal origin only.

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 2014 [80]

Hypertensive heart disease was the form of CVD most commonly reported by Indigenous people (5.8%) in 2012-2013 [79]. After age-adjustment, the level of hypertensive heart disease among Indigenous people was similar to that among non-Indigenous people (Table 18). The greatest disparities between Indigenous and non-Indigenous males and females for age-adjusted rate ratios (1.5 and 1.7 respectively) were for 'Heart, stroke and vascular diseases', which include ischaemic and cerebrovascular diseases and heart failure.

Table 18. Prevalence (%) of cardiovascular disease, Indigenous people by sex and type, and Indigenous:non-Indigenous age-adjusted rate ratios, Australia, 2012-2013

Cardiovascular disease type	Males		Females	
	Prevalence	Ratio	Prevalence	Ratio
Hypertensive heart disease	5.6	1.0	6.0	1.1
Heart, stroke and vascular diseases	4.0	1.5	3.8	1.7
All cardiovascular disease	11.1	1.2	14.2	1.3

Notes: 1 Prevalences are expressed as percentages

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

Source: ABS 2014 [79]

Around 4% of Indigenous people (2.8%<sup>16</sup> of Torres Strait Islander people and 4.0% of Aboriginal people [78]) reported that they had 'heart, stroke and/or vascular diseases' in 2012-2013 [71]. Heart disease, stroke and/or vascular diseases were reported in almost the same proportions by Indigenous males and females (4.0% and 3.8% respectively) [79]. These diseases were prevalent from about 35 years of age onwards; 4% of Indigenous people aged 35-44 years reported heart, stroke and/or vascular disease, compared with 10% of those aged 45-54 years and 20% of those aged 55 years and over [80].

Around 6% of Indigenous people (5.3% of Torres Strait Islander people and 5.8% of Aboriginal people [78]) reported that they had hypertensive heart disease [71]. Hypertensive heart disease was reported in almost the same proportions by Indigenous males and females (5.6% and 6.0% respectively) [79]. Hypertensive disease increased in prevalence from about 25 years of age onwards; 12% of Indigenous people aged 25 years and over reported hypertensive heart disease [71] with rates ranging from 4% of those aged 25-34 years to 25% of those aged 55 years and over [80].

The 2012-13 AATSIHS also provides data for selected risk factors for CVD [71]. These self-reported results are supplemented—for the first time—by biomedical results obtained from a subset of Indigenous adults (18 years and over) who provided blood and urine samples [82]. The self-reported [71] and biomedical results [82] show that various CVD risk factors are more prevalent among Indigenous people than among their non-Indigenous counterparts, including: daily smoking (rate ratio 2.6<sup>17</sup>); obesity (rate ratio 1.6<sup>17</sup>); inadequate daily fruit and vegetable intake (rate ratios 0.9 and 0.8 respectively for meeting the guidelines<sup>17</sup>); high blood pressure (rate ratio 1.2); abnormal high density lipoprotein (HDL) cholesterol (rate ratio 1.8<sup>18</sup>); high triglycerides (rate ratio 1.9<sup>18</sup>); and dyslipidaemia (rate ratio 1.1<sup>18</sup>).

<sup>16</sup> The relative standard error of this proportion is high and should be used with caution.

<sup>17</sup> For Indigenous people aged 15 years and over.

<sup>18</sup> For Indigenous people aged 18 years and over.

## Prevalence of rheumatic heart disease and incidence of acute rheumatic fever

Jurisdictional data for the prevalence of RHD and the incidence of ARF are currently only available from the NT, Qld and WA Rheumatic Heart Disease Registers [74]. It is not possible to directly compare data from these registers<sup>19</sup> but, despite low rates of RHD and ARF in Australia, it is clear that these diseases are disproportionately represented in the Indigenous population.

Of the recorded cases of RHD in the NT (1,479 at 31 December 2010), Qld (939 at 27 August 2012) and WA (158 at 30 June 2011), 93%, 90% and 100% respectively were Indigenous people [74]. More details are available for the NT where, after age-adjustment, the prevalence of RHD among Indigenous Australians was 26 times that among other Australians. Two-thirds (66%) of the people with RHD were females and around one-third (34%) were males [47]. 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 Australia 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 NT Top End, and 17 times higher among those living in the Central Australia 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 recorded cases of ARF in the NT (317 from 2005-2010), Qld (178 from 2009-2011) and WA (21 from 2010-11), 98%, 90% and 100% respectively were of Indigenous people [74]. More details are available for the NT in the period 2007-2010 when 221 of 226 new and recurrent cases of ARF were identified as Indigenous people [47]. As is the case for RHD, the majority of cases among Indigenous people were for females (63% female compared with 37% male). After age-adjustment, the rate of 0.8 cases per 1,000 population for Indigenous females was 75 times higher than for non-Indigenous females. The rate of 0.4 per 1,000 for Indigenous males was 70 times higher than 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 Australia part of the NT and the NT Top End (0.6 per 1,000). The incidence rate for Indigenous females living in the Central Australia part of the NT (0.9 per 1,000) was slightly higher than for their NT Top End counterparts (0.7 per 1,000).

## Hospitalisation

There were 11,588 hospital separations for diseases of the circulatory system among Indigenous people in 2012-13, accounting for 3.0% of separations identified as Indigenous [65]. After age-adjustment, hospitalisation rates for circulatory disease were 1.6 times higher for Indigenous people than for non-Indigenous people [32]. The hospitalisation rates for various types of circulatory disease were also consistently higher among Indigenous people than among their non-Indigenous counterparts with the following rate ratios: 2.2 for ischaemic heart disease, 1.7 for stroke, 2.5 for hypertension and 3.7 for RHD. Both Indigenous males and females had consistently higher rates for ischaemic heart disease, stroke, hypertension and RHD than their non-Indigenous counterparts, but the rate ratios were greater for females (with 1.8, 1.5, 2.3 and 2.4 for males compared with 3.0, 1.8, 2.6 and 4.7 for females).

Between 2007-08 and 2009-2010 in NSW, Vic, Qld, WA, SA and the NT<sup>20</sup> there were 1,065 hospitalisations of Indigenous people with RHD/ARF<sup>21</sup> [74]. After age-adjustment, the hospitalisation rate for Indigenous people was 67 per 100,000, 6.7 times the rate for non-Indigenous people.

## Mortality

CVD was the leading cause of death of Indigenous people in 2012, being responsible for 25% (621) of the deaths of people identified as Indigenous living in NSW, Qld, WA, SA and the NT [54]. After age-adjustment, deaths from diseases of the circulatory system were 1.6 times more common for Indigenous people than for non-Indigenous people [32].

Of the various types of circulatory diseases, ischaemic heart diseases<sup>22</sup> were the leading cause of death for Indigenous people (338 deaths) in 2012, followed by cerebrovascular diseases<sup>23</sup> (108 deaths) [55]. Ischaemic heart diseases were also the overall leading cause of death for Indigenous people, accounting for almost 14% of all deaths. After age-adjustment, deaths from ischaemic heart diseases and cerebrovascular diseases were about twice as high for Indigenous people than for non-Indigenous people (2.1 and 1.5 times respectively). There were more deaths from ischaemic heart diseases among Indigenous males (217) than among Indigenous females (121), but more Indigenous females died from cerebrovascular diseases than Indigenous males (65 compared with 43). Indigenous males were more likely to die from ischaemic heart diseases and cerebrovascular diseases than non-Indigenous males (2.3 and 1.6 times respectively) and Indigenous females were more likely to die from these diseases than non-Indigenous females (1.9 and 1.5 times respectively).

<sup>19</sup> It is not possible to directly compare data from the NT, WA and Qld as the registers are at different stages of establishment and coverage.

<sup>20</sup> Data from the NT is for public hospitals only.

<sup>21</sup> ARF and RHD were reported together.

<sup>22</sup> Ischaemic heart diseases include angina, blocked arteries of the heart and heart attacks.

<sup>23</sup> Cerebrovascular diseases include haemorrhages, strokes, infarctions and blocked arteries of the brain.

Despite disproportionately high death rates for ischaemic heart diseases (also known as coronary heart disease-CHD) among Indigenous people, recent analysis reveals an improvement in the overall CHD mortality gap between 2001-2002 and 2009-2010 [83]. This is due in large part to greater declines in CHD mortality among Indigenous women, particularly those in the age groups 40-54 years and 70 years and over.

Avoidable mortality data (mortality data associated with potentially preventable and treatable conditions for people aged less than 75 years) is available for the period 2008-2012 for Indigenous people in NSW, Qld, WA, SA and the NT [32]. There were 92 potentially avoidable deaths from rheumatic and other valvular heart disease among Indigenous people in this period. After age-adjustment, potentially avoidable deaths from rheumatic and other valvular heart disease were 12.4 times more common for Indigenous people than for non-Indigenous people.

For the period 2006-2010, RHD alone was responsible for the deaths of 90 Indigenous people in NSW, Qld, WA, SA and the NT [47]. The age-adjusted death rate for Indigenous people was 4.7 times that of non-Indigenous people. Both Indigenous males and females were more likely to die from RHD than their non-Indigenous counterparts (3.5 and 5.3 times respectively).

The striking difference between Indigenous people and non-Indigenous people in CVD mortality is the much greater impact among young and middle-aged Indigenous adults. In 2009-2010 in NSW, Qld, WA, SA and the NT, the death rates for CHD (the leading cause of CVD-related deaths) were 7 to 13 times higher for Indigenous men and women in the 25-39 years and 40-54 years age-groups than the rates for their non-Indigenous counterparts [83].

## 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) [84, 85]. If damaged cells spread into surrounding areas, or to different parts of the body (metastasise), they are known as malignant. Cancerous cells can arise from almost any cell, so cancer can occur almost anywhere in the body. Until recently, the impact of cancer on Aboriginal and Torres Strait Islander 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 [86, 87]. Identification in the cancer registries has been improving [88] but due to incompleteness of Indigenous identification for cancer notifications in several jurisdictions, currently there is no overall national information on cancer incidence among Indigenous people. Provision for the identification of Indigenous people is not yet included on all pathology forms and when it is recorded the information may not always be transferred to cancer registries [87, 89]. Second, cancer has often been 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 people.

### Extent of cancer among Indigenous people

#### Incidence

In the five-year period 2005-2009, an average of 840 Indigenous people living in NSW, Qld, WA and the NT were diagnosed with cancer each year [9]. After age-adjustment, the cancer incidence rate was slightly lower for Indigenous people than for non-Indigenous people (421 and 443 per 100,000 people, respectively).<sup>24</sup>

Details are available for males and females for the five year period 2004-2008. Cancer incidence rates were significantly higher for males than for females for both the Indigenous and non-Indigenous populations [89]. 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.

For 2005-2009 in NSW, Qld, WA and NT, after age-adjustment, the incidence rates were significantly higher for Indigenous people than non-Indigenous people for: liver cancer (rate ratio 2.8); cervical cancer (rate ratio 2.3); cancer of unknown primary site (rate ratio 1.8); lung cancer (rate ratio 1.7); and uterine cancer (rate ratio 1.6) [9]. The incidence of pancreatic cancer was also higher for Indigenous people than non-Indigenous people (rate ratio 1.3). After age-adjustment, cancer incidence rates were lower for Indigenous people than non-Indigenous people for: colorectal cancer (rate ratio 0.8); breast cancer in females (rate ratio 0.7); non-Hodgkin lymphoma (0.7); and prostate cancer (0.6).

For 2005-2009, detailed information is available for the incidence of cervical and breast cancers for Indigenous people living in NSW, Qld, WA and NT. After age-adjustment, the rate for cervical cancer among Indigenous women was higher than for non-Indigenous women (16.9 and 6.5 per 100,000 respectively) [90], and for breast cancer significantly lower than for non-Indigenous women (85 and 105 per 100,000 respectively) [91]. Despite the lower rate for breast cancer it is still the most common cancer diagnosed for Indigenous women in NSW, Qld, WA and NT.

More details are available for 2004-2008 where the most common cancer diagnosed among Indigenous people living in NSW, Qld, WA and the NT was lung cancer (average of 121 cases per year), followed by breast cancer (females only) (average of 88 cases per year),

<sup>24</sup> The ABS has revised upwards the estimated population of Indigenous Australians leading to an apparent decrease in incidence rates from *Cancer in Australia: an overview 2012* [9].

bowel cancer (average of 70 cases per year) and prostate cancer (males only) (average of 58 per year) [89]. 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 19).

**Table 19. 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 [89]

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 [89].

### Hospitalisation

There were 3,490 hospital separations for cancer among Indigenous people in 2012-13 [32]. The age-standardised hospitalisation rates for cancer for Indigenous people were lower than for their non-Indigenous counterparts (10 and 15 per 1,000, respectively).

In terms of specific cancers, the age-standardised hospitalisation rate for lung cancer and cervical cancer for Indigenous people in 2012-13 were 1.8 and 1.6 times respectively higher than those for their non-Indigenous counterparts [32]. Hospitalisation rates for lung cancer were similar for Indigenous males and females (1.3 per 1,000) and higher for non-Indigenous males than females (0.9 per 1,000 and 0.5 per 1,000 respectively).

### 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 [54]. After age-adjustment, the death rate for Indigenous people was 1.5 times higher than 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 higher than for non-Indigenous people.

In the five-year period 2008-2012, there was an average of 459 deaths from cancer per year among Indigenous people living in NSW, Qld, WA, SA and the NT [9]. After age-adjustment, the mortality rate of all cancers combined for Indigenous people was significantly higher than for non-Indigenous people (221 and 172 per 100,000 respectively, rate ratio 1.3). Lung cancer accounted for the highest average number of cancer-related deaths for Indigenous people with 115 deaths per year (25% of all Indigenous deaths from cancer), followed by liver cancer with 34 deaths (7%), breast cancer in females with 30 deaths (6%) and cancer of unknown primary site with 27 deaths (6%).

For 2008-2012, after age-adjustment, mortality rates in NSW, Qld, WA, SA and the NT were significantly higher for Indigenous people than for non-Indigenous people for: cervical cancer (rate ratio 3.4); liver cancer (rate ratio 3.0); lung cancer (rate ratio 1.7); and cancer of unknown primary site (rate ratio 1.5) [9]. Mortality rates for uterine cancer (rate ratio 1.6), pancreatic cancer (1.2), and breast cancer in females (1.1) were also higher for Indigenous people than non-Indigenous people but the differences were not statistically significant [9]. Mortality rates were lower for Indigenous people than non-Indigenous people for non-Hodgkin lymphoma (rate ratio 0.9), colorectal cancer (rate ratio 0.8) and prostate cancer (rate ratio 0.8), but the differences were not statistically significant.

More details are available for 2007-2011 when, 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 [89]. 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 stomach cancer (1.7) (Table 20). After age-adjustment, the death rate for cancer was 1.5 times higher for Indigenous people than for their non-Indigenous counterparts.

**Table 20. 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 [89]

The patterns of Indigenous cancer incidence and mortality are largely explained by the higher level of risk factors, most notably tobacco use [92-94]. For example, high rates of smoking are the likely cause of a high incidence of cancers of the lung, mouth and throat.

The higher Indigenous:non-Indigenous rate ratio for deaths from cancer than for cancer incidence 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 more likely to present with higher rates of co-morbidities
- Indigenous people are less likely to receive optimal treatment [92, 94-96].

## Diabetes

Diabetes is a group of disorders marked by high levels of glucose in the blood [97] and caused by either or both of the following:

- insulin not being produced by the pancreas or not produced in sufficient amounts to convert glucose from food into energy
- the body not being able to use insulin effectively [97, 98].

There are several types of diabetes, of which the most frequently occurring are type 1, type 2 and gestational diabetes mellitus (GDM) [97, 99]. Type 1 diabetes is relatively uncommon in the Indigenous population [100]. Type 2 diabetes, however, represents a serious health problem for many Indigenous people, who tend to develop it at earlier ages than other Australians, and often die from it at younger ages. GDM develops in some women during pregnancy [101] and is more common among Indigenous women than among non-Indigenous women [102].

Diabetes can lead to life-threatening health complications, some of which may develop within months of diagnosis while others may take years to develop [103]. Complications of diabetes include diseases of the large blood vessels (macrovascular disease), which can lead to heart disease and stroke, and diseases of the small blood vessels (microvascular disease), which can lead to kidney failure, limb amputations, eye disease and blindness [103, 104]. For many Indigenous people diabetes is not diagnosed until after complications have developed [105].

Diabetes is known to have adverse effects on pregnant women and their babies [102]. 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; high birthweight; low Apgar score; high-level resuscitation; admission to special care unit; and increased length of stay in hospital.

Statistics about diabetes for Indigenous people are often underestimated for several reasons, including under-identification of Indigenous status.<sup>25</sup> Self-reported diabetes data may underestimate the prevalence of diabetes by up to 50% [106].

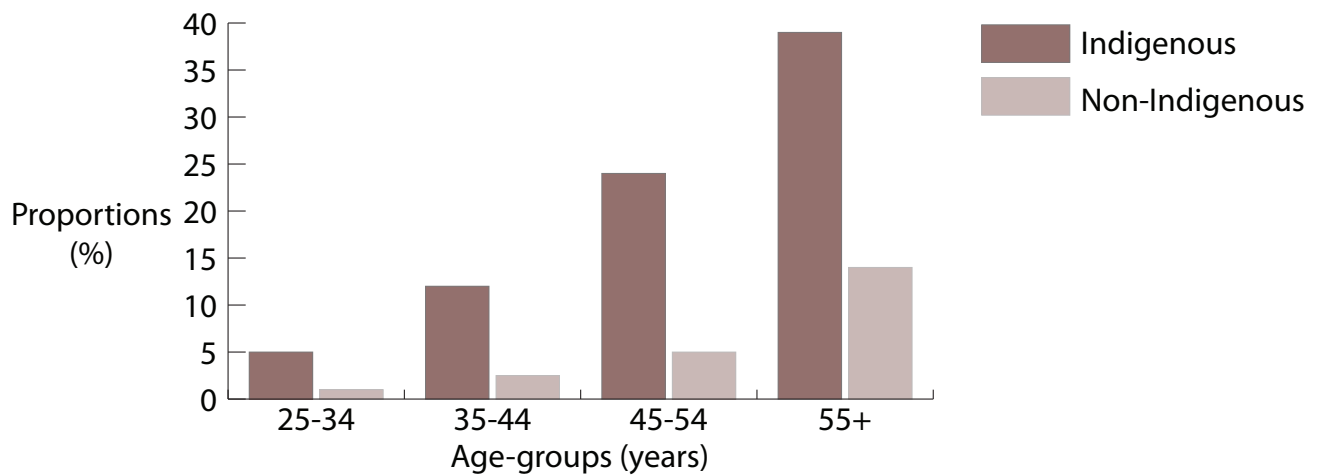
## Extent of diabetes among Indigenous people

### Incidence and prevalence

Around 8.6% of Aboriginal and Torres Strait Islander people (8.8% of Aboriginal people and 7.0% of Torres Strait Islander people) aged 2 years and over reported in the 2012-2013 AATSIHS that they had type 1 or type 2 diabetes and/or high sugar levels in their blood or urine [71, 78]. After age-adjustment, rates of diabetes and/or high sugar levels were 3.2 times higher among Indigenous people than among non-Indigenous people [80]. Diabetes and/or high sugar levels were reported by a higher proportion of Indigenous females (9.6%) than Indigenous males (7.7%) [79]

The prevalence of diabetes and/or high sugar levels increased with age for all age-groups [107]. The prevalence ranged from 5.3% for Indigenous people aged 25-34 years<sup>26</sup> to 40% for those aged 55 years and over (Figure 3) [80]. The age-specific levels from 25 years onwards 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 2014 [80]

The prevalence of diabetes/high sugar levels was lower for Indigenous people living in non-remote areas (7.5%) than among those living in remote areas (12.8%) [81].

The self-reported results obtained from the AATSIHS were broadly consistent with biomedical results obtained for a subset of Indigenous adults (18 years and over) who provided blood and urine samples [82]. In 2012-2013, results for fasting plasma glucose levels revealed that:

- 11.1% of Indigenous adults had diabetes (9.6% had known diabetes and 1.5% were newly diagnosed from their test results) [108]
- a further 4.7% of Indigenous adults were at high risk of diabetes [108]
- after age-adjustment, Indigenous adults were more than three times as likely as non-Indigenous adults to have diabetes [109]
- diabetes prevalence among Indigenous adults increased with age, with particularly high rates among those aged 55 years and over (35%) [109]
- diabetes tended to occur at earlier ages among Indigenous adults, with age-specific rates being similar to those among non-Indigenous adults who were 20 years older [109]
- Indigenous adults in remote areas were twice as likely to have diabetes as those living in non-remote areas (20.8% compared with 9.4%) [110]
- Indigenous adults who were obese were around seven times more likely to have diabetes than those who were of normal weight or underweight (17.2% compared with 2.4%) [111]
- around half of Indigenous adults with diabetes also had signs of chronic kidney disease (53% compared with 11% without diabetes) [112]
- Indigenous people with diabetes were also more likely to have chronic disease biomarkers associated with cardiovascular disease, liver disease and anaemia, than those without diabetes [112].

<sup>25</sup> For further details see 'Limitations of the sources of Indigenous health information' in the Introduction.

<sup>26</sup> The prevalence for Indigenous people in the 2-14 years and 15-24 years age-groups were also reported (0.5% and 1.4% respectively), but data for non-Indigenous people in these age groups was not provided

The most recent analysis of the incidence of insulin-treated diabetes in Australia uses data from the National (insulin-treated) Diabetes Register (NDR) [113]. In 2011, Indigenous people accounted for 2.6% of new cases of type 1 diabetes, 1.8% of new cases of type 2 diabetes, and 1.9% of new cases of GDM among women aged 15-49. For 2006-2011, after age-adjustment, incidence rates of diabetes type 1 were lower for Indigenous people (7 per 100,000) than for non-Indigenous people (10 per 100,000). The incidence rate of insulin treated diabetes was almost 4 times higher for Indigenous people (134 per 100,000) than non-Indigenous people (36 per 100,000). After age-adjustment, incidence rates for insulin treated GDM were similar for Indigenous women (60 per 100,000) and non-Indigenous women (59 per 100,000).

In the period 2005-2007, almost 7% of Indigenous mothers in NSW, Vic, Qld, WA, SA and the NT had diabetes during pregnancy: 1.5% had pre-existing diabetes; 5.1% had GDM; and 93.4% did not have diabetes [102]. 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 April 2008 to March 2013, type 2 diabetes was managed at encounters with general practitioners (GPs) twice as frequently for Aboriginal and Torres Strait Islander patients as for other patients (8.2 per 100 encounters compared with 4.0 per 100 encounters) [114]. More details are available for the earlier period April 2006 to March 2011, when diabetes problems were managed at a rate of 76 per 1,000 GP encounters with Indigenous patients [47]. After adjusting for age, this was about three times the rate for other patients, due mainly to the higher management rate of type 2 diabetes. GP encounters for GDM for Indigenous females were managed at 1.5 times the rate of encounters for other females.

There were 6,391 hospital separations for ICD 'Endocrine, nutritional and metabolic diseases' (which includes diabetes) among Indigenous people in Australia in 2013-14, accounting for 1.6% of separations identified as Indigenous [115]. In 2012-13, hospitalisation rates for diabetes as the principal and/or an additional diagnosis were 4 times higher for Indigenous people than for non-Indigenous people [116]. Indigenous males (108 per 1,000) were 3 times more likely to be hospitalised for diabetes than non-Indigenous males (36 per 1,000) and Indigenous females (140 per 1,000) were 5 times more likely than non-Indigenous females (28 per 1,000) to be hospitalised for diabetes. Indigenous people were 1.7 times more likely than their non-Indigenous people to be hospitalised for type 1 diabetes as the principal and/or an additional diagnosis. Indigenous males (4.2 per 1,000) were almost twice as likely to be hospitalised for type 1 diabetes than non-Indigenous males (2.4 per 1,000) and Indigenous females (4.2 per 1,000) were almost twice as likely than non-Indigenous females (2.4 per 1,000) to be hospitalised for type 1 diabetes. Hospitalisation rates were 4 times higher for Indigenous people compared with non-Indigenous people for type 2 diabetes as the principal and/or an additional diagnosis. Indigenous males (107 per 1,000) were 3 times more likely to be hospitalised than non-Indigenous males (34 per 1,000) and Indigenous females (134 per 1,000) were almost 6 times more likely to be hospitalised for type 2 diabetes than non-Indigenous females (23 per 1,000).

For the two year period July 2008 to June 2010, diabetes (all types excluding GDM) 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 [47]. Detailed analyses revealed:

- around 84% of these hospitalisations were for non-insulin-dependent type 2 diabetes
- after age-adjustment, hospitalisation rates for type 2 diabetes were higher for Indigenous males and females than for their non-Indigenous counterparts (3.9 and 5.7 times respectively)
- the rate of hospitalisation for type 1 diabetes was around twice as high for Indigenous people than for non-Indigenous people
- hospitalisation rates increased with age
- 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
- hospitalisation rates were highest in remote areas (21.5 per 1,000), very remote (19.3 per 1,000), and outer regional areas (17.1 per 1,000), and lowest in major cities (8.8 per 1,000) and inner regional areas (11.4 per 1,000).

GDM accounted for a further 1,171 hospitalisations of Indigenous females [47]. After age-adjustment, Indigenous females were hospitalised for GDM at almost three times the rate of non-Indigenous females.

Complications from diabetes, particularly renal complications but also circulatory and ophthalmic conditions, are the cause of high rates of hospitalisations [117]. Hospitalisation rates for renal complications of type 2 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. The hospitalisation rate for multiple complications of diabetes was 6.5 times higher for Indigenous people than for other Australians.

## Mortality

Diabetes was responsible for 8.1% (201 deaths) of deaths of Indigenous people living in NSW, Qld, SA, WA and the NT in 2012 [54, 55]. 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 [101, 118].)

## **Social and emotional wellbeing (including mental health)**

Social and emotional wellbeing (SEWB) is a complex and multifaceted concept that has particular resonance and meaning for Aboriginal and Torres Strait Islander peoples [119, 120]. While the term SEWB has been used interchangeably with 'mental health' and 'mental illness', Gee et al argue that these latter terms should be positioned 'within' a broader understanding of SEWB rather than 'equated with SEWB' [120, p.63]. The terms 'mental illness' and 'mental health' are historically situated within a biomedical (individualistic) model of health and are implicated in past unjust policies and practices while SEWB for Aboriginal and Torres Strait Islander peoples embodies cultural understanding as a collective and holistic expression of health [119, 120]. Mental health and ill health are part of the experience of SEWB and need to be understood and interpreted in the broader context. Understanding SEWB and mental health as cultural constructions in this way enhances the capacity for culturally appropriate, strengths based approaches to managing emerging issues for individuals and communities. SEWB for Aboriginal and Torres Strait Islander people then, may be defined as 'a multidimensional concept of health that includes mental health, but which also encompasses domains of health and wellbeing such as connection to land or 'country', culture, spirituality, ancestry, family and community' [120, p.55]. Severe mental illness, while evident in the anthropological or ethnographic records, was relatively rare in traditional Aboriginal societies [121]. For Aboriginal people broadly speaking, the structure and cultural practices of traditional society buffered the impacts experienced since colonisation. Similarly, for Torres Strait Islander people, traditional cultural practices enhanced the likelihood of better health outcomes, including SEWB. The impact of colonisation has had a systematically profound impact on Aboriginal and Torres Strait Islander peoples' traditional cultural practices and by implication on their SEWB.

Having positioned mental health within the broader framework for SEWB it is nevertheless important to define it for the purposes of understanding the impact mental health issues have on the health and wellbeing of Aboriginal and Torres Strait Islander peoples. The World Health Organization (WHO) defines mental health as a state of social and emotional wellbeing in which individuals can cope with the normal stresses of life and realise their potential [122, 123]. Like SEWB, mental health is influenced by a complex interplay of biological, psychological, social, environmental, and economic factors [122, 124, 125]. 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 [122], 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 [122, 124]. 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 [122, 124, 126].

## **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. [32, 127]. 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 in 2011-2012 [32]. There were variations in psychological distress levels within the Indigenous population in terms of sex and remoteness. Around 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) [127].

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 [128]. 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 21). 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) [128]. The most commonly reported stressors were fairly consistent for both females and males, and for each of the age-groups. 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 21. 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	1.8
Serious illness	23	1.4
Not able to get a job	23	2.6
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 and are not age-standardised

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

Source: ABS, 2013 [128]

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 ATSIHS 2012-13 survey respondents reported on feelings of calmness and peacefulness, happiness, fullness of life, and energy [32].<sup>27</sup> Nine-tenths (91%) 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 (18%), and fullness of life (19%). These figures are similar to those obtained in the 2008 NATSISS survey [129]. 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 [32]. Information collected in the 2008 NATSISS showed that 89% of Indigenous people aged 15 years and over were able to obtain emotional, physical, or financial help from someone else during a time of crisis. Non-Indigenous people experience similar levels of social support: the 2010 *General social survey* (GSS) found that 94% of non-Indigenous people were able to access support at a time of crisis [130].

Removal from one's natural family also has significant implications for a person's social and emotional wellbeing [131]. 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

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



difficulties (compared with 15% of their counterparts in the general WA population) [132]. 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 continuing high levels of distress experienced by many Indigenous people, 16,393 of the hospital separations in 2012-13 with a principal diagnosis of ICD 'Mental and behavioural disorders' were identified as Indigenous [65].<sup>28</sup>

Information about hospitalisation for the specific sub-categories within the ICD chapter 'Mental and behavioural disorders' are not available for 2012-13, but data from 2008-10 show hospitalisation rates for each sub-category were generally higher for Indigenous people than for other Australians [47]. 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 [Derived from 133, 134]. 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 [47]. 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 22) [47].<sup>29</sup> 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 22. 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	Rate ratio	Number	Rate	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 23 and 24.  
 2 'Mental disorders due to substance use' comprises ICD codes F10-F19, 'Organic mental disorders' ICD codes F00-F09, 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) [47]

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 [55]. 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) [55]. Death rates were higher for Indigenous males than for Indigenous females (in those jurisdictions for which details for females were available) (Table 23).

28 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'.  
 29 Under the ICD, intentional self-harm is classified under 'External causes of morbidity and mortality' (codes X60-X84); details are provided separately.

**Table 23. 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 [55]

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 24) [55]. The burden of death by intentional self-harm 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 24. 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 [55]

Research in NSW, Qld, the ACT, and the NT has highlighted the increasing impact of suicide among young Indigenous people [135-137]. 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' [138, 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 [32].

## 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 [139, 140]. Of particular importance to Aboriginal and Torres Strait Islander people is chronic kidney disease (CKD), which is defined as kidney damage or reduced kidney function that lasts for three months or more [141]. CKD is inclusive of different conditions, including diabetic nephropathy, hypertensive renal disease, glomerular disease, chronic renal failure, and end-stage renal disease (ESRD) [93]. 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 [141]. 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 [142, 143].

A number of risk factors are associated with kidney disease, including diabetes, high blood pressure, infections, LBW, and obesity [141]. These conditions are particularly common among Indigenous people and contribute to high rates of CKD [141, 144].

## Extent of kidney disease among Indigenous people

### Prevalence

Around 1.8% of Indigenous people reported that they had kidney disease as a long-term health condition in the 2012-2013 AATSIHS [71]. 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 (3.9) than for females (3.6). The reported prevalence of kidney disease was less than 2% for Indigenous people aged less than 45 years, but 4.0% for those aged 45-54 years and 7.7% for those aged 55 years and over.

With most information on CKD limited to self-reported data, the primary focus in the literature has been on ESRD [141, 145]. The overall incidence rate of ESRD for Indigenous people is consistently reported as being significantly higher than that for non-Indigenous people [145].

Data from the ANZDATA for the five-year period 2009-2013 reveal that the age-standardised notification rate of ESRD for Indigenous people was 579 per 1,000,000 population, 6.2 times the rate for non-Indigenous people (Table 25) [Derived from 38, 146-148].

Notification rates of ESRD were higher for Indigenous people than for non-Indigenous people in all states and territories, with the highest rates recorded for Indigenous people living in the NT (1,501 per 1,000,000), WA (922 per 1,000,000), and SA (696 per 1,000,000).

**Table 25. 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, 2009-2013**

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	169	288	3,707	94	3.1
Vic	55	387	2,957	98	3.9
Qld	287	510	2,072	89	5.7
WA	236	922	1,054	90	10.2
SA	76	696	865	91	7.6
NT	337	1,501	65	88	17.1
Australia	1,172	579	11,222	94	6.2

- Notes: 1 Rates per 1,000,000 population have been standardised using the ERP from 30 June 2001  
 2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate  
 3 Notification rates for Tas and the ACT have not been shown separately because of the small numbers of notifications, but are included in the figures for Australia

Source: Derived from ANZDATA, 2014 [146], ABS, 2011 [147], ABS, 2003 [148], ABS, 2014 [38]

Of people newly registered with the ANZDATA in 2009-2015, 60% 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 26) [Derived from 38, 146-148]. Rate ratios were particularly high for people aged 45-54 years (11.6).

**Table 26. Numbers of notifications and notification rates of end-stage renal disease, by Indigenous status and age-group, and Indigenous:non-Indigenous rate ratios, Australia, 2009-2013**

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-14	7	6	169	8	0.8
15-24	24	36	265	18	2.0
25-34	66	145	517	33	4.4
35-44	228	557	890	57	9.8
45-54	381	1,210	1,560	104	11.6
55-64	334	1,818	2,447	191	9.5
65-74	114	1,457	2,801	336	4.3
75+	18	512	2,573	364	1.4
All ages	1,172	579	11,222	94	6.2

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

Source: Derived from ANZDATA, 2014 [146], ABS, 2011[147], ABS, 2003 [148], ABS, 2014 [38]

Detailed information from ANZDATA is available for 2012 when a total of 254 Indigenous people commenced dialysis, representing a slight increase from 2011 [145]. In 2012, there were 20 new transplant operations for Indigenous recipients, compared with 801 operations performed for non-Indigenous recipients. At 31 December 2012, 34 (3%) of the 1,065 patients on the waiting list for a transplantation were Indigenous [149].

Haemodialysis (HD), conducted in urban or regional clinics and hospitals, is the most common form of dialysis treatment for Indigenous people with ESRD [141, 150-152]. In 2012, HD accounted for the majority of treatment (90%), with only 10% of Indigenous dialysis patients receiving peritoneal dialysis (PD) [145]. The majority of non-Indigenous dialysis patients also received HD [150], but 19% of non-Indigenous dialysis patients received PD [153]. In 2012, there were 1,425 prevalent dialysis patients in Australia (including both PD and HD) identified as Indigenous, with a level 4.8 times higher for Indigenous people (2,430 per 1,000,000) than for non-Indigenous people (507 per 1,000,000) [145, 154].

### Hospitalisation

In 2012-13 hospitalisation rates for CKD were nearly 5 times higher among Indigenous people than for non-Indigenous people where CKD was the principal and/or additional diagnosis (excluding regular dialysis) [116]. For Indigenous males, rates were 3.4 times higher than for non-Indigenous males for hospitalisation for CKD as the principal and/or an additional diagnosis (4,340 and 1,269 per 100,000 respectively). For Indigenous females, rates were 6.3 times higher than for non-Indigenous females for hospitalisation for CKD as the principal and/or an additional diagnosis (5,157 and 817 per 100,000 respectively).

There were 172,151 hospital separations for ESRD among Indigenous people in 2012-13 [32]. After age-adjustment, the hospitalisation rate for ESRD was 9.9 times higher for Indigenous people than for other Australians. Indigenous females had the highest rate of hospitalisation for ESRD, 15.1 times that of other females; Indigenous males were hospitalised for ESRD, at 6.7 times the rate of other males.<sup>30</sup> 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 [155].

In 2012-13 after age-adjustment, hospitalisation rates for ESRD for Indigenous people increased with remoteness [32]. In remote and very remote areas the hospitalisation rate for Indigenous people was over 50 times higher than for non-Indigenous people. For Indigenous people living in remote and very remote areas, the hospitalisation rate was over twice the rate of Indigenous people living in major cities.

In 2012-13, there were 1,038 hospital separations per 1,000 population for Indigenous people, 2.7 times the rate for non-Indigenous people with about 86% of the difference between these rates due to higher separation rates for Indigenous people admitted for same-day maintenance kidney dialysis [65]. Hospitalisation rates for regular dialysis as the principal diagnosis were 10 times higher for Indigenous people than for non-Indigenous people [116]. For Indigenous males, hospitalisation rates were 6.8 times higher than for non-Indigenous males for regular dialysis (39,268 and 5,805 per 100,000 respectively). For Indigenous females, hospitalisation rates were 14.9 times higher than for non-Indigenous females for regular dialysis (49,011 and 3,281 per 100,000 respectively).

### 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 [55].<sup>31</sup> After age-adjustment, the death rate for Indigenous people was 2.5 times that for non-Indigenous people.

During the period 2008-2012, after adjusting for differences in population structure, the death rates for kidney disease for Indigenous people living in NSW, Qld, WA, SA and NT was 2.6 times (30 per 100,000) the rate for non-Indigenous people (11 per 100,000) [32].

More detailed information is available for people living in NSW, Qld, WA, SA and the NT for 2009-2011. During this period, CKD was the underlying or associated cause of death of 801 Indigenous people [97]. CKD was recorded as the underlying cause of death for 46% (371) of the 801 deaths of Indigenous people. After age-adjustment, the death rate for CKD as an underlying or associated cause of death for Indigenous people was 2.4 times higher than the rate for non-Indigenous people. The Indigenous:non-Indigenous rate ratios were higher for females (2.8) than for males (2.1). When CKD was the underlying cause of death, the death rate for Indigenous people was 2.8 times higher than for non-Indigenous people (35 and 12 per 100,000). The Indigenous:non-Indigenous rate ratios were higher for Indigenous females (3.4) than for Indigenous males (2.2).

30 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.

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

# Injury

Injury includes both physical harm to a person's body and non-physical harm, including grief, loss and suffering [156], but in public health practice attention is almost entirely confined to physical harm [157]. 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 [158] 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 [159].<sup>32</sup> 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 [156, 158].

## Extent of injury among Indigenous people

### Prevalence

The 2012-2013 AATSIHS reported that 2.5% of Aboriginal and Torres Strait Islander people had a long-term condition caused by injury with the highest reporting levels in the 35-44 and 45-54 years age-groups [161, 162]. Long-term conditions caused by injury were reported more frequently by Indigenous people than by non-Indigenous people across all age-groups except for the 55+ years age group [161]. After age-adjustment, Indigenous people were 1.2 times more likely than non-Indigenous people to report a long-term condition as a result of an injury; the rate ratio for females (1.3) was slightly higher than for males (1.1) [162].

In relation to violence, almost one-quarter (23%) of Indigenous people reported in the 2008 NATSISS that they had been a victim of physical or threatened violence in the previous 12 months [129]. Victimization was higher among younger Indigenous people, with males and females aged 15-24 years having the highest reported proportions (29% and 31%, respectively) [163]. Victimization levels were highest among Indigenous people in the 15-24 years age-group across all levels of remoteness except for regional regions where the highest level was for the 25-34 years age group. For Indigenous males in the 15-24 years age group, 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%) [47]. 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 27,653 hospital separations for injuries for Indigenous people in 2012-13 [65]. After age-adjustment, the separation rate for injury was higher for Indigenous people than for other Australians. The leading external causes of injury-related hospitalisations in 2012-13 were ICD 'Complications of medical and surgical care' (25%), assault (18%), falls (17%), and exposure to mechanical forces (14%).

In 2012-13, the age-standardised hospitalisation rates for injury for Indigenous males (51 per 1,000) and females (42 per 1,000) living in NSW, Vic, Qld, WA, SA and the NT were nearly twice (rate ratio 1.9) those for non-Indigenous males and females [32].

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 2012-13 [32]. The rate increased from 34 per 1,000 in major cities to 77 per 1,000 in remote and very remote areas. Hospitalisation rate ratios (Indigenous/non-Indigenous) were higher in remote areas than major cities for a number of principal diagnoses:

- for assaults, the rate ratio was higher in remote and very remote areas (18.2) than in major cities (6.9)
- for falls, the rate ratio was higher in remote and very remote areas (1.6) than in major cities (1.1)
- for complications of medical and surgical care, the rate ratio was higher in remote and very remote areas (2.1) than in major cities (1.5).
- for transport accidents, the rate ratio was lower in remote and very remote areas (0.8) than in major cities (1.2).

Assaults account for a higher proportion of injury-related hospitalisations among Indigenous people than among non-Indigenous people; in 2012-13, 18% of injury-related hospitalisations among Indigenous people were for assaults compared with 2% among

<sup>32</sup> This system is followed in this section, but it has its limitations (for more details, see [160]).



other people [65]. Assault was responsible for 19% of all hospitalisations for Indigenous males and 27% for Indigenous females living in NSW, Vic, Qld, WA, SA and the NT [32]. Indigenous males and females were 9 and 34 times, respectively, more likely to be hospitalised for assault than 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 2012-13 than among their non-Indigenous counterparts [32]. After age-adjustment, Indigenous people were hospitalised for assaults relating to family violence 33 times the rate of non-Indigenous people. The hospitalisation rates from family violence-related assaults were highest for Indigenous females aged 25-34 years (17 per 1,000) and for Indigenous males aged 35-44 years (5 per 1,000). The hospitalisation rates from family violence-related assaults for Indigenous people increased with remoteness, from 2.0 per 1,000 in major cities to 15 per 1,000 in remote areas (compared with 0.4 and 0.1 per 1,000, respectively, for other Australians).

### 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 [54]. Important specific causes of injury deaths were intentional self-harm (117 deaths, 4.7% of all Indigenous deaths) and land transport accidents (88 deaths, 3.6% of all Indigenous deaths). 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 [47]. 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 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 [164]. 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 [53].

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 [165, 166]. Infants and children are particularly susceptible to developing respiratory conditions, due to factors like exposure to tobacco smoke, poor environmental conditions, and poor nutrition [165, 167].

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 [164]. These diseases are characterised by shortness of breath. A major risk factor for COPD is smoking, but exposure to irritants like dust and fumes and recurrent childhood infections can also increase the risk of developing COPD [168, 169].

The risk of developing asthma is affected by genetics (e.g. family history of allergies), environmental factors, and other influences on the immune system (e.g. tobacco smoke and medications) [170]. Asthma attacks can be triggered by exercise, viral infections, cigarette smoke, allergens (e.g. dust mites) and irritants (e.g. air pollutants). Asthma attacks cause a narrowing of airways, resulting in symptoms including wheezing and breathlessness, which may be life threatening for some people.

Among Indigenous adults, factors contributing to pneumonia include increasing age, smoking tobacco, alcohol, diabetes mellitus, environmental factors (e.g. overcrowding) and a low uptake of relevant vaccinations [171, 172].

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

#### Prevalence

Disease of the respiratory system was reported by 31% of Indigenous people who participated in the 2012-2013 AATSIHS [162]. After age-adjustment, the overall level of respiratory disease among Indigenous people was 1.2 times higher than for non-Indigenous people. Respiratory conditions were reported more frequently by Indigenous women (34%) than Indigenous men (28%).

Asthma was the most commonly reported condition for Indigenous people (18%) and the second most commonly reported long-term condition [162]. After age-adjustment, the level of asthma among Indigenous people was 1.9 times higher than for non-Indigenous people [162]. Asthma was reported more commonly by females (20%) than by males (15%) [173] and by Indigenous people living in non-remote areas (20%) than by those living in remote areas (10%) [174]. Other respiratory conditions reported by Indigenous people included chronic sinusitis (8%) and COPD (4%) [162].



## Hospitalisation

There were 20,944 hospital separations for respiratory disease among Indigenous people in 2012-13 [65]. For selected respiratory diseases, the age standardised hospitalisation rates for Indigenous people were 4.4 times higher for COPD, 3.3 times higher for influenza and pneumonia, 1.8 times higher for asthma, 1.8 times higher for acute upper respiratory infections and 1.4 times higher for whooping cough than for their non-Indigenous counterparts [32]. Indigenous young people aged 15-24 years were hospitalised for whooping cough at 5.5 times the rate of other young people.

Hospitalisation rates were higher for Indigenous adults than for non-Indigenous adults for:

- influenza and pneumonia, including 6.7 times higher in the 25-44 years age group and 6.8 times higher in the 45-64 years age group
- asthma, including 4.3 times higher in the 45-64 years age group
- acute upper respiratory infections, including 3.4 times higher in the 45-64 years age group.

The hospitalisation rate for influenza and pneumonia was particularly high for Indigenous people living in remote/very remote areas (21.2 per 1,000) compared with Indigenous people living in major cities areas (5.5 per 1,000) (rate ratio 3.9).

## 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 [54]. After age-adjustment, the death rate for Indigenous people was 2.2 times higher than 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 for non-Indigenous people.

The death rate from chronic lower respiratory diseases 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 for their non-Indigenous counterparts [55]. Among people aged 65-74 years, the rate of 283 per 1,000 for Indigenous people was 3.8 times higher than 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 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 diseases (Table 27) [47]. Age-adjusted death rates for chronic lower respiratory diseases were around three times higher for Indigenous males and females than for their non-Indigenous counterparts. COPD accounted for 87% of the deaths of Indigenous people caused by chronic lower respiratory diseases. 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 for non-Indigenous people.

**Table 27. 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+ years

Source: AIHW, 2013 [47]

## 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 [129, 175]. 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 [53, 176]. Even mild vision loss can reduce an individual's ability to live independently and increase the risk of mortality [53, 177].

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 [178, 179]. 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 [180, 181].

## Box 5: 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 [181]. 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' 2004-2005 NATSIHS [182], 2008 NATSISS, [129] and the 2012-2013 AATSIHS [107].

### Extent of eye health problems among Indigenous people

Eye and sight problems were reported by one-third (33%) of Aboriginal and Torres Strait Islander people who participated in the 2012-2013 AATSIHS, making it the most commonly reported long-term health condition [183]. Eye and sight problems were reported by 38% of Indigenous females and by 29% of Indigenous males [173]. The age-adjusted levels of eye and sight problems were slightly lower for both Indigenous males and females than for their non-Indigenous counterparts (ratio 0.9) [162]. 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%) [184].

#### 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 [180]. After adjusting for age and sampling, blindness was five times less common among Indigenous children aged 5-15 years than among non-Indigenous children.

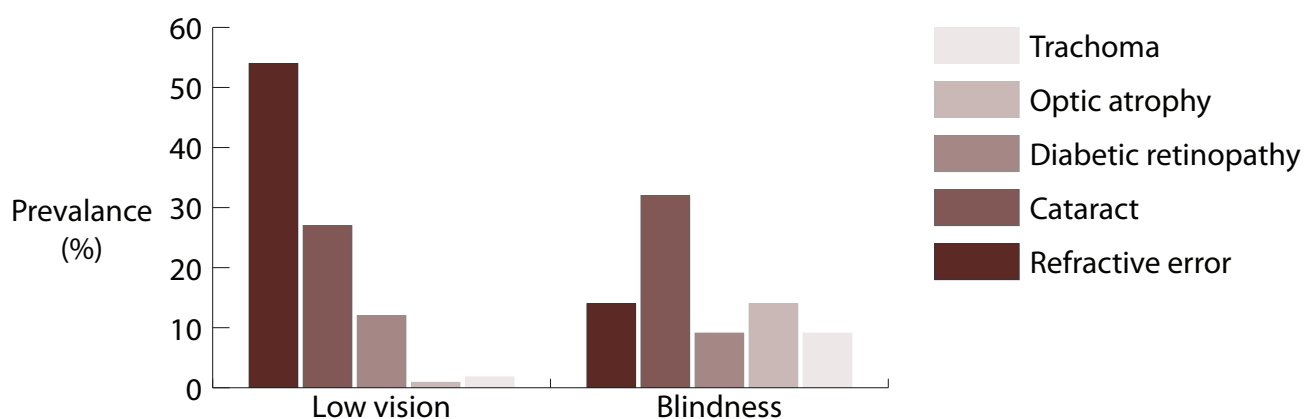
The 2008 NATSISS reported that 9% of Indigenous children aged 4-14 years had some form of eye or sight problems [185]. The most common forms of these problems were refractive errors: long-sightedness (37%) and short-sightedness (28%) [186]. The 2008 NIEHS reported that more than one-half of low vision (56%) among Indigenous children aged 5-15 years was due to refractive error [181]. Of the three children who were blind, one child was blind due to refractive error. Assessing the vision of young children is an important preventative measure that can significantly reduce the loss of vision in adulthood [187].

#### 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 [181]. 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 for non-Indigenous adults [181]. 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. The next leading causes of blindness were refractive error and optic atrophy (both 14%), followed by diabetic retinopathy (a complication of diabetes) and trachoma (an infectious eye disease) (both 9%).

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



Source: NIEHS 2009 [181]

### Specific eye conditions

Refractive error is a common eye condition that is easily corrected with glasses [188]. Only 20% of Indigenous adults wore glasses in 2012 for distance vision, compared with 56% of non-Indigenous adults [189]. In a 2014 study of school children aged between 6-12 years in Qld, Indigenous children had less refractive errors than their non-Indigenous peers (9.6% compared with 16.1%) [190]. In the 2008 NIEHS, refractive error was the cause of more than one-half of low vision (54%) and 14% of blindness among Indigenous adults [181]. 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. Around 39% of Indigenous adults were not able to read normal size print (difficulty with near vision or myopia).

As noted above, cataract was the leading cause of blindness among Indigenous adults and the second most common cause of low vision [181]. 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 2012-13 than it was for their non-Indigenous counterparts [65]. In 2013-14, there were 1,447 elective surgery admissions for cataract extraction for Indigenous people [191]. The median wait for cataract surgery was 107 days for Indigenous people and around 78 days for non-Indigenous people.

Diabetic retinopathy, a complication of diabetes that causes damage to the small blood vessels in the retina, can impair vision and cause blindness [192]. The 2008 NIEHS reported that blinding diabetic retinopathy was 30 times more common among Indigenous adults than among non-Indigenous adults [181]. 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 [180] with regular screening and timely treatment [193]. Annual screening is recommended for Indigenous people with diabetes [194]. Prevention measures include the management of diabetes (blood glucose control, blood pressure and lipids) and following a healthy lifestyle (maintaining a normal body mass index (BMI)) nutritious diet, and regular exercise) [195].

Trachoma has been virtually eliminated in the developed world, but still occurs in some remote areas of Australia [180, 196]. If left untreated, it can cause scarring and in-turned eyelashes that lead to blindness (trichiasis).

In 2008, 60% of Indigenous communities in very remote areas surveyed in the NIEHS had endemic trachoma [181]<sup>33</sup>, with an overall prevalence of active trachoma among Indigenous children aged 5-15 years of 3.8%, ranging from 0.6% in major cities to 7.3% in very remote inland areas. The highest prevalence, 23%, was in very remote inland NT.

The National Trachoma Surveillance Unit has collected data on trachoma prevalence since 2006 [197]. In 2013, it reported an overall prevalence of active trachoma of 4% among children aged 5-9 years from 127 communities screened in the NT, WA, SA and NSW. There have been improvements since 2009 when the prevalence was 14% among children aged 1-9 years living in 134 screened communities in the NT, SA and WA [198].

In 2013, trichiasis was detected in 1% of Indigenous adults aged 40 years and over living in 143 at-risk communities in WA, SA, NT and NSW [197]. A total of 49 cases were reported (8 in WA, 8 in SA, and 33 in the NT).

The decrease in the prevalence of trachoma and trichiasis among Aboriginal and Torres Strait Islander people is due to the commitment in recent years in screening, treatment and targeted health promotion campaigns [196]. To eliminate trachoma completely, this commitment will need to be sustained.

#### 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 [192]. 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 [199, 200]. 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 [201, 202]. The 2008 NIEHS found that 35% of Indigenous adults have never had an eye examination [180]. 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 [202].

There is evidence of improvements in Aboriginal and Torres Strait Islander eye health, for example, successful initiatives allowing Aboriginal people to access affordable and culturally appropriate services for cataract surgery in NSW [203], and notably the reduction of the prevalence of trachoma among Aboriginal and Torres Strait Islander children from 14% in 2009 to 4% in 2013 [197].

## 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 [204]. 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) [205].

OM can be caused by viruses or bacteria or both, and often occurs as a result of another illness such as a cold [204]. 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

33 In 2014, endemic trachoma was defined as a prevalence of active trachoma of 5% or more in Aboriginal and Torres Strait Islander children aged 5-9 years and a prevalence of trichiasis of 0.1% of the Aboriginal and Torres Strait Islander adult population

referred to as chronic suppurative otitis media (CSOM) [205]. 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 Aboriginal and Torres Strait Islander people remains higher than for the general Australian population, particularly among children and young adults [204, 206, 207].

OM, particularly in suppurative forms, is associated with impairment of hearing, with major implications for language development and learning [129, 207-209]. 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 [208].

## **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 [207, 210-212]. 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' [213, p.2].

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 [107]. 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 [107]. 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.

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 [214]. 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 [215]. 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 [129].

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 [49]. Children aged 0-3 years (20%) and 4-11 years (20%) were more likely to have recurring ear infections than children aged 12-17 years (14%). Abnormal hearing was reported for 6.8% of the children aged 4-17 years. Of children aged 4-11 years who experienced recurring ear infections with discharge, 28% had abnormal hearing, compared with 1.4% of those without ear infections.

### General practice attendances and hospitalisation

According to *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 [53].

In 2012-13, there were 2,762 hospital separations for diseases of the ear and mastoid process (portion of the temporal bone of the skull behind the ear) among Indigenous people [65]. The hospitalisation rate for Indigenous children aged 0-3 years was 9.2 per 1,000, slightly lower, 0.8 times, than the rate for non-Indigenous children (12.0 per 1,000) [32]. Rates for Indigenous children aged 4-14 years (7.1 per 1,000) were 1.6 times higher than for non-Indigenous children (4.4 per 1,000). In major cities, hospitalisation rates for Indigenous children aged 0-14 years (5.9 per 1,000) were lower than rates for non-Indigenous children (6.7 per 1,000). In remote and

very remote areas, the hospitalisation rate for Indigenous children aged 0-14 years (15.6 per 1,000) was twice as high as the rate for non-Indigenous children (7.3 per 1,000).

As with many other areas of Indigenous health, high rates of recurring ear infections are associated with poverty, crowded housing conditions, inadequate access to clean water and functional sewerage systems, nutritional problems, and poor access to health care [117]. 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 [207].

## 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’ ([216] cited in [217, p.1]). It is more than simply the absence of disease in the oral cavity; it is a standard of oral functioning that enables comfortable participation in everyday activities.

The two most common oral diseases are caries and periodontal disease [218]. 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 [47].<sup>34</sup> Almost one-half (46%) of the children reporting oral health problems 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 28) [182]. The proportion of Indigenous people aged 55 years or older who reported using dentures was higher for those living in non-remote areas than for those living in remote areas (55% and 19%, respectively) and the proportion requiring dentures was higher in remote areas than in non-remote areas (19% and 10%).

**Table 28. Proportion (%) of Indigenous people reporting number 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
<b>Number of teeth lost</b>						
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
<b>Dentures</b>						
Wears 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 [182]

#### Caries

People's experience of caries is measured by the 'decayed missing and filled teeth' index (dmft) for deciduous teeth (first set of teeth) and by the DMFT index for permanent (adult) teeth [219]. Both indices measure how many teeth (t/T) are decayed (d/D), missing (m/M) or filled (f/F). These indices do not differentiate between a tooth with minor problems and one with major problems, nor do they provide a direct indication of the discomfort or dysfunction experienced.

34 The 2012-2013 AATSIHS did not collect information on oral health.



In 2007 in NSW and 2008 in SA, Tas and the NT, the proportions of Indigenous children aged 5-10 years with no dmft ranged from 29% to 43% (which was lower than the proportions for their non-Indigenous counterparts) [32]. Indigenous children aged between 6-15 years generally had higher DMFT scores than non-Indigenous children in all age-groups. The combined dmft/DMFT scores increased with age for both Indigenous and non-Indigenous children aged 6-15 years.

Recent information about the oral health of Indigenous children is available from the *Stronger futures in the Northern Territory oral health program* (SFNT-OHP) [220]. In 2013, 41% of Indigenous children who received dental treatment as part this program received treatment for caries. The proportions of Indigenous children (aged 1-15 years) receiving dental treatment between July 2012 and December 2013 that had dmft/DMFT ranged from 56% of those aged 1-3 years to 89% of those aged 8 years. Among children treated as part of this program, the proportion of children with caries decreased in most age-groups between 2009 and 2013.<sup>35</sup>

According to the *National survey of adult oral health* (NSAOH), Indigenous adults had more caries than non-Indigenous adults in 2004-2006 [221]. Indigenous people aged 15 years or older had 2.3 times more untreated caries than their non-Indigenous counterparts: 57% of Indigenous adults and 25% of non-Indigenous adults had one or more teeth affected. Indigenous adults had more than three times the number of decayed tooth surfaces than non-Indigenous adults. Those aged 35-54 years had five times more decayed tooth surfaces than 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 [221, 222]. Children rarely develop severe periodontal disease but gingivitis is relatively common, particularly among older children [222]. 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 across Australia 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 [221]. The prevalence of moderate or severe periodontitis was about 1.3 times higher for Indigenous people than that for non-Indigenous people.

Indigenous people are affected by periodontal diseases at younger ages than non-Indigenous people [221]. 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%). The prevalence of both deep periodontal pockets and clinical attachment loss were higher for Indigenous people aged 15-34 years than for their non-Indigenous counterparts: 18% compared with 13%, and 24% compared with 17%, respectively. The prevalence of tooth sites with deep periodontal pockets was more than twice as high for Indigenous people as it was for non-Indigenous people in this age-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 [221]. The 2004-2006 NSAOH found that edentulism increased with age for both Indigenous and non-Indigenous populations, 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.

### Dentist visits and hospitalisation

According to the 2012-2013 AATSIHS, around 4.8% of Indigenous people reported visiting a dentist in the two weeks prior to survey [223]. Proportions were similar for remoteness levels: 4% of Indigenous people living in non-remote areas and 6% of Indigenous people living in remote areas reported visiting a dentist in the two weeks prior to survey [107].

According to the NSAOH, 51% of Indigenous people reported having visited a dentist in the previous 12 months, and 43% reported usually visiting a dentist at least once per year in 2004-2006 [221]. Around one-third (34%) of Indigenous people reported that cost had prevented dental treatment and 27% reported that they would have a lot of difficulty paying a \$100 dental bill.

In 2008 for Indigenous children requiring a dentist, the most common reasons for not taking them included: wait times were too long; appointments were not available when required; the cost; and the carer could not find time to take the child [32].

In 2012-13, after age-adjustment, national hospitalisation rates for dental conditions were 1.3 times higher for Indigenous people than for non-Indigenous people [32]. The hospitalisation rate for Indigenous people living in remote areas was more than twice as

<sup>35</sup> This decrease is based on combined dmft/DMFT scores and may reflect improvements in oral health or may reflect oral health differences between communities serviced by the SFNT-OHP in the NT.



high as for Indigenous people living in non-remote areas. The hospitalisation rates were higher for Indigenous children aged 0-4 and 5-9 years than for non-Indigenous children, but the reverse was true for those aged 10-14 years (Table 29).

**Table 29. Age-specific hospital separation rates for dental conditions, by Indigenous status, and Indigenous:non-Indigenous rate ratios, Australia, 2012-13**

Age-group (years)	Indigenous	Non-Indigenous	Rate ratio
0-4	8.4	4.9	1.7
5-9	12.2	9.8	1.2
10-14	3.0	5.9	0.5
All ages	7.9	6.9	1.2

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

Source: Steering Committee for the Review of Government Service Provision, 2014 [32]

## 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 [224]. It can be considered in terms of the nature of the impairment in body structure or function, a limitation in activities (such as mobility and communication), a restriction in participation (involvement in life situations, such as work, education and social interaction), and the affected person's physical and social environment [225, 226]. 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)' [227].

The main source of information about the level of disability at a population level is the ABS' periodic *Survey of disability, ageing and carers* (SDAC), which also collects details about a person's need for assistance with core activities [224]. Information about disability at a population level is also collected in Australia's five-yearly censuses [35] and information about disability among Indigenous people was collected in the 2008 NATSISS [129]. 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 [228]. 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' [228, p.532].<sup>36</sup> 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 [47]. 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 [100, 228].

### Extent of disability among Indigenous people

The 2012 SDAC reported that for Indigenous people the crude disability rate was 23% in 2012, a slight increase on 21% in 2009 [229]. The overall disability rates for Indigenous males and females were not significantly different (25% and 22% respectively). The disability rate for Indigenous boys aged 0-14 years old (21%) was 2.5 times higher than the comparable rate for girls (8.5%).

Indigenous people had higher rates of disabilities than non-Indigenous people across all age groups and for both males and females. Indigenous children aged 0-14 years were more than twice as likely as non-Indigenous children to have a disability (15% compared with 6.6%) [229]. Indigenous people aged 35-54 years old were 2.7 times as likely as non-Indigenous people of the same age to have a disability (38% compared with 14%). After age-adjustment, Indigenous people were 1.7 times as likely as non-Indigenous people to be living with disability.

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) [230]. The need for assistance with core activities generally increased with age among both Indigenous and non-Indigenous people, with the proportions requiring assistance higher among Indigenous people than among their non-Indigenous counterparts for all age-groups (Table 30). The proportion of Indigenous males needing assistance with core activities was higher than for Indigenous females up to the 65 years and older age-group, but the reverse was true beyond that age.

<sup>36</sup> In attempting to address these conceptual difficulties, there have been some methodological differences in collecting information about disability, particularly related to core activity restriction

Table 30. 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 [230], ABS, 2001 [231]

The 2012 SDAC reported that Indigenous people had a significantly higher overall need for assistance compared with non-Indigenous people (63% compared with 60%) [229]. Indigenous people were almost twice as likely to require assistance with communication compared with non-Indigenous people (11.3% compared with 6.6%) and they were more likely to need assistance with cognitive or emotional tasks (29% compared with 22%). The proportions of Indigenous people with profound/severe core activity limitation were 1.7 times higher than for non-Indigenous people for all age-groups; 7.8% of Indigenous people had a profound/severe core activity limitation (7.8% of males and 7.5% of females) with males 1.5 times as likely and females 1.9 times as likely as their non-Indigenous counterparts. Higher proportions of Indigenous people required assistance with a core activity from a younger age (45 years and older) than non-Indigenous people (55 years and older). 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.<sup>37</sup>

In 2008, the proportion of profound/core activity restriction among Indigenous people varied slightly with the remoteness of residence [100]. 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 [47].<sup>38</sup> 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 on broad categories of types of disability: sight/hearing/speech; physical; intellectual; psychological; type not specified [227]. 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 [47]. In 2012-13, physical disability was the most common disability type for Indigenous adults living in non-remote areas (32%) followed by 'sight, hearing, speech' (20%) [32].

### Services

Increasing the access to disability services for the Indigenous population is one of the priority areas identified by the National Disability Agreement (NDA), developed by the Council of Australian Governments (COAG) to improve the outcomes for Indigenous people with disability [232, 233]. 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 [234]. NDA services include accommodation support, community support, community access, respite and employment services [235].

<sup>37</sup> Data are not available for a comparison of the prevalences for all Indigenous and non-Indigenous people, including those living in remote areas  
<sup>38</sup> Information was not available for the NT.

## Box 6: 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' ([235, p.14-18].

Some Indigenous people face significant barriers to access disability support services, due to social marginalisation, concern about approaching government agencies, differences in cultural attitudes towards disability and services that are culturally aware [32, 236].

In 2010-11, around 41% of the Indigenous potential population<sup>39</sup> aged 0-64 years used NDA disability support services provided by the states and territories (Table 31) [235]. 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: Steering Committee for the Review of Government Service Provision, 2013 [235]

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) [235]. 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: Steering Committee for the Review of Government Service Provision, 2013 [235]

### Education and employment

After age-adjustment, Indigenous people with a disability were 1.4 times more likely than non-Indigenous people with a disability to have obtained a Year 10 or below level of education, and less than half as likely to have a bachelor degree or higher [229]. Indigenous people generally had lower labour force participation than non-Indigenous people (65% compared with 79% respectively), however for those with disability, the gap was wider (35% and 54% respectively). In 2012, Indigenous people with a disability were significantly less likely than non-Indigenous people with a disability to be employed (26% compared with 49%); and the unemployment rate for Indigenous people with a disability was nearly three times as high as the comparable rate for non-Indigenous people with a disability (25.3% compared with 9.0%).

## Communicable diseases

Communicable diseases of particular relevance to Aboriginal and Torres Strait Islander people include: tuberculosis, hepatitis (A, B, and C), sexually transmissible infections (STIs), HIV/AIDS, *Haemophilus influenzae* type b (Hib), pneumococcal disease, meningococcal disease and skin infections [237, 238]. 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) [239, 240]. Risk factors for communicable diseases vary according to the type of disease [237]. Improvements to sanitation, and the increased use of vaccination and antibiotics (for bacterial infections), have markedly reduced some infectious diseases in Australia [225].

<sup>39</sup> 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' [235, p.14 18].

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* [241]. 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 [242-244], all common in many Aboriginal and Torres Strait Islander communities. Other risk factors also common among Aboriginal and Torres Strait Islander people are diabetes, tobacco use, alcohol use and advanced kidney disease [243, 244]. Another risk factor for TB is HIV infection [244, 245].

### Extent of tuberculosis among Indigenous people

The most recent information about TB among Indigenous people is for 2006-2010, for which period 164 (21%) of the 789 notifications of TB among Australian-born people in Australia were identified as Indigenous [Derived from 246, 247-249].<sup>40</sup> Two-fifths (42%) of the new cases among Indigenous people were reported in the NT (69 cases), and around one-third (29%) in Qld (48 cases) (Table 33). Australia-wide, the crude notification rate in 2006-2010 was 5.6 cases per 100,000 population for Indigenous people; the crude notification rate was highest for the NT (27.4 cases per 100,000 population) [Derived from 246-249, 250, 251]. After age-adjustment, the notification rate for Indigenous people was 12.5 times than for Australian-born non-Indigenous people (Table 34).<sup>41</sup>

The notification rate of TB was higher for Indigenous people than for Australian-born non-Indigenous people across all age-groups, with rate ratios being highest for the 35-44 years, 45-54 years and 55-64 years age-groups (Table 34) [Derived from 246-249, 250, 251].

**Table 33. Numbers of new cases and crude notification rates of tuberculosis among Indigenous people, by jurisdiction, Australia, 2006-2010**

Jurisdiction	Number	Rate
NSW	28	3.5
Vic	4	2.3
Qld	48	6.3
WA	7	1.3
SA	6	4.1
Tas	2	2.1
ACT	0	0.0
NT	69	27.4

Notes: 1 Population figures are for 30 June 2008 (the mid-point of the five-year period, 2006-2010)

2 Rates are crude incidence rates per 100,000 population

Source: Derived from Roche, 2008 [246], Barry, 2009 [247], Barry, 2012 [248], Bareja, 2014 [249], ABS, 2009 [250], ABS, 2008 [251]

**Table 34. Numbers of new cases and notification rates of tuberculosis, by Indigenous status and age-group, and Indigenous: non-Indigenous rate ratios, Australia, 2006-2010**

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-4	9	2.7	56	0.8	3.3
5-14	12	1.8	39	0.3	6.5
15-24	14	2.6	78	0.5	4.9
25-34	28	7.5	69	0.5	16.1
35-44	33	9.7	43	0.3	35.2
45-54	35	14.4	68	0.5	31.4
55-64	19	13.9	62	0.5	27.1
65+	14	16.4	210	1.5	11
All ages	164	6.1	625	0.6	12.5

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, 2008 [246], Barry, 2009 [247], Barry, 2012 [248], Bareja, 2014 [249], ABS, 2009 [250], ABS, 2008 [251].

40 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, but the Committee's 2012 report provided no indication of its intentions about ongoing reporting of new cases.

41 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.

## Hepatitis

Hepatitis is an inflammation of the liver, most commonly caused by a viral infection [252]. The viruses identified most frequently are referred to as types A, B, C, D and E.

### 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) [253, 254]. 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.

#### 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 [255, 256]. Previously, clinically significant HAV infections were much more common among Indigenous children than among non-Indigenous children, particularly for those living in northern Qld, WA, SA and the NT [255]. 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) [254]. The great decline among Indigenous people is reflected in notification figures for the three-year period 2011-2013 when of the 70 notifications of HAV for people living in WA, SA, and the NT, none were identified as Indigenous [Derived from 257, 258, 259].

### 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 [239]. A mother may also transmit HBV to the foetus during pregnancy or to the infant 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 [239, 253].

#### Extent of HBV among Indigenous people

Of the 563 people diagnosed with newly acquired HBV in Australia in the three-year period 2011-2013, 48 (8.5%) were identified as Indigenous [259]. The crude rate of diagnosis of newly acquired HBV of 4 per 100,000 for Indigenous people was 5 times the rate of 0.8 per 100,000 for non-Indigenous people. Details of the ages of the people with newly diagnosed HBV are not available for 2011-2013, but the majority of diagnoses in 2012 for both Indigenous and non-Indigenous people were among those aged 20 years or older (69% and 95%, respectively) [260]. The notification rate of newly diagnosed HBV declined 28% in the period 2009-2013, with a 10% increase in rates in the non-Indigenous population. In this period, the rate of newly diagnosed HBV was substantially higher in the Indigenous population aged 30-49 years compared with other age groups.

The highest rate of diagnosis on newly acquired HBV for Indigenous people in 2013 was for those living in remote areas and the next highest rates were for people living in very remote and outer regional areas [260]. The HBV notification rate for Indigenous people living in major cities was similar to that of non-Indigenous people.

A HBV vaccination program commencing in Indigenous communities in the mid-1980s has had considerable success in protecting Indigenous children from HBV infection [261], but several studies suggest that some Indigenous children had a sub-optimal response to the HBV vaccine, raising concerns about their immunity to HBV [262, 263]. 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 [262, 263]. 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 [261].

### Hepatitis C

Transmission of hepatitis C virus (HCV) typically occurs via blood-to-blood contact [264]. Injecting drug use is the most common method of contracting the virus and is responsible for the vast majority of cases [257, 265]. The likelihood of transmission of HCV via sexual contact is generally very low [253]. 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 [264]. Some people with HCV can live relatively normal lives, largely unaffected by the virus, but others may develop cirrhosis, liver cancer, or liver failure [266]. 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 [253].

## 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 2013 for which Indigenous status was not reported was more than 30% for all jurisdictions except WA (4%), SA (7%) and the NT (6%) [259].

Of the 5,597 people diagnosed with HCV in WA, SA and the NT in the three-year period 2011-2013, 796 (14%) were identified as Indigenous [Derived from 259]. In these jurisdictions, the crude notification rate for HCV was 3.7 times higher for Indigenous people than for non-Indigenous people (146 and 39 per 100,000, respectively) [Derived from 250, 259, 267]. Over the three-year period 2011-2013, the notification rate was much lower for Indigenous people living in the NT (43 per 100,000) than for Indigenous people living in WA (227 per 100,000) and SA (174 per 100,000).

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 2013 than for their non-Indigenous counterparts, particularly in the ten-year age-groups between 20 and 49 years [260]. For newly diagnosed HCV, the majority (92%) of notifications in both the Indigenous and non-Indigenous population occurred in people over 20 years of age. 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 major cities and inner regional areas (for WA, SA, Tas, and the NT in 2013) [260]. These rates were between 10 and 5 times higher respectively than 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 [239, 256, 268, 269]. Infants and children are particularly susceptible to Hib, which is serious in its invasive form. High rates of Hib carriage in the upper respiratory tract have been noted prior to cases of invasive disease [270]. Higher rates in Indigenous populations worldwide suggest socioeconomic disadvantage, particularly high rates of tobacco use and crowded living conditions, as the probable cause [256].

### 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 [269, 271]. The decline has been markedly evident in Aboriginal and Torres Strait Islander children, but they continue to be at higher risk of contracting Hib than non-Indigenous children [269].

In 2007-2010, 25 (29%) of the 85 cases of invasive Hib disease notified in all jurisdictions were identified as Indigenous [256]. Children (Indigenous and non-Indigenous) 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 for non-Indigenous people.

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 [256].

## 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 [256]. 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 [239]. 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 [172, 239, 256, 272]. In children, recurrent or chronic OM and attendance at childcare increases susceptibility to IPD [256, 272].

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 [239]. In 2001, vaccination was funded for Indigenous infants and young children and for all Australian children medically at risk [239, 272]. 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 in Australia since 2001 [272]. Indigenous people have a significantly higher incidence of IPD than non-Indigenous people [256], with the rate of IPD increasing between 2008 and 2011 [273]. Based on



notifications for all jurisdictions in 2011, the age-adjusted rate of IPD was 8 times higher for Indigenous people (53.3 per 100,000) than for non-Indigenous people (6.7 per 100,000). This was the largest gap since the commencement of surveillance in 2002, with an outbreak in Central Australia partially contributing to the increase. The annual rate of IPD among Indigenous people aged 50 years and older decreased from 82 per 100,000 in 2012 to 63 per 100,000 population in 2013, a decrease of 23% [274].

Age-specific rates for IPD among Indigenous people in 2007-2010, 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) [256]. Importantly, age-specific rates for Indigenous people aged 25-49 (45 per 100,000) were almost 12 times higher than 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 [256]. 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 age-group (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 for 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 [272, 275, 276]. 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 [272, 277, 278]. 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 [172, 256, 272].

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 [279]. By 2004, rates for Indigenous children under 2 years had decreased to 92 per 100,000, similar to those for non-Indigenous children. 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 [280]. In 2007-2010, the rate of IPD for Indigenous children aged 0-4 years was 2.9 times higher than for other children [256]. 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 [256]. 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) [256, 281]. 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 [256, 281, 282]. Possible risk factors for the disease include living in crowded housing conditions, exposure to smokers, recent illness and multiple kissing partners [281].

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 [256, 282]. 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 [282]. Vaccination has reduced the burden of serogroup C meningococcal disease in Australia, but currently there is no vaccination program for serogroup B [256]. 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 [256]. 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 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 [256]. 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 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 for other children.

There were 42 deaths from meningococcal infection for people living in NSW, NT, Qld, SA and WA in 2006-2010 [256]. Among Indigenous people, up to four deaths<sup>42</sup> 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 [237]. 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 [283]. 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 are regarded as fundamental in preventing STI transmission [284, 285].

The majority of STIs are asymptomatic or produce only mild symptoms [286, 287]. 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 [237].

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 [288, 289].

Human papilloma virus (HPV) and genital herpes are common STIs in Australia, but they are not notifiable diseases [290]. 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 [273]. 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* [291]. 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

Indigenous people accounted for 27% of gonorrhoea notifications in 2013 (Indigenous status was not reported for 28% of notifications) [260]. The notification rate was 14 times higher for Indigenous people than for their non-Indigenous counterparts (694 and 48 per 100,000, respectively). Notification rates were substantially higher in the Indigenous population than in the non-Indigenous population in all areas of residence especially in outer regional, remote and very remote areas of Australia.

In 2013, the majority (73%) of gonorrhoea notifications for the Indigenous population in Vic, Qld, WA, SA, Tas, and the NT occurred in the 15-29 years age-group, with 33% in the 15-19 years age-group compared with the non-Indigenous population, 52% and 8% respectively [260].

Indigenous females were marginally more likely to be diagnosed with gonorrhoea than Indigenous males however in the non-Indigenous population, the number of diagnoses for males was four times the number reported for females [260]. 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.

## Syphilis

Syphilis, caused by the organism *Treponema pallidum*, is a complex infection that has four identified stages: primary, secondary, latent, and tertiary [292]. 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 [293]. 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 [294].

### **Extent of syphilis among Indigenous people**

In 2013, 142 (8%) of the 1,764 people newly diagnosed with syphilis were identified as Indigenous (Indigenous status was not reported for 9% of notifications) [260]. The notification rate for Indigenous people was almost 3 times the rate for non-Indigenous people (18

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

per 100,000 and 7 per 100,000 respectively). In the Indigenous population, notification rates were higher as remoteness increased and in the non-Indigenous population the rates were higher in major cities and in inner regional areas. In 2013, the notification rate in the Indigenous population for syphilis was highest for the 15-29 year age-group and in the non-Indigenous population it was highest for the 30-39 age-group.

In 2013, the percentage of syphilis diagnoses in the Indigenous population was slightly higher for males (52%) than for females (48%) [260]. A different pattern was observed in the non-Indigenous population with males accounting for 94% of diagnoses. This indicates that transmission of syphilis is mainly through heterosexual contact in the Indigenous population and through sex between males in non-Indigenous population.

The rates of syphilis notifications for Indigenous people were highest for those living in remote and very remote areas and for non-Indigenous people, they were highest in major cities and inner regional areas in 2013 [260].

## Chlamydia

Chlamydia is caused by the bacterium *Chlamydia trachomatis* [286]. 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 [47], but when considering only the jurisdictions with reasonable Indigenous identification<sup>43</sup> it is second to gonorrhoea [258].

### Extent of chlamydia among Indigenous people

Chlamydia was the most reported notifiable disease in Australia in 2013 [260]. Indigenous people accounted for 8% of the notifications of chlamydia in 2013 (Indigenous status was not reported for 51% of notifications). The notification rate for chlamydia was 3 times higher for Indigenous people than for non-Indigenous people (1,207 per 100,000 compared with 379 per 100,000).

Chlamydia is typically diagnosed among adolescents and young adults in both the Indigenous and non-Indigenous populations [260]. In 2013, people aged 15-29 years accounted for around 81% of chlamydia notifications in both populations.

For both the Indigenous and non-Indigenous populations, females accounted for a greater proportion of chlamydia diagnoses than males in 2013 [260]. Higher notification rates for Indigenous females aged 15-29 years may be due to a greater disease burden and/or greater access to health services and subsequent testing for females.

Notifications for chlamydia were twice as high in major cities for the Indigenous population compared with the non-Indigenous population, twice as high in inner regional areas, five times higher in outer regional areas, 4 times higher in remote areas, and 6 times higher in very remote areas [260].

## HIV/AIDS

The human immunodeficiency virus (HIV) is a retrovirus that destroys cells in the body's immune system [295]. Untreated, the virus weakens immune system functioning to the point where minor infections may become fatal [296]. 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 [264, 295].

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 [297]. 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 [100]. 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' [295, 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 [298].

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

## Extent of HIV/AIDS among Indigenous people

National surveillance data show that in 2013 there were 1,236 cases of newly diagnosed HIV infection of which 26 (2.1%) were among Indigenous people [Derived from 259]. Age-standardised rates of HIV diagnosis were 1.3 times higher for Indigenous people than non-Indigenous people (4.9 and 3.9 per 100,000 respectively) [259]. Prior to this period, the age-standardised notification rate of newly diagnosed HIV infection in the Indigenous population was 3.9 per 100,000 in 2004, then rates fluctuated until 2011 and increased in 2012-13 reaching 4.9 per 100,000 in 2013. In this period, a nominal increase was observed in the diagnosis rate among non-Indigenous people. In 2013, the median age of diagnosis was 37 years. Males accounted for 85% of new HIV cases among Indigenous people [259].

Over half of new HIV infections among the Indigenous population in 2013 were reported in Qld (35%) and NSW (31%) [259]. Indigenous people living in major cities had the highest rates of new HIV diagnoses, 6 per 100,000 compared with none in remote areas. The patterns of new HIV infections were similar for Indigenous and non-Indigenous people. Among the non-Indigenous population, those residing in major cities also had the highest rate of HIV infection, 6 per 100,000, compared with 3 per 100,000 in remote areas.

In terms of exposure to HIV, men who have sex with men accounted for 44% of new HIV cases among Indigenous people in 2013 [259]. Heterosexual contact was also identified as a common form of exposure to HIV among Indigenous people (32%).

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 dropped to 6.3% in 2012, and then increased substantially to 24% in 2013 [259]. Among non-Indigenous people, 89% of all new HIV cases in 2009-2013 were attributed to the categories 'men who have sex with men' (76%) and 'heterosexual contact' (13%) [Derived from 259]. Injecting drug use was responsible for 3% of new cases among non-Indigenous people.

Information about the occurrence of AIDS in the Indigenous population in 2013 is not available, but the number of new AIDS cases for the total population in 2009 was only 90 [299]. In 2009, there were nine deaths from AIDS in Australia.

## Skin diseases, infections and infestations

Susceptibility to skin infections and infestations increases with poor living conditions and overcrowding [300, 301]. The significant public health problem posed by skin infections in many remote Aboriginal and Torres Strait Islander communities, particularly among Aboriginal and Torres Strait Islander children, requires appropriate education, improved hygiene and reduced overcrowding [302].

### 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 [303, 304]. It is endemic in some remote central and northern Aboriginal and Torres Strait Islander communities, with prevalence of up to 50% in children [304] and up to 25% in adults [305]. 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 and almost all before they reached 2 years of age [306]. Another study of medical records for children born between 2001 and 2005 in a remote community in the NT found that 68% of children had presented with scabies during their first year of life, and 77% had presented in the first two years [302].

#### 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 [302, 307]. A study of a remote community in the NT found that 82% of children had presented with pyoderma in their first year of life and 87% in their first two years [302]. The pyoderma in Aboriginal and Torres Strait Islander communities commonly involves group A streptococcus (GAS), which is responsible for continuing outbreaks of acute post-streptococcal glomerulonephritis and ARF [307, 308].

#### Other skin infections

Aboriginal and Torres Strait Islander people, particularly those living in the high-rainfall, humid areas of northern Australia, are also vulnerable to a variety of fungal and related organisms [307].

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 [309].

#### Hospitalisation

Skin conditions can be linked to serious complications, which can result in hospitalisation and, very uncommonly, death [301, 302]. 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) [134]. 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 [310]. 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 for non-Indigenous people (161 per 100,000 compared with 8.1 per 100,000) [311]. 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

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, 29]. 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 [28]. 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, 29].

In addition to indicators of Indigenous social disadvantage, attention also needs to be focused on the '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 Aboriginal and Torres Strait Islander people is influenced by many factors such as socio-economic disadvantage, and geographical, environmental, and social factors [312, 313]. Poor nutrition is an important factor contributing to overweight and obesity, malnutrition, CVD, type 2 diabetes, and tooth decay [313, 314]. 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 [315]. 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 Aboriginal and Torres Strait Islander people aged 15 years or older met the guidelines for daily fruit intake (42%), and only 5% ate enough vegetables each day [71]. Females were more likely than males to have eaten an adequate amount of fruit (44% and 40% respectively) and vegetables (7% and 3% respectively) each day [71]. Levels of fruit and vegetable consumption per day were different for Indigenous people aged 15 years or older living in remote and non-remote areas, 46% of those living in remote areas consumed the recommended number of servings of fruit compared with 41% of people in non-remote areas. Those living in non-remote areas were more likely than those in remote areas to consume adequate amounts of vegetables (5% compared with 3%). 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 0.8) 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.

The AATSIHS also examined associations between dietary behaviour and labour force status and educational attainment [71]. After age standardisation, unemployed Indigenous people were less likely to consume adequate amounts of fruit (63%) and vegetables (98%) than those who were employed (54% and 94% respectively) or not in the labour force (60% and 95% respectively). When considering educational levels, Indigenous people who had completed year 12 or equivalent were less likely to consume adequate amounts of fruit (54%) and vegetables (93%) than those who had completed year 10 or below (59% and 95% respectively).

The *National Aboriginal and Torres Strait Islander health measures survey* (NATSIHMS) 2012-2013 collected information on three biomarkers of nutrition – vitamin D, anaemia and iodine [82], it was found that:

- More than a quarter of Aboriginal and Torres Strait Islander adults (27%) had a vitamin D deficiency. After age-adjustment, Aboriginal and Torres Strait Islander people were only slightly more likely to have a vitamin D deficiency than their non-Indigenous counterparts (ratio 1.1). The levels of vitamin D deficiency were similar for both Indigenous males and females, and across all age groups (ranging from 25% to 29%). Vitamin D deficiency was more common among Indigenous people living in remote areas (39%) than those in non-remote areas (23%).
- For Aboriginal and Torres Strait Islander adults, 7.6% were at risk of anaemia (ratio 1.9 after age-adjustment) and they were at higher risk of anaemia than their non-Indigenous counterparts in all age groups. Women were more likely to be at risk of anaemia than men (10% compared with 4.8%). The risk of anaemia was higher for those living in remote areas compared with those living in non-remote areas (10% compared with 6.9%).



- The Aboriginal and Torres Strait Islander adult population was found to be iodine-sufficient. They had higher iodine levels than non-Indigenous adults (median levels of 135 ug/L compared with 124 ug/L) and those living in remote areas had higher median levels than those living in non-remote areas.

The AATSIHS 2012-2013 collected information on the fruit and vegetable consumption of children and found that 78% of Aboriginal and Torres Strait Islander children aged 2-14 years were eating adequate amounts of fruit eat day, but only 16% were eating enough vegetables [313]. A higher proportion of girls were meeting the guidelines for fruit intake than boys (81% compared with 76%), but the proportions were similar for vegetable intake (14% and 17% respectively). The rates of fruit and vegetable intake were similar for children in remote and non-remote areas.

The *Footprints in time: longitudinal study of Indigenous children* reported that levels of isolation affected the diet of children aged 2-7 years in 2010 [316]. Cereals, protein, and fruit and vegetables were the types of food eaten by most children across all locations and 7.1% ate bush tucker. 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. In 2011, further information was collected on bush tucker, finding that children living in more isolated areas were more likely to eat bush tucker than children living elsewhere, and that the types of foods eaten reflected the availability of foods in the region [317].

## Physical activity

Physical activity is important for maintaining good health [318]. *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 [319]. Low levels of activity, including sedentary behaviour, are a risk factor for a variety of health conditions including CVD, type 2 diabetes, certain cancers, depression and other social and emotional wellbeing conditions, overweight and obesity, a weakened musculoskeletal system and osteoporosis [318, 319].

According to the 2012-2013 AATSIHS, 46% of Aboriginal and Torres Strait Islander 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); this level was 0.9 times higher than for their non-Indigenous counterparts [107]. Two-fifths (40%) of Indigenous adults had exercised for at least 150 minutes over five sessions in the previous week; 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; these levels of physical activity were 0.9 and 0.6 times those of their non-Indigenous counterparts. Indigenous adults spent around one third the time on physical activity (39 minutes per day including 21 minutes on walking for transport) compared with children aged 5-17 years [318]. Those who participated in the pedometer study recorded an average of 6,963 steps per day; 17% met the recommended threshold of 10,000 steps or more.

Among Aboriginal and Torres Strait Islander 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%) [107]. 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. In remote areas, 55% of Indigenous adults exceeded the recommended 30 minutes of physical activity and 21% did not participate in any physical activity on the day prior to the interview [318]. The most common type of physical activity for adults was 'walking to places' (71%). One-in-ten (11%) participated in cultural activities, including hunting and gathering bush foods or going fishing.

Among Aboriginal and Torres Strait Islander 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; this level of physical inactivity was 1.1 times that of their non-Indigenous counterparts [319]. A higher proportion of Indigenous women than Indigenous men were physically inactive (68% compared with 55%); this pattern was evident for all age-groups [107]. Indigenous adults spent an average of 5.3 hours per day on sedentary activities, including 2.3 hours of watching television, DVDs and videos [318].

Aboriginal and Torres Strait Islander children aged 2-4 years living in non-remote areas spent an average of 6.6 hours per day participating in physical activity and spent more time outdoors than their non-Indigenous counterparts (3.5 hours compared with 2.8 hours) [318]. Indigenous children aged 2-4 years spent an average of 1.5 hours on sedentary screen-based activities such as watching TV, DVDs or playing electronic games.

Aboriginal and Torres Strait Islander children aged 5-17 years living in non-remote areas spent an average of two hours per day participating in physical activity (exceeding the recommendation of one hour per day); this was 25 minutes more than their non-Indigenous counterparts [318]. Around half (48%) of Indigenous children met the recommended amount of physical activity, compared with 35% of non-Indigenous children. The most common physical activities among Indigenous children were active play and children's games (57%) and swimming (18%). Those who participated in the pedometer study recorded an average of 9,593 steps per day, with an average of one-in-four children (25%) meeting the recommended 12,000 steps per day.



Aboriginal and Torres Strait Islander children aged 5-17 years living in non-remote areas spent an average of 2.6 hours per day on sedentary screen-based activities (exceeding the recommended limit of two hours). Indigenous children aged 12-14 years spent half the time that non-Indigenous children spent using the internet or computer for homework (4 minutes compared with 8 minutes per day) and those aged 15-17 years spent nearly one third of the time spent by their non-Indigenous counterparts (8 minutes compared with 20 minutes per day). Indigenous children aged 15-17 years spent more time on screen-based activities than those aged 5-8 years (3.3 hours compared with 1.9 hours).

In remote areas, 82% of Aboriginal and Torres Strait Islander children aged 5-17 years did more than 60 minutes of physical activity on the day prior to the interview [318]. The most common activities were walking (82%), running (53%), and playing football or soccer (33%).

## Bodyweight

The standard measure for classifying a person's weight status is BMI (BMI: weight in kilograms divided by height in metres squared) [320]. 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 [290, 315, 320, 321]. 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) [315].

Abdominal obesity, also known as central obesity, is also a risk factor for the development of the metabolic syndrome [322]. 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 a 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 [315].

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 [323]. 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 [324-326]. 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 [326]. More recently, Hughes and colleagues [327] have developed an equation for calculating fat free mass in adult Indigenous people using the easily acquired variables of resistance<sup>44</sup>, height, weight, age and gender for use in the clinical assessment and management of obesity.

Based on BMI information collected as a part of the 2012-2013 AATSIHS, 66% of Aboriginal and Torres Strait Islander people aged 15 years or older were classified as overweight (29%) or obese (37%) [71]. A further 30% were normal weight and 4% were underweight. Combined overweight/obesity levels were significantly higher for people living in non-remote areas (67%) than for those living in remote areas (62%). Similar proportions of Indigenous males and females were overweight or obese (65% and 67% respectively), however, a larger proportion of males than females were overweight (31% and 26% respectively) while a greater proportion of females than males were obese (40% and 34% respectively). After age-adjustment, the combined overweight/obesity levels were slightly higher for Indigenous people aged 15 years or older than for their non-Indigenous counterparts (ratio 1.2) and Indigenous people were 1.6 times as likely as non-Indigenous people to be obese (ratio 1.4 for males and 1.7 for females).

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 [71]. A higher proportion of Indigenous females (81%) than Indigenous males (62%) 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, 81% of males and 73% of females aged 18 years or older were at increased risk of developing chronic diseases. The proportions of Indigenous men and women who were at increased risk of developing chronic diseases based on both measures of waist circumference and WHR increased with age.

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 [328]:

- 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.

44 When an electrical current is passed through the body, fatty tissue offers more resistance than lean tissue. The resistance to the flow of electricity is used to calculate the proportion of body fat in the individual.

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 [328]. 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)
- they were in the lowest quintile for household income (6.6% compared with 3.3% in the highest quintile).

According to the 2012-2013 AATSIHS, based on BMI information, around 30% of Aboriginal and Torres Strait Islander children aged 2-14 years were overweight (20%) or obese (10%), 62% were in the normal weight range, and 8% were underweight [71]. Similar proportions of Indigenous boys and girls aged 2-14 years were overweight or obese (28% and 32% respectively). After age-adjustment, the combined overweight/obesity levels were slightly higher for Indigenous children aged 2-14 years than those for their non-Indigenous counterparts (ratio 1.2) mainly due to higher obesity rates in Indigenous boys (10% compared with 6%) and girls (11% compared with 7%).

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 [329]. Females had higher levels of central obesity (50%) than 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) [330]. In comparison, the *National health survey 2007-2008* reported 17% of all Australian children aged 5 to 17 years were overweight and 8% obese [331].

Hardy and colleagues [332] found that from 1997 to 2010, overweight/obesity and WHR increased more rapidly in Aboriginal and Torres Strait Islander children than in non-Indigenous children aged 5-16 years in NSW. They identified lack of daily breakfast, excessive screen time and soft drink consumption as the major risk factors and suggested that encouraging strategies to limit screen time held promise.

## Immunisation

Vaccination has been very successful in contributing to improvements in Aboriginal and Torres Strait Islander health and child survival in recent decades, with national immunisation coverage rates for Indigenous children improving since 2008 [333]. However, some vaccine-preventable diseases are still experienced at higher rates among Indigenous people than among non-Indigenous people [239]. From 2005, the *National immunisation program* for all children included vaccines for hepatitis B, diphtheria-tetanus-pertussis (DTP), *Haemophilus influenzae* type B (Hib), measles, mumps, rubella (MMR) and polio [47]. More recently vaccines have been included for pneumococcal disease, meningococcal C, varicella (chickenpox), rotavirus, HPV, and influenza. In 2013, the *National HPV vaccination program* was extended to include both females and males aged 12-13 years old, along with a catch up program for males aged 14-15 years old (during 2013-2014) [333].

Some vaccine-preventable diseases are experienced at higher rates among Indigenous people than among non-Indigenous people [239]. Additional vaccines are specifically recommended for Indigenous people, depending on age, location and health risk factors. These include vaccinations for bacille Calmette-Guérin (BCG) for neonates living in areas of high TB incidence, hepatitis A for children living in NT, Qld, SA and WA, hepatitis B for adults not previously vaccinated, influenza, pneumococcal conjugate for children living in NT, Qld, SA and WA and pneumococcal polysaccharide for persons aged 15-49 years old with underlying conditions increasing the risk of IPD and all persons aged 50 years and older.

### Childhood vaccination

According to the Australian Childhood Immunisation Register (ACIR), the national coverage for full immunisation for Indigenous children increased from 2008-2012 for the following age-groups:

- in the 12- $\geq$ 15 month cohort by 1.4%,
- in the 24- $\geq$ 27 month cohort by 1.3% and
- in the 60- $\geq$ 63 month cohort by 12% [333].

Coverage estimates at 31 December 2013 indicated that Indigenous children had slightly lower coverage for all vaccines at 1 year of age than other children (86% of Indigenous children fully immunised compared with 90% of other children); coverage for Indigenous

and other children was similar at 2 years of age (91% and 92% respectively), and at 5 years of age coverage for Indigenous children was greater than for other children (93% and 92% respectively) [32]. In most states/territories (except SA and ACT), Indigenous children's vaccination rates were similar or higher than for non-Indigenous children. Vaccination coverage estimates were significantly lower for SA than for other jurisdictions:

- for the 1 year age-group, coverage for Indigenous children was 80% compared with 90% for other children
- for the 2 year old cohort, coverage for Indigenous children was 87% compared with 93% for other children
- for the 5 year old age group, coverage for Indigenous children was 83% compared with 91% for other children.

In terms of specific vaccines, in 2011, the greatest differences in coverage nationally, was for Hib which was 8.7% lower among Indigenous children than among non-Indigenous children (ratio 0.9) [47].

## Adult vaccination

Vaccination against influenza and pneumonia is recommended for Aboriginal and Torres Strait Islander people aged 50 years and over and for non-Indigenous people aged 65 years and over [32]. Influenza immunisation in the previous 12 months for Indigenous adults aged 50 years and older in 2012-2013 was reported by: 51% of those aged between 50-64 years old, 74% of those aged 65 years and above, and overall 57% of those aged 50 years and older. No new data are available on vaccination rates for non-Indigenous adults.

Vaccination rates for pneumococcus in the last 5 years for Indigenous people were: 23% of 50-64 year olds, 44% of 65 year olds and older, and 29% overall of 50 years and older [32].

## 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 [334]. 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' [315]. The WHO recommends exclusive breastfeeding for six months followed by complementary feeding with continued breastfeeding for up to two years or beyond [334]. 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 [335]. 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 [182]. 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 [182]. 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 [49].

The *Footprints in time – the longitudinal study of Aboriginal children* collected data from 11 sites (rural, remote and urban) around Australia in 2008-2009 [336]. Data on breastfeeding from this study showed that 80% of Indigenous children 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, many forms of cancer, and lung diseases, as well as a variety of other health conditions [53]. 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 concern to health, with children particularly susceptible to resultant 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 [323]. Tobacco use accounted for one-in-five deaths in the Indigenous population.

### **Extent of tobacco use among Indigenous people**

The 2012-2013 AATSIHS found that 44% of Indigenous people aged 15 years and over reported that they were current smokers [337]. This represents a significant reduction from levels reported in the NATSISS 2008 (47%), and 2002 (51%) [338, 339]. 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 [340].

In 2012-2013, the proportion of Indigenous men who were current smokers (46%) was similar to the proportion of Indigenous women (42%) [337]. After age-adjustment, Indigenous people were 2.5 times more likely to smoke than non-Indigenous people (44% compared with 17%, respectively).

In 2012-2013, Indigenous people living in remote areas reported a higher proportion of current smokers (53%) than those living in non-remote areas (41%). The age-group with the highest proportion of current smokers in remote areas was the 18-24 years age-group (65%). The overall proportion of current smokers in remote areas in 2012-2013 has not changed significantly since 2002 [341, 342].

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: 47% less people are smoking among 15-17 year olds (17% down from 32%); and 27% less people are smoking among 18-24 year olds (41% down from 56%) [341, 342]. 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 33% in 2002.

High rates of smoking have been reported for Indigenous mothers [44]. 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 [185, 343]. For Indigenous people aged 15 years and older the proportion was 26% [340].

### **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 [344]. Consumption of alcohol in pregnancy can affect the unborn child leading to fetal 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)) [345]. These disorders are incurable, and 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%) [346, 347]. Of 11 selected risk factors, alcohol was the fifth leading cause of the burden of disease among Indigenous people [346]. The highest levels of disease burden attributable to alcohol use among Indigenous people were for injury (22%), mental disorders (16%), and cancers (6.3%).

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 [47, 348, 349].

### **Extent of alcohol use among Indigenous people**

In the 2012-2013 AATSIHS, 23% of Aboriginal and Torres Strait Islander people aged 18 years or older had never consumed alcohol or had not done so for more than 12 months [349]. 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 [349]. 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 men and women 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).

## Box 7: Assessing risks from use of alcohol

In 2009, the NHMRC introduced revised guidelines that depart from specifying 'risky' and 'high risk' levels of drinking [344]. 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
- 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 breastfeeding women is not to drink alcohol.

### Short term and single occasion risk

The 2012-2013 AATSIHS reported that 22% of the Aboriginal and Torres Strait Islander 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) [349]. Levels of single occasion drinking risk were similar for both Indigenous and non-Indigenous populations (according to the 2009 guidelines). After age-adjustment, 52% of Indigenous people and 45% of non-Indigenous people drank at risk on a single occasion (ratio 1.1). However, (according to the 2001 guidelines) Indigenous people were 1.4 times more likely to drink at levels of 'high risk' of short term harm. Indigenous men were 1.5 times more likely than Indigenous women to exceed the guidelines for drinking at risk on a single occasion (68% compared with 46%, respectively). The proportion of Indigenous people exceeding the guidelines for single occasion risk was lower in very remote areas compared with other areas [32].

### Lifetime risk

According to the 2013 NDSHS, there was a significant decline in the proportion of Indigenous people exceeding the NHMRC guidelines for lifetime risk (drinking no more than two standard drinks on any single day for males and females) [350]. Findings from the 2012-2013 AATSIHS show that among Aboriginal and Torres Strait Islander drinkers aged 18 years and over, 20% drank at levels exceeding the 2009 guidelines for long-term/lifetime drinking risk [351]. After age-adjustment, lifetime drinking risk was similar for both Indigenous people and non-Indigenous people (ratio 1.0). However, Indigenous people were 1.4 times more likely to drink at 'high risk' levels of long term harm (2001 guidelines). Indigenous men were 2.7 times more likely than Indigenous women to exceed the guidelines for risk of long term harm (29% compared with 11%, respectively).

A lower proportion of Aboriginal and Torres Strait Islander people in very remote areas have been found to exceed the guidelines for lifetime risk when compared with other areas (specifically inner regional and remote areas) [32].

### Alcohol and pregnancy

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 [47]. 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) [47]. After age-adjustment, Indigenous males were hospitalised at five times and Indigenous females at four times the rates of their non-Indigenous counterparts. Almost nine-tenths (86%) of hospitalisations related to alcohol use were for mental and behavioural disorders due to alcohol use, including acute intoxication, dependence syndrome, and withdrawal state. The hospitalisation rate for alcoholic liver disease among Indigenous people was six times the rate for non-Indigenous people.

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

### Mortality

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



and behavioural disorders was seven times higher, and the rate for alcohol-related deaths attributed to alcohol poisoning five times higher than for non-Indigenous people.

## Illicit substance use

Illicit substance 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 [32]. Illicit substance use is a risk factor for ill-health, increasing the likelihood of infection with bloodborne viruses, and contributing to mental illness, poisoning and self-inflicted injury, and can cause death [32, 352].

Illicit substance 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 [347]. For the same year, illicit substance use was responsible for 3.4% of the burden of disease among the Indigenous population; the highest level of disease burden attributable to illicit substances was for mental health (13%) and injury (3.6%) [346].

### Extent of illicit substance use among Indigenous people

The 2012-2013 AATSIHS reported that more than half (52%) of Indigenous people aged 15 years and older had never used illicit substances [353]. Similar proportions were reported in the 2008 NATSISS (57%) [328]. Proportions for never using illicit substances were higher for Indigenous females than for Indigenous males [328, 353].

According to the 2012-2013 AATSIHS, 22% of Indigenous people aged 15 years and over had used an illicit substance in the 12 months prior to interview [107], a slight decrease from that reported in the 2008 NATSISS (23%) [328] and the 2004-2005 AATSIHS (28%) (among Indigenous people aged 18 years or over) [182]. While not directly comparable, the level among Indigenous people from 2012-2013 is approximately 1.5 times that reported in the 2013 *National drug strategy household survey* (NDSHS) among the total Australian population aged 14 years or over (15%) [350]. The 2012-2013 AATSIHS found that illicit substance use in the previous 12 months was highest among younger age-groups: 15-24 years (28%), 25-34 years (27%), 35-44 years (23%), and 45-54 (19%) [353].

The 2012-2013 AATSIHS found that the illicit substance most commonly used by Indigenous people aged 15 years and over in the previous 12 months was cannabis (19%) [353], with a similar level reported in the 2008 NATSISS (17%) [47]. The use of pain killers and sedatives (3.9%), amphetamines (2.3%) decreased slightly when compared with the 2008 NATSISS (4.5% and 4.0%, respectively).

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 2.8% [353].

In 2012-2013, males were around 1.5 times more likely than females to have used an illicit drug in the previous 12 months (27% and 18%, respectively) [353]. The higher proportions of use by males were found for all drug types, except pain killers/sedatives where proportions were similar (3.6% and 4.1%, respectively). Around twice as many Indigenous males as Indigenous females had used cannabis (24% compared with 14%), amphetamines (2.9% compared with 1.8%), and 'other drugs' (3.7% compared with 1.9%).

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%) (this was the case for all drug types except kava) [353]. These proportions are similar to those reported in the 2008 NATSISS (24% and 17%, respectively) [47]. Likewise, in 2012-2013, the proportion of Indigenous people who had ever used illicit substances was higher for those living in non-remote areas (48%) than in remote areas (36%) [353]. These proportions are similar to those reported in the 2008 NATSISS (47% and 31%, respectively) [47].

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%) compared with those who had 'never used illicit substances' (35% were current daily smokers) [47]. A higher proportion of 'recent illicit substance users' reported risky/high-risk drinking (7.3% reported risky/high-risk consumption over 3 days and 8.9% reported risky/high-risk consumption over 7 days) compared with those who had 'never used illicit substances' (3.0% reported risky/high-risk drink consumption over 3 days and 3.7% reported risky/high-risk drink consumption over 7 days).

Higher proportions of Indigenous people who had experienced stressors in the last 12 months were more likely to be 'recent substance users' than those who 'never used illicit substances'. For those who reported recent substance use, 6.4% reported a stressor of 'witness to violence' and 5.9% reported a stressor of abuse or violent crime. For those who had never used illicit substances, 2.8% reported a stressor of 'witness to violence' and 1.8% reported a stressor of abuse or violent crime. According to the 2008 NATSISS, 95% of mothers of Indigenous children aged 0-3 years did not use illicit substances during pregnancy [47]. The proportion of mothers of Indigenous children who did use illicit substances during pregnancy was highest in Vic (9.3%), followed by WA (8.5%), and lowest in NSW and Qld (both 3.9%).



## Hospitalisation

Between July 2012 and June 2013, there were 3,552 hospital separations related to substance use among Indigenous people in Australia [Derived from 32]. The national age-standardised hospitalisation rates for conditions relating to substance use were higher for Indigenous people than for non-Indigenous people [32]. The leading causes of substance use-related hospitalisations for the Indigenous and non-Indigenous populations were ICD 'Mental/behavioural disorders' and ICD 'Poisoning'. Indigenous people were hospitalised at 3.1 times the rate for non-Indigenous people due mental and behavioral disorders. Indigenous people were hospitalised at 2.7 times the rate for non-Indigenous people for ICD 'Accidental poisoning' and 2.3 times the rate for poisoning. Substance use-related hospitalisation rates for Indigenous people were higher in major cities and decreased with remoteness of residence.

## 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 than for their non-Indigenous counterparts in 2008-2012 (Table 35) [32]. The rate for Indigenous males (10.8 per 100,000) was higher than for Indigenous females (8.9 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, 2008-2012

Jurisdiction	Indigenous rate	Non-Indigenous rate	Rate ratio
NSW	12.6	6.2	2.0
Qld	7.2	6.3	1.1
WA	8.7	7.1	1.2
SA	22.3	6.8	3.3
NSW, Qld, WA, SA and the NT	9.9	6.4	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: Derived from Steering Committee for the Review of Government Service Provision, 2014 [32]

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 [354]. 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

The health status of Australia's Aboriginal and Torres Strait Islander people continues to improve slowly. However, 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 for improvements in key closing the gap targets.

With respect to life expectancy, while there has been a decrease in overall death rates between 1998 and 2013 of 16%, this apparent good news is tempered by the fact that there has been no significant decrease between 2006 and 2013 [355]. The most recent estimates, in 2010-12, of life expectancy at birth for Indigenous people, indicate a life expectancy of 69.1 years for males and 73.7 years for females. This represents an absolute gain from 2005-2007 to 2010-2012. While these absolute gains are ameliorated somewhat by the relative gains by non-Indigenous people the Closing the Gap Steering Committee welcomed the gains as an 'on the ground' improvement that has tangible meaning for Aboriginal and Torres Strait Islander families and communities [356, p.7].

There appears to have been sustainable improvements in the target to halving the gap in mortality rates for Aboriginal and Torres Strait Islander children by 2018 [355].<sup>45</sup> Nevertheless, as pointed out in the *Close the gap progress and priorities* report, due to a decrease in the death rate for non-Indigenous children the rate ratio has not changed in the last decade [356].

A number of key initiatives and commitments offer promise of contributing to continued efforts to close the gap. There is increased acknowledgement of the importance of strong cultural foundations to sustainable improvements in health and well-being [33, 355]. As noted earlier in this *Overview*, a shift in the discourse about Aboriginal and Torres Strait Islander health from deficit to strengths based approaches is a powerful and empowering development [32]. An increased focus on 'what works' provides tangible signposts for positive pathways forward. In this respect the recognition of the importance of the Aboriginal and Torres Strait Islander community controlled health sector will be crucial [357]. On the national stage, constitutional recognition of Aboriginal and Torres Strait Islander peoples has been linked to positive health and wellbeing outcomes [33]. Integrated, holistic, systemic changes such as these are essential to the long term future for Aboriginal and Torres Strait Islander peoples as identity strengthening and empowering strategies to improve health outcomes.

<sup>45</sup> While the 2013 rate was above the trajectory range this was due to a large number of 2012 deaths being registered in 2013. The average rate for the two years is within the required trajectory to achieve the target by 2018.

# Glossary

## **age-adjustment**

see **age-standardisation**

## **age-specific death rate**

the number of deaths of persons of a specific age-group in one year per 1,000 persons of the same age-group

## **age-specific fertility rate**

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

## **age-standardisation**

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

## **body mass index (BMI)**

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

## **crude rate**

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

## **direct standardisation**

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

## **excess deaths**

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

## **expectation of life**

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

## **fertility rate**

see **age-specific fertility rate** and **total fertility rate**

## **hospitalisation**

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

## **incidence**

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

## **incidence rate**

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

## **Indigenous Australians**

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

## **indirect standardisation**

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

## **infant mortality rate (IMR)**

number of infant deaths per 1,000 live births

## **International Classification of Disease (ICD)**

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

**life expectancy**

see **expectation of life**

**maternal mortality ratio**

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

**median age at death**

the age above and below which 50% of deaths occurred

**morbidity**

state of being diseased or otherwise unwell

**mortality**

death

**non-Indigenous Australians**

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

**prevalence**

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

**risk factor**

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

**standardisation**

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

**standardised mortality ratio (SMR)**

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

**standardised rate**

the number of new cases (standardised incidence rate) or deaths (standardised death rate) due to a disease for a particular population after adjustment has been made for differences in the age structures of this population and a reference population; see **standardisation**

**total fertility rate**

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

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## Abbreviations

- **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
- **NNDSS** - National Notifiable Diseases Surveillance System
- **NSAOH** - National Survey of Adult Oral Health
- **NSW** - New South Wales
- **NT** - Northern Territory
- **NTEHP** - National Trachoma and Eye Health Program
- **NTER** - Northern Territory Emergency Response
- **OATSIH** - Office for Aboriginal and Torres Strait Islander Health
- **OM** - Otitis media
- **PD** - Peritoneal dialysis
- **Qld** - Queensland
- **RHD** - Rheumatic heart disease
- **SA** - South Australia
- **SAB** - *Staphylococcus aureus* bacteraemia
- **SDAC** - Survey of 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



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