

2015

Overview of Aboriginal and Torres Strait Islander health status, 2015

Burns Jane

Edith Cowan University, j.burns@ecu.edu.au

Samantha Burrow

Edith Cowan University, s.burrow@ecu.edu.au

Neil M. Drew

Australian Indigenous HealthInfoNet, n.drew@ecu.edu.au

Michelle Elwell

Edith Cowan University, m.elwell@ecu.edu.au

Caitlin A. Gray

Edith Cowan University, caitlin.gray@ecu.edu.au

See next page for additional authors

Follow this and additional works at: <https://ro.ecu.edu.au/ecuworkspost2013>



Part of the [Community Health and Preventive Medicine Commons](#), and the [Health Services Research Commons](#)

Australian Indigenous HealthInfoNet. (2016). Overview of Australian Indigenous and Torres Strait Islander health status, 2015. Perth, WA: Australian Indigenous HealthInfoNet.

This Book is posted at Research Online.

<https://ro.ecu.edu.au/ecuworkspost2013/2223>

Authors

Burns Jane, Samantha Burrow, Neil M. Drew, Michelle Elwell, Caitlin A. Gray, Millie Harford-Mills, Joanne Hoareau, Renee Lynch, Andrea Macrae, Trish O'Hara, Christine Potter, Miranda Poynton, Kathy Ride, and Avinna Trzesinski



Australian Indigenous
HealthInfoNet

Overview of Aboriginal and Torres Strait Islander health status 2015



Core funding is
provided by the
Australian Department
of Health



The Australian Indigenous Health*InfoNet*

The Australian Indigenous Health*InfoNet*'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 practitioners) and researchers. The Health*InfoNet* also provides easy-to-read and summarised material for students and the general community.

The Health*InfoNet* 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.healthinonet.ecu.edu.au). The research involves analysis and synthesis of data and other information obtained from academic, professional, government and other sources. The Health*InfoNet*'s work in knowledge exchange aims to facilitate the transfer of pure and applied research into policy and practice to address the needs of a wide range of users.

Recognition statement

The Australian Indigenous Health*InfoNet* recognises and acknowledges the sovereignty of Aboriginal and Torres Strait Islander peoples as the original custodians of the country. Aboriginal and Torres Strait 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 spirituality. We recognise that the current health status of Aboriginal and Torres Strait Islander people 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 of Western Australia on whose country our offices are located.

Contact details

Director: Professor Neil Drew

Address: Australian Indigenous Health*InfoNet*
Edith Cowan University
2 Bradford Street
Mount Lawley
Western Australia 6050

Telephone: (08) 9370 6336

Facsimile: (08) 9370 6022

Email: healthinonet@ecu.edu.au

Web: www.healthinonet.ecu.edu.au

Overview of Australian Indigenous health status, 2015

Publication team

Production editor

Jane Burns

Contributing authors 2015

Jane Burns

Samantha Burrow

Neil Drew

Michelle Elwell

Caitlin Gray

Millie Harford-Mills

Joanne Hoareau

Renee Lynch

Andrea MacRae

Trish O'Hara

Christine Potter

Miranda Poynton

Kathy Ride

Avinna Trzesinski

Library services

Graham Barker

Lawrence Rutherford

March 2016

Australian Indigenous Health*InfoNet*

Perth, Western Australia

Suggested citation:

Australian Indigenous Health*InfoNet* (2016) *Overview of Australian Indigenous and Torres Strait Islander health status, 2015*.
Perth, WA: Australian Indigenous Health*InfoNet*

Contents

Preface	iv
Acknowledgements	iv
Dedication to Professor Neil Thomson	v
Key facts	vi
<i>Population</i>	vi
<i>Births and pregnancy outcome</i>	vi
<i>Mortality</i>	vi
<i>Hospitalisation</i>	vi
<i>Selected health conditions</i>	vi
<i>Factors contributing to Aboriginal and Torres Strait Islander health</i>	viii
Introduction	1
<i>Sources of information</i>	1
<i>Limitations of the sources of Aboriginal and Torres Strait Islander health information</i>	2
The context of Aboriginal and Torres Strait Islander health	3
<i>Historical context and social determinants of Aboriginal and Torres Strait Islander health</i>	3
<i>The historical context of Aboriginal and Torres Strait Islander health</i>	3
<i>The importance of contemporary social determinants and cultural concepts of Aboriginal and Torres Strait Islander health</i>	4
<i>The shift to strengths based approaches</i>	4
<i>Indicators of Aboriginal and Torres Strait Islander social disadvantage</i>	5
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>	11
<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>	15
<i>Age-specific separation rates</i>	16
<i>Causes of hospitalisation</i>	16
<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>	35
<i>Ear health and hearing</i>	36
<i>Oral health</i>	38
<i>Disability</i>	40
<i>Communicable diseases</i>	43

<i>Tuberculosis</i>	43
<i>Hepatitis</i>	44
<i>Haemophilus influenzae type b</i>	45
<i>Pneumococcal disease</i>	46
<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 Aboriginal and Torres Strait Islander health	50
<i>Selected health risk and protective factors</i>	50
<i>Nutrition</i>	50
<i>Physical activity</i>	52
<i>Bodyweight</i>	53
<i>Immunisation</i>	54
<i>Breastfeeding</i>	55
<i>Tobacco use</i>	56
<i>Alcohol use</i>	56
<i>Illicit substance use</i>	58
Concluding comments	59
Glossary	61
Abbreviations	63
References	66

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 Islanders people. It has been prepared by Australian Indigenous HealthInfoNet staff as part of our contribution to supporting those who work in the Aboriginal and Torres Strait Islander health sector. The *Overview* is a key element of the HealthInfoNet commitment to authentic and engaged knowledge development and exchange.

The initial sections of this *Overview* provide information about the context of Aboriginal and Torres Strait Islander health, 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 sex 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). For more information on accessing and using the HealthInfoNet resource please view our instructional videos accessible from the web resource and also located on You Tube at www.youtube.com/channel/UCftVbk_1fVQz2i_9TyQ1E2Q.

As part of our ongoing commitment to the use of appropriate terminology regarding Aboriginal and Torres Strait Islander people, we have changed the title of the *Overview* to make it consistent with the HealthInfoNet guidelines on the appropriate use of terminology (www.healthinonet.ecu.edu.au/key-resources/bibliography?lid=30201).

The key to successful knowledge exchange and transfer is authentic partnership in the development of materials so we welcome your comments and feedback about the *Overview* of Aboriginal and Torres Strait Islander health status 2015.

Also in this issue we pay tribute to Professor Neil Thomson the founder and Foundation Director of the HealthInfoNet who passed away on the 24 January, 2016.



Neil Drew, Director on behalf of the HealthInfoNet team

Acknowledgements

Particular thanks are extended to:

- 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.
- Members of the HealthInfoNet Advisory Board and HealthInfoNet consultants.
- Users of the HealthInfoNet resource for their ongoing support and feedback.



Dedication to Professor Neil Thomson

The 2015 *Overview of Aboriginal and Torres Strait Islander health status* is dedicated to founding Director of the Australian Indigenous HealthInfoNet, Professor Neil Thomson who passed away in January 2016. Neil was responsible for the first *Overview* in 1999 which was originally called a Summary. The *Overview* continues today as an authoritative, comprehensive annual summary of the most recent indicators of the health of Aboriginal and Torres Strait Islander people. It is an important part of the Australian Indigenous HealthInfoNet's contributions to closing the gap in health between Aboriginal and Torres Strait Islander and other Australians and draws on the most up-to-date, authoritative sources and undertakes some original analyses.

Neil had a long involvement in Aboriginal and Torres Strait Islander health combined with tertiary training in medicine, mathematics, anthropology and public health and clinical medical practice including positions in the Kimberley region of WA. His special interests were in the transfer/translation of research and other information to inform policy-making, planning and service delivery and in 1997 he established the Australian Indigenous HealthInfoNet. This dedication is an acknowledgement of Neil's substantial and tireless contribution over his working career to improving health outcomes of Aboriginal and Torres Strait Islander people, of which the *Overview* remains a hallmark publication.



Bibdjool

Donna Lei Rioli - a Western Australian Indigenous artist - was commissioned by the HealthInfoNet to create a logo incorporating a gecko, chosen as 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 Aboriginal and Torres Strait Islander Australians.

Key facts

Population

- At 30 June 2015, the estimated Australian Aboriginal and Torres Strait Islander population was 729,048 people.
- For 2015, it was estimated that NSW had the highest number of Indigenous people (225,349 people, 31% of the total Indigenous population).
- For 2015, it was estimated that the NT had the highest proportion of Indigenous people in its population (30% of the NT population were Indigenous).
- In 2015, around 35% of Indigenous people lived in a capital city.
- The Indigenous population is much younger than the non-Indigenous population.

Births and pregnancy outcome

- In 2014, there were 17,779 births registered in Australia with one or both parents identified as Indigenous (5.9% of all births registered).
- In 2014, Aboriginal and Torres Strait Islander mothers were younger than non-Indigenous mothers; the median age was 25.1 years for Aboriginal and Torres Strait Islander mothers and 30.9 years for all mothers.
- In 2014, total fertility rates were 2,222 births per 1,000 for Aboriginal and Torres Strait Islander women and 1,804 per 1,000 for all women.
- In 2013, the average birthweight of babies born to Aboriginal and Torres Strait Islander mothers was 3,200 grams compared with 3,361 grams for babies born to non-Indigenous mothers.
- In 2013, the proportion of low birthweight babies born to Aboriginal and Torres Strait Islander women was twice that of non-Indigenous women (12% compared with 6.1%).

Mortality

- In 2009-2013, the age-standardised death rate for Aboriginal and Torres Strait Islander people was 1.7 times the rate for non-Indigenous people.
- Between 1998 and 2013, there was a 16% 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 2010-2014, 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 2012-2014, 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 2008-2012, for direct maternal deaths the rate ratio was 2.2 times higher for Indigenous women than for non-Indigenous women.

Hospitalisation

- In 2013-14, 4.2% of all hospitalisations were of Aboriginal and Torres Strait Islander people.
- In 2013-14, the age-standardised separation rate for Aboriginal and Torres Strait Islander people was 2.3 times higher than for other Australians.
- In 2011-13, the main cause of hospitalisation for Aboriginal and Torres Strait Islander people was for 'care involving dialysis', responsible for 45% of Aboriginal and Torres Strait Islander separations.

Selected health conditions

Cardiovascular disease

- In 2012-2013, 13% of Aboriginal and Torres Strait Islander people reported having a long-term heart or related condition; after age-adjustment, these conditions were around 1.2 times more common for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2013-14, hospitalisation rates for circulatory disease were almost twice as high for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

- In 2013, cardiovascular disease was the leading cause of death for Aboriginal and Torres Strait Islander people, accounting for 24% of Indigenous deaths.
- In 2013, the age-adjusted death rates from ischaemic heart diseases and cerebrovascular diseases for Aboriginal and Torres Strait Islander people were both 1.6 times the rates for non-Indigenous people.

Cancer

- In 2005-2009, age-adjusted cancer incidence rates were slightly lower for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2005-2009, the most common cancers diagnosed among Aboriginal and Torres Strait Islander people were lung and breast cancers.
- In 2012-13, age-standardised hospitalisation rates for cancer were lower for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2013, the age-standardised death rate for cancer for Aboriginal and Torres Strait Islander people was 1.3 times higher than for non-Indigenous people.

Diabetes

- In 2012-2013, 9% of Aboriginal and Torres Strait Islander people reported having diabetes; after age-adjustment, Aboriginal and Torres Strait Islander people were more than 3 times more likely to report having some form of diabetes than non-Indigenous people.
- In 2012-13, age-adjusted hospitalisation rates for diabetes for Indigenous males and females were 3.5 and 4.7 times the rates for other males and females.
- In 2013, Aboriginal and Torres Strait Islander people died from diabetes at 6 times the rate of non-Indigenous people.

Social and emotional wellbeing

- In 2012-13, after age-adjustment, Aboriginal and Torres Strait Islander people were 2.7 times as likely as non-Indigenous people to feel high or very high levels of psychological distress.
- In 2012-13, 69% of Aboriginal and Torres Strait Islander adults experienced at least one significant stressor in the previous 12 months.
- In 2012-13, 91% of Aboriginal and Torres Strait Islander people reported on feelings of calmness and peacefulness, happiness, fullness of life and energy either some, most, or all of the time.
- In 2013-14, there were 16,070 hospital separations with a principal diagnosis of ICD 'Mental and behavioural disorders' identified as Indigenous.
- In 2013, the death rate for ICD 'Intentional self-harm' (suicide) for Aboriginal and Torres Strait Islander people was 2.2 times the rate reported for non-Indigenous people.

Kidney health

- In 2010-2014, after age-adjustment, the notification rate of end stage renal disease was 6.6 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2011-13, 'care involving dialysis' was the most common reason for hospitalisation among Aboriginal and Torres Strait Islander people.
- In 2008-2012, the age-standardised death rate from kidney disease was 2.6 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Injury

- In 2013-14, after age-adjustment, Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander women than for other women.
- In 2013, injury was the third most common cause of death among Aboriginal and Torres Strait Islander people, accounting for 15% of Aboriginal and Torres Strait Islander deaths.

Respiratory disease

- In 2012-2013, 31% of Aboriginal and Torres Strait Islander people reported having a respiratory condition. After age-adjustment, the level of respiratory disease was 1.2 times higher for Aboriginal and Torres Strait Islander than non-Indigenous people.
- In 2012-2013, 18% of Aboriginal and Torres Strait Islander people reported having asthma.

- In 2012-13, after age-adjustment, hospitalisation rates for Aboriginal and Torres Strait Islander 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 2013, after age-adjustment, the death rate for respiratory disease for Aboriginal and Torres Strait Islander people was 2.0 times that for non-Indigenous people.

Eye health

- In 2012-2013, eye and sight problems were reported by 33% of Aboriginal and Torres Strait Islander people.
- In 2012-2013, myopia and hyperopia for Aboriginal and Torres Strait Islander people were reported at 0.8 and 1.1 times the proportions for their non-Indigenous counterparts. The proportion of Aboriginal and Torres Strait Islander people who reported blindness was 7.4 times more than for their non-Indigenous counterparts.

Ear health and hearing

- In 2012-2013, ear/hearing problems were reported by 12% of Aboriginal and Torres Strait Islander people.
- In 2013-14, the hospitalisation rate for ear/hearing problems for Aboriginal and Torres Strait Islander children aged 4-14 years was 1.6 times higher than the rate for non-Indigenous children.

Oral health

- In 2010, in Qld, WA, SA, Tas, ACT and the NT, Aboriginal and Torres Strait Islander children had more dental problems than non-Indigenous children.
- In 2004-2006, caries and periodontal diseases were more prevalent among Aboriginal and Torres Strait Islander adults than among non-Indigenous adults.

Disability

- In 2012, after age-adjustment, Aboriginal and Torres Strait Islander people were 1.7 times as likely as non-Indigenous people to have a profound/core activity restriction.

Communicable diseases

- In 2009-2013, after age-adjustment, the notification rate for tuberculosis was 11.3 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2010-2015, the crude notification rate for hepatitis B was 3.6 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2010-2014, the crude notification rate for hepatitis C for Aboriginal and Torres Strait Islander people was 7.8 times higher than for non-Indigenous people.
- In 2007-2010, notification rates for Haemophilus influenzae type b were 12.9 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2007-10, the age-standardised rates of invasive pneumococcal disease were highest in the 50 years and older age-group followed by the 0-4 years age-group. Rates for Aboriginal and Torres Strait Islander people aged 25-49 were almost 12 times higher than for non-Indigenous people.
- In 2007-2010, the age-standardised notification rate of meningococcal disease was 2.7 times higher for Aboriginal and Torres Strait Islander people than for other Australians; the rate for Aboriginal and Torres Strait Islander children aged 0-4 years was 3.8 times higher than for their non-Indigenous counterparts.
- In 2014, Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander than non-Indigenous people.

Factors contributing to Aboriginal and Torres Strait Islander health

Nutrition

- In 2012-2013, 54% of Aboriginal and Torres Strait Islander people reported eating an adequate amount of fruit but only 8% of Aboriginal and Torres Strait Islander people reported eating an adequate amount of vegetables.
- In 2012-2013, on average, Aboriginal and Torres Strait Islander people consumed 41% of their total daily energy in the form of discretionary foods.

Physical activity

- In 2012-13, 47% of Aboriginal and Torres Strait Islander adults in non-remote areas met the target of 30 minutes of moderate intensity physical activity on most days.
- In 2012-2013, after age-adjustment, 61% of Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander adults were classified as overweight or obese; after age-adjustment, the level of obesity/overweight was 1.2 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Immunisation

- In 2014, 93% of Aboriginal and Torres Strait Islander children aged 5 years were fully immunised against the recommended vaccine-preventable diseases.

Breastfeeding

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

Tobacco use

- In 2012-13, 44% of Aboriginal and Torres Strait Islander adults were current smokers; after age-adjustment, this proportion was 2.5 times higher than the proportion among non-Indigenous adults.
- In 2011, 50% of Aboriginal and Torres Strait Islander mothers reported smoking during pregnancy.

Alcohol use

- In 2012-13, 23% of Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander and non-Indigenous population.
- In 2011-13, after age-adjustment, Aboriginal and Torres Strait Islander males were hospitalised at 4.5 times and Aboriginal and Torres Strait Islander females at 3.6 times the rates of their non-Indigenous counterparts for a principal diagnosis related to alcohol use.
- In 2008-2012, the age-standardised death rates for alcohol-related deaths for Aboriginal and Torres Strait Islander people was 4.9 times higher than for non-Indigenous people.

Illicit drug use

- In 2012-13, 22% of Aboriginal and Torres Strait Islander adults reported that they had used an illicit substance in the previous 12 months.
- In 2008-2012, the rate of drug-induced deaths was 1.5 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Introduction

This *Overview of Australian Aboriginal and Torres Strait Islander 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 people 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 Aboriginal people and Torres Strait Islander people.

Sources of information

Research for the *Overview* involves the collection, collation, and analysis of a wide range of relevant information, including both published and unpublished material. Sources include government reports, particularly those produced by the Australian Bureau of Statistics (ABS), the Australian Institute of Health and Welfare (AIHW), the Australian Health Ministers' Advisory Council (AHMAC), and the Steering Committee for the Review of Government Service Provision (SCRGSP). Important additions to the regular ABS and AIHW publications are four series of special reports that bring together key information about Indigenous 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 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 AIHW produced an updated version in 2015 [1].

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 NAGATSIHID strategic plan 2011-2015 acknowledged 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' [2, 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, for example, the *Australian Aboriginal and Torres Strait Islander health 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 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 Aboriginal and Torres Strait Islander health information

The assessment of Aboriginal and Torres Strait Islander people's 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.

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

In relation to population estimates, the ABS has made considerable efforts in recent decades to achieve accurate counts of the Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander patients were correctly identified in Australian public hospital admission records in 2011-12 [8].

The levels of Aboriginal and Torres Strait Islander people's 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 health status. The differences between Aboriginal and Torres Strait Islander people 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 Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander people. The AIHW's *Cancer in Australia: an overview 2014* acknowledges that national data on cancer incidence and mortality among Aboriginal and Torres Strait Islander people are not available and Indigenous-specific information about screening is only collected for breast cancer and not for cervical and bowel cancer [9].
- Special reports related to Aboriginal and Torres Strait Islander health (see the *Sources of information* section) 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 for periods of time and for comparisons.

The context of Aboriginal and Torres Strait Islander health

Historical context and social determinants of Aboriginal and Torres Strait Islander health

Aboriginal and Torres Strait Islander people are the original first peoples of the country. Aboriginal people are distinctively different ethnically and culturally from Torres Strait Islander people [10].

Aboriginal people in Australia are recognised among the oldest living cultures in the world with estimates ranging from 50,000 to 120,000 years [11]. They occupied the 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 people have lived on the 270 or so islands in the straits between Australia and Papua New Guinea for approximately 2,500 years [11]. Today in addition to living in other parts of Australia, they continue to 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 Torres Strait they have traditionally had close contact with Papuan New Guinean communities and Australian Aboriginal communities.

Despite their differences, Aboriginal and Torres Strait Islander people have had many shared experiences since colonisation including dispossession, marginalisation and racism, and the Stolen Generations, that have had a significant impact on health outcomes to the present day.

The historical context of Aboriginal and Torres Strait Islander health

There is an indisputable relationship between the enduring impact of colonisation and current health status of Aboriginal and Torres Strait Islander people [11-15]. This relationship has also been defined as the historical determinants of health [16]. Social disadvantages, directly related to dispossession and characterised by poverty and powerlessness, are reflected in measures of education, employment, income and incarceration. Aboriginal and Torres Strait Islander people generally enjoyed better health in 1788¹ than most people living in Europe at that time [17-21]. 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

¹ The first Australian colony was formally proclaimed in 1788.

infections (including a non-venereal form of syphilis and yaws²) 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 [18, 19, 22, 23]. These diseases, particularly smallpox, caused considerable loss of life among Aboriginal and Torres Strait Islander populations, but the impacts were not restricted to the immediate victims. The epidemic also affected the fabric of Aboriginal and Torres Strait Islander societies through depopulation and social disruption.

The impact of introduced diseases was almost certainly the major cause of death for Aboriginal and Torres Strait Islander people, but direct conflict and occupation of Indigenous homelands by non-Indigenous people also contributed substantially to Aboriginal and Torres Strait Islander people's mortality [22, 24-26]. The initial responses of Aboriginal and Torres Strait Islander 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.

A number of identifiable periods define the process of colonisation since settlement all of which have had profound implications for the health and wellbeing of Aboriginal and Torres Strait Islander people [13]. Sherwood describes the early but enduring experiences of dispossession, conflict, protectionism, removal of children and assimilation and the more contemporary impacts of self-determination, the intervention, and the apology by former Prime Minister, Kevin Rudd in 2008 [13, pp.31-36]. These issues continue to impact on the health outcomes and prospects for Aboriginal and Torres Strait Islander people, in both policy and practice.

The importance of contemporary social determinants and cultural concepts of Aboriginal and Torres Strait Islander health

The international literature unequivocally attests to the impact of what have become known as the social determinants of health on health outcomes [14-16, 27]. The social (and cultural) determinants of Aboriginal and Torres Strait Islander health include socioeconomic status, employment, poverty, housing, education, racism, trauma, stressful life events and access to community resources [16]. Gee et al [16] note that these factors are concurrent and cumulative and cannot be considered in isolation. It is also crucial to direct a reflective gaze on the persisting impact of colonisation on contemporary health care practices and to ensure that invoking the social determinants of health does not obscure the important culturally bound understanding of these determinants [13]. It is also important to understand that for Aboriginal and Torres Strait Islander people health is a holistic concept. There was no separate term in Indigenous languages for health as it is understood in western society [28]. 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 identity and being.

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 people 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 [29, 30]. 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. [31, 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' [30, 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:

² Yaws is a bacterial infection of the skin, bones and joints.

- recognise and honour the resilience, persistence, and importance of Aboriginal and Torres Strait Islander cultures to positive health outcomes
- recalibrate the narrative and challenge stereotypical and racist views of Aboriginal and Torres Strait Islander people 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 [32]
- provide clear pathways forward unobscured by the weight of negative expectations that have become self-fulfilling prophesy.

In relation to Aboriginal and Torres Strait Islander health there is increased recognition of the importance of a number of culturally determined 'health protecting factors' including connection to land, culture, spirituality and ancestry; kinship and; self-determination, community governance and cultural continuity [15, pp.104-105]. Strengths based approaches embrace and endorse strategies, programs and policies that embody these health protective factors. It is also very important for strengths based approaches to adopt a decolonising agenda; 'why it is important that we all employ a more open and decolonising gaze' [13, p.29].

Indicators of Aboriginal and Torres Strait Islander social disadvantage

The key measures in these areas for Aboriginal and Torres Strait Islander people nationally include:

Education

According to the 2011 Australian *Census* [33]:

- 92% of 5 year old Aboriginal and Torres Strait Islander children were attending an educational institution
- 1.6% of the Aboriginal and Torres Strait Islander population had not attended school compared with 0.9% of the non-Indigenous population
- 29% of Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander people reported having a post-school qualification, compared with 49% of non-Indigenous people
- 4.6% of Aboriginal and Torres Strait Islander people had attained a bachelor degree or higher, compared with 20% of non-Indigenous people.

An ABS school report [34] revealed, in 2013:

- the apparent retention rate for Aboriginal and Torres Strait Islander 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 102³%; and from year 7/8 to year 12 it was 83%.

The 2015 national report on schooling in Australia [35] showed:

- 79% of year 3 Indigenous students and 74% of year 5 Indigenous students were at or above the national minimum standard for reading, compared with 96% of year 3 non-Indigenous students and 95% of year 5 non-Indigenous students
- 81% of year 3 Indigenous students and 68% of year 5 Indigenous students were at or above the national minimum standard for persuasive writing, compared with 96% of year 3 non-Indigenous students and 94% of year 5 non-Indigenous students
- 74% of year 3 Indigenous students and 76% 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 95% 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 grammar and punctuation, compared with 96% of year 3 non-Indigenous students and 94% of year 5 non-Indigenous students
- 78% of year 3 Indigenous students and 79% 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 96% of year 5 non-Indigenous students.

³ Factors that may account for retention rates exceeding 100% include international migration, students repeating a year of education, students changing between full-time and part-time study and age requirements for participation in education.

Employment

According to the 2011 Australian *Census* [33]:

- 42% of Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander 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 equivalised⁴ gross weekly household income for Aboriginal and Torres Strait Islander households in 2011-13 was \$465 compared with \$869 for non-Indigenous households [30].

Aboriginal and Torres Strait Islander population

Based on information from the 2011 Australian Census, the ABS has estimated the Aboriginal and Torres Strait Islander population at 729,048 on 30 June 2015 [36] (Table 1). The Aboriginal and Torres Strait Islander population accounted for 3.0% of Australia's total population of 24 million [36, 37]. The estimation for the Aboriginal and Torres Strait Islander population in NSW is the highest (225,349 people), followed by Qld (208,026), WA (95,707), and the NT (73,396) (Table 1). The NT has the highest proportion of Aboriginal and Torres Strait Islander people among its population (29.7%) and Vic the lowest (0.9%).

Table 1. Estimated Aboriginal and Torres Strait Islander (Indigenous) population, by jurisdiction, Australia, 30 June 2015

Jurisdiction	Indigenous population (number)	Proportion of Australian Indigenous population (%)	Proportion of jurisdiction population (%)
NSW	225,349	31	3.0
Vic	52,299	7.2	0.9
Qld	208,026	29	4.3
WA	95,707	13	3.5
SA	40,646	5.6	2.4
Tas	26,440	3.6	5.1
ACT	6,902	0.9	1.7
NT	73,396	10	30
Australia	729,048	100.0	3.0

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

Source: Derived from ABS, 2014 [36], ABS, 2013 [37]

There was a 21% increase in the number of Aboriginal and Torres Strait Islander people counted in the 2011 Census compared with the 2006 Census [3]⁵. The largest increases were in the ACT (34%), Vic (26%), NSW (25%) and Qld (22%) [38]. For all jurisdictions, the 55 years and over age-group showed the largest relative increase (i.e. the Indigenous population is ageing) [39]. There are a number of 'structural' reasons contributing to the growth of the Indigenous population:

- the slightly higher fertility rates of Aboriginal and Torres Strait Islander women compared with the rates of other Australian women (see 'Births and pregnancy outcome')
- a higher proportion of Aboriginal and Torres Strait Islander 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 [39]:

- 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.

In 2015, around 35% of Aboriginal and Torres Strait Islander people (256,056 people) lived in major cities, 45% (324,886 people) lived in inner and outer regional areas, and 20% (148,106) lived in remote and very remote areas [36].

In terms of specific geographical areas, more than one-half (53%) of all Aboriginal and Torres Strait Islander people counted in the 2011 Census lived in nine of the 57 Indigenous regions⁶ [4]. In 2015, the largest projected populations were in three regions in eastern

⁴ Equivalised household income adjusts the actual incomes of households to make households of different sizes and compositions comparable.

⁵ There is a difference between the census 'counts' and 'estimates'. The 'estimates' adjust for a number of factors and are more accurate.

⁶ Indigenous regions are large geographical units loosely based on the former Aboriginal and Torres Strait Islander Commission boundaries.

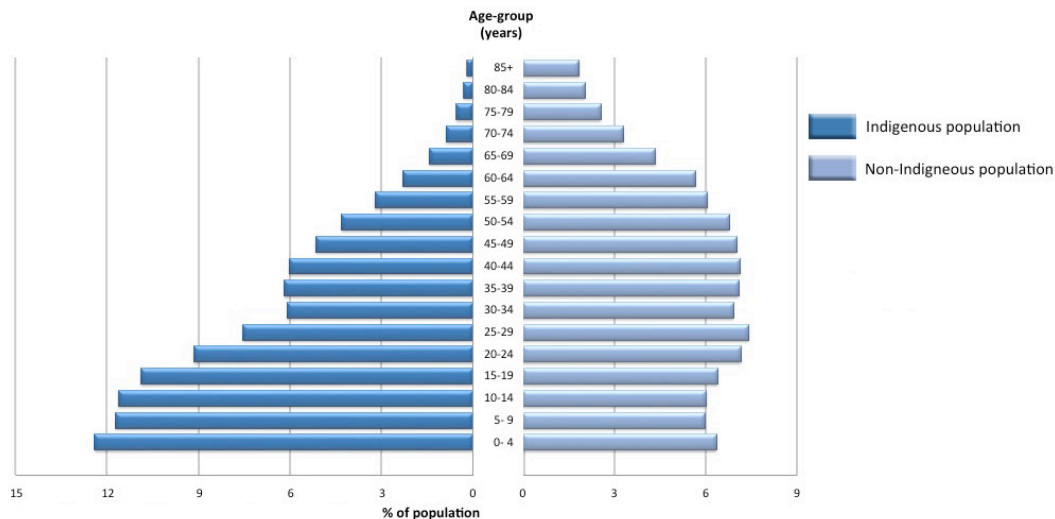
Australia (Brisbane, NSW Central and the North Coast, and Sydney-Wollongong), which accounted for 29% of the total Aboriginal and Torres Strait Islander population [36].

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 people⁷ lived in Qld; NSW was the only other state with a large number of Torres Strait Islander people.

The Aboriginal and Torres Strait Islander population is much younger overall than the non-Indigenous population (Figure 1) [40].

According to estimates from the 2011 Census, at 30 June 2011 about 36% of Aboriginal and Torres Strait Islander people were aged less than 15 years, compared with 18% of non-Indigenous people. About 3.4% of Aboriginal and Torres Strait Islander people were aged 65 years or over, compared with 14% of non-Indigenous people.

Figure 1. Population pyramid of Aboriginal and Torres Strait Islander and non-Indigenous populations, 30 June 2011



Source: ABS, 2012 [40]

Births and pregnancy outcome

In 2014, there were 17,779 births registered in Australia with one or both parents identified as Aboriginal and/or Torres Strait Islander (5.9% of all births registered) [41]. 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 2014, both parents identified as Aboriginal and Torres Strait Islander in 29% of those registered as Indigenous; only the mother in 43% (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) [41].

⁷ Includes people who identified as Torres Strait Islanders and those who identified as being of both Aboriginal and Torres Strait Islander descent.

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 postnatal 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.⁸ 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.

⁸ 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 2014, Aboriginal and Torres Strait Islander women had more babies and had them at younger ages than non-Indigenous women; teenagers had 17% of the babies born to Aboriginal and Torres Strait Islander women, compared with only 3.1% of those born to all mothers [41]. The median age of Indigenous mothers was 25.1 years, compared with 30.9 years for all mothers. The highest birth rates (known technically as fertility rates) were for the 20-24 years age-group for Aboriginal and Torres Strait Islander women and for the 30-34 years age-group for all women (Table 2). The fertility rate of teenage Indigenous women (57.3 babies per 1,000 women) was over four times that of all teenage women (13 babies per 1,000).

Table 2. Age-specific fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2014

Age-group of mother (years)	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Aboriginal and Torres Strait Islander mothers							
15-19	44	34	62	88	49	83	57
20-24	103	110	136	174	121	126	125
25-29	112	109	130	143	109	100	119
30-34	84	88	89	100	73	72	85
35-39	44	62	54	54	47	34	48
40-44	9.3	16	12	12	7.4	9.4	11
All mothers							
15-19	11	8.4	18	15	13	43	13
20-24	43	38	61	55	49	93	48
25-29	91	87	107	99	103	104	96
30-34	117	123	119	122	126	106	120
35-39	69	75	63	70	67	60	69
40-44	15	16	13	14	13	13	14

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, 2015 [41]

Total fertility rates

In 2014, total fertility rates were 2,222 births per 1,000 for Aboriginal and Torres Strait Islander women and 1,804 per 1,000 for all women (Table 3) [41]. The highest total fertility rate for Aboriginal and Torres Strait Islander women was for those in WA (2,863 babies per 1,000 women), followed by Qld (2,412 per 1,000) and the NT (2,121 per 1,000).

Table 3. Total fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2014

Status of mother	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Aboriginal and Torres Strait Islander mothers	1,976	2,091	2,412	2,863	2,031	2,121	2,222
All mothers	1,733	1,736	1,909	1,878	1,858	2,104	1,804

Notes: 1 Total fertility rate is the number of children born to 1,000 women at the current level and age pattern of fertility
2 Figures are not provided for Tas and the ACT because of the small numbers involved and doubts about the level of identification of Indigenous births. Numbers for those jurisdictions are included in figures for Australia

Source: ABS, 2015 [41]

Birthweights

The average birthweight of babies born to Aboriginal and Torres Strait Islander mothers in 2013 was 3,200 grams, 161 grams less than the average for babies born to non-Indigenous mothers (3,361 grams) [42]. Of these babies, 12% (1,507) were of low birthweight (LBW), compared with 6.1% (18,045) of babies of non-Indigenous mothers. (LBW, defined as a birthweight of less than 2,500 grams, increases the risk of health problems and death in infancy.)

Also:

Of these LBW babies, 18% of babies born to Aboriginal and Torres Strait Islander mothers and 16% of babies born to non-Indigenous mothers were of very LBW (less than 1,500 grams); 8.4% of babies of Aboriginal and Torres Strait Islander mothers and 6.8% of babies of non-Indigenous mothers were of extremely LBW (less than 1,000 grams).

LBW for babies of Aboriginal and Torres Strait Islander mothers ranged from 12% of babies in major cities to 14% in very remote areas. Details for jurisdictions are available for 2012, when babies born to Aboriginal and Torres Strait Islander women were nearly twice as likely to be of LBW (12%) than those born to non-Indigenous women (6.0%). The proportions of LBW babies born to Aboriginal and Torres Strait Islander women were highest in the ACT (15%)⁹, SA (15%), and WA (15%) [43]. The proportions of babies of LBW were higher for Aboriginal and Torres Strait Islander mothers than for all mothers in all jurisdictions (Table 4).

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

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Aboriginal and Torres Strait Islander mothers									
Mean birthweight	3,245	3,298	3,233	3,128	3,131	3,313	3,133	3,128	3,211
% low birthweight	11	10	11	15	15	11	15	14	12
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 [43]

Risk factors for LBW include pre-term birth, socioeconomic disadvantage, the age of the mother, and antenatal care [44]. 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 2013, almost half (48%) of Aboriginal and Torres Strait Islander mothers and 13% of non-Indigenous mothers reported smoking during pregnancy [42].

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 Aboriginal and Torres Strait Islander mothers who smoked during pregnancy (15%) than among those who did not smoke during pregnancy (7.8%) [45]. Similarly, 9.7% 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. In 2009–2011, excluding pre-term and multiple births, 51% of LBW births to Aboriginal and Torres Strait Islander mothers were attributable to smoking, compared with 19% for other mothers [46]. It has been estimated that if the smoking rate for Aboriginal and Torres Strait Islander pregnant women was the same as it was for other mothers, the proportion of LBW babies could be reduced by up to 26%.

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 [47]. As a result of the incomplete identification of Indigenous status in death records, the 2,914 Aboriginal and Torres Strait Islander deaths registered in 2014 are an underestimate of the actual number of deaths. Also, delays in registration of deaths are more common for Aboriginal and Torres Strait Islander people. For example, of all the Aboriginal and Torres Strait Islander deaths which occurred in Australia in 2011, about 87% were registered in 2011 compared with 95% of non-Indigenous deaths [48].

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') [48]. 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 [47]. 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.

⁹ 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.

Adjusting for age-structures of populations

Comparison of Aboriginal and Torres Strait Islander 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 [49]. (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 2,914 deaths in Australia in 2014 where the deceased person was identified as Aboriginal and/or Torres Strait Islander [47]. The age-standardised death rate of 9.6 per 1,000 population for Aboriginal and Torres Strait Islander people was 1.8 times the rate for their non-Indigenous counterparts.

More detailed information about death rates is available for the five-year period 2009-2013 for people living in NSW, Qld, WA, SA and the NT [50]. After age-adjustment, the death rate for Aboriginal and Torres Strait Islander people living in those jurisdictions was 1.7 times the rate for non-Indigenous people (Table 5). The rates for Indigenous people were highest in the NT (1,461 per 100,000) and WA (1,323 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, 2009-2013

Jurisdiction	Indigenous rate	Non-Indigenous rate	Rate ratio
NSW	804	585	1.4
Qld	964	590	1.6
WA	1,323	552	2.2
SA	818	611	1.3
NT	1,461	612	2.4
Total NSW, Qld, WA, SA & NT	985	585	1.7

- Notes:
- 1 Rates per 100,000 are directly age-standardised using the 2001 Australia ERP
 - 2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
 - 3 Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates

Source: AIHW, 2015 [50]

Between 1998 and 2013, there was a 16% reduction in the age-standardised death rates for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT; there was also a significant closing of the gap in death rates between Aboriginal and Torres Strait Islander and non-Indigenous people during this time period [50].

Expectation of life

In 2013, the ABS published revised estimates for expectation of life at birth for Indigenous people [48]. After adjustment for the underestimate of the number of deaths identified as Indigenous, the ABS estimated that Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander 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).

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

Jurisdiction	Indigenous status/sex		Difference
	Indigenous	Non-Indigenous	
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 [48]

Age at death

The median age at death¹⁰ in 2014 for Aboriginal and Torres Strait Islander males ranged from 49.9 years for those living in WA to 57.7 years for those living in NSW (Table 7) [47]. These levels were around 20 years less than those for non-Indigenous males, which ranged from 68.3 years (NT) to 80.3 years (SA).

The median age at death for Aboriginal and Torres Strait Islander females in 2014 ranged from 57.5 years for those living in the NT to 64.1 years for those living in NSW (Table 7) [47]. These levels were also around 20 years less than those for non-Indigenous females, which ranged between 71.3 years (NT) and 85.8 years (SA).

Table 7. Median age at death, by Indigenous status and sex, NSW, Qld, WA, SA and the NT, 2014

Jurisdiction	Indigenous		Non-Indigenous	
	Males	Females	Males	Females
NSW	57.7	64.1	79.0	85.3
Qld	57.4	62.8	77.7	84.4
WA	49.9	60.0	77.9	84.5
SA	56.5	60.5	80.3	85.8
NT	53.4	57.5	68.3	71.3
All jurisdictions	55.4	61.5	78.6	85.0

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, 2015 [47]

In 2010-2014, age-specific death rates were higher for Aboriginal and Torres Strait Islander 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) [47]. (The rate ratios, based on the numbers of deaths registered, vary according to the levels of Indigenous identification (see above).)

¹⁰ 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, 2010-2014

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio	
	Males	Females	Males	Females	Males	Females
NSW						
0	4.6	4.1	3.9	3.1	1.2	1.3
1-4	27	24	16	14	1.7	1.7
5-14	7.0	9.1	9.0	8.0	0.8	1.1
15-24	71	35	45	21	1.6	1.7
25-34	160	86	67	30	2.4	2.9
35-44	345	195	119	66	2.9	3.0
45-54	682	355	274	164	2.5	2.2
55-64	1,179	926	647	382	1.8	2.4
65+	3,633	3,735	3,952	3,601	0.9	1.0
Qld						
0	7.5	6.3	4.5	4.1	1.7	1.5
1-4	35	33	20	15	1.8	2.1
5-14	20	11	11	8.1	1.8	1.4
15-24	105	56	53	25	2.0	2.2
25-34	215	112	79	36	2.7	3.1
35-44	422	248	129	70	3.3	3.5
45-54	879	486	264	165	3.3	2.9
55-64	1,621	1,215	631	370	2.6	3.3
65+	5,137	4,011	3,745	3,353	1.4	1.2
WA						
0	7.8	4.5	2.5	2.3	3.1	2.0
1-4	62	44	19	15	3.3	3.0
5-14	35	31	9.1	9.2	3.9	3.4
15-24	209	100	52	24	4.0	4.1
25-34	294	174	79	29	3.7	6.1
35-44	694	398	121	64	5.7	6.2
45-54	1,247	759	234	149	5.3	5.1
55-64	2,194	1,532	557	332	3.9	4.6
65+	5,629	4,577	3,594	3,184	1.6	1.4
SA						
0	7.1	6.1	3.2	2.5	2.2	2.5
1-4	11	33	18	18	0.6	1.9
5-14	27	9.5	7.8	8.8	3.5	1.1
15-24	100	69	46	18	2.2	3.8
25-34	215	169	75	36	2.9	4.7
35-44	597	449	148	85	4.0	5.3
45-54	1,123	591	307	178	3.7	3.3
55-64	1,529	1,229	662	390	2.3	3.2
65+	3,724	2,917	4,097	3,830	0.9	0.8
NT						
0	14.0	11.9	3.0	4.1	4.7	2.9
1-4	59	101	34	4.6	1.7	22.1
5-14	46	55	16	13	2.8	4.2
15-24	264	150	85	36	3.1	4.2
25-34	406	236	85	27	4.8	8.6
35-44	858	603	113	51	7.6	11.9
45-54	1,589	1,340	317	138	5.0	9.7
55-64	2,751	2,082	683	324	4.0	6.4
65+	6,162	5,918	3,119	2,362	2.0	2.5
All jurisdictions						
0	7.1	5.8	3.8	3.2	1.9	1.8
1-4	39	37	18	15	2.2	2.5
5-14	21	19	9.6	8.3	2.2	2.2
15-24	126	66	49	23	2.6	3.0
25-34	237	135	73	32	3.2	4.2
35-44	508	311	125	69	4.1	4.5
45-54	965	583	269	163	3.6	3.6
55-64	1,652	1,253	631	372	2.6	3.4
65+	4,591	4,113	3,860	3,504	1.2	1.2

Notes: 1 Rates are per 100,000

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, 2015 [47]

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 2012-2014, the Aboriginal and Torres Strait Islander IMR (6.0 per 1,000) was almost twice as high as the non-Indigenous IMR [47] (Table 9). The highest Aboriginal and Torres Strait Islander IMR occurred in the NT (13 per 1,000); the lowest occurred in NSW (4.4 per 1,000).

Table 9. Infant mortality rates, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2012-2014

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio	
	Males	Females	Males	Females	Males	Females
NSW	4.6	4.2	3.7	3.1	1.2	1.4
Qld	6.7	5.5	4.1	4.1	1.6	1.3
WA	5.8	4.4	2.1	2.1	2.8	2.1
SA	9.0	6.0	3.0	2.4	3.0	2.5
NT	13	12	3.1	4.2	4.1	2.9
All jurisdictions	6.5	5.5	3.5	3.2	1.9	1.7

- 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, 2015 [47]

In the five-year period 2008-2012, Aboriginal and Torres Strait Islander 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 [50]. Aboriginal and Torres Strait Islander infants died from these conditions at 1.6 times the rate of non-Indigenous infants. The second most common cause of infant death was for ICD 'Signs, symptoms and ill-defined conditions', which includes sudden infant death syndrome (SIDS); Aboriginal and Torres Strait Islander infants died at 3.3 times the rate of non-Indigenous infants (and, for SIDS alone, at 2.4 times the rate). The third most common cause of infant death was for ICD 'Congenital malformations', for which Indigenous and non-Indigenous infants had similar rates (rate ratio of 1.0).

From 1998 to 2012, the IMR for Aboriginal and Torres Strait Islander babies has declined by 64%; there was also a significant closing of the gap in IMRs between Aboriginal and Torres Strait Islander and non-Indigenous infants during this time period (by 83%) [30].

Causes of death

Cardiovascular disease was the leading cause of death of Aboriginal and Torres Strait Islander people in 2013, being responsible for 24% of the deaths of Indigenous people living in NSW, Qld, WA, SA and the NT [51]. The next most common causes of death were: ICD 'Neoplasms' (mainly cancers) being responsible for 21% of deaths; followed by ICD 'External causes' (injury) (15%); ICD 'Endocrine, nutritional and metabolic diseases' (including diabetes) (9.1%); and ICD 'Diseases of the respiratory system' (8.2%).

In terms of specific conditions, coronary heart disease (CHD) (also known as ischaemic heart disease) was the leading cause of death of Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT in 2013 at a rate 1.6 times that of their non-Indigenous counterparts (Table 10) [51]. The other leading specific causes of death of Aboriginal and Torres Strait Islander people were diabetes (rate ratio: 6.0), chronic lower respiratory disease (rate ratio: 2.4) and lung cancer (rate ratio: 1.8).

Table 10. Numbers and rates of the leading causes of Aboriginal and Torres Strait Islander deaths and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2013

Cause of death	Number	Rate	Rate ratio
Coronary heart disease	321	127	1.6
Diabetes mellitus	202	90	6.0
Chronic lower respiratory disease	148	65	2.4
Lung cancer	140	56	1.8
Suicide	138	24	2.2
Cirrhosis and other liver diseases	124	31	4.7
Cerebrovascular disease	122	67	1.6
Land transport accidents	72	13	2.4
Diseases of the urinary system	66	35	3.1
Certain conditions originating in the perinatal period	60	5.5	2.3

- 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 ERP
 - 3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate (not shown)

Source: ABS, 2015 [51]

Similarly, in the five-year period 2008-2012 for people living in NSW, Qld, WA, SA and the NT, 'circulatory diseases' was the most common cause of death for Aboriginal and Torres Strait Islander people being responsible for 25% of Indigenous deaths, followed by neoplasms (almost entirely cancer; 20%), and external causes of death (injury; 15%) [50]. For all major causes of death, Indigenous people died at higher rates than non-Indigenous people (Table 11).

Table 11. Proportion and age-standardised death rates of the leading causes of Indigenous deaths and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2008-2012

Cause of death	Proportion	Rate	Rate ratio
Circulatory diseases	26	286	1.5
Neoplasms	20	224	1.3
External causes	15	75	2.0
Endocrine, metabolic and nutritional disorders - (including diabetes)	9.1	103	4.6
Respiratory diseases	7.6	96	1.9
Digestive diseases	5.6	47	2.3
Nervous system diseases	2.5	24	0.9
Kidney diseases	2.5	30	2.6
Infectious and parasitic diseases	2.4	19	2.1
Conditions originating in the perinatal period	2.1	4.3	1.6
Other causes	7.4	76	1.6
All causes	100	986	1.7

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 are per 100,000 population
 3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate

Source: AIHW, 2015 [50]

In 2013, the leading specific causes of death differed for Aboriginal and Torres Strait Islander males and females living in NSW, Qld, WA, SA and the NT [52]. For Aboriginal and Torres Strait Islander males, the two leading specific causes of death were CHD followed by suicide, and chronic lower respiratory disease. For non-Indigenous males, the leading causes of death were CHD, lung and related cancers, and cerebrovascular disease. The leading causes of death for Aboriginal and Torres Strait Islander females were diabetes, CHD, and lung and related cancers. For non-Indigenous females, the leading causes of death were CHD, dementia (including Alzheimer's disease), and cerebrovascular disease.

Maternal mortality

Maternal deaths

Maternal deaths refer to pregnancy-related deaths occurring to women during pregnancy or up to 42 days after delivery [53]. 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 2008-2012, eight of the 102 maternal deaths were of Aboriginal and Torres Strait Islander women (Indigenous status was not reported in 23 of the deaths) [53]. The leading causes of maternal death among Indigenous women were cardiovascular conditions, sepsis, and psychosocial conditions.

Reflecting the higher rate of confinements among Indigenous women, the MMR for Aboriginal and Torres Strait Islander women in 2008-2012 was 13.8 deaths per 100,000 confinements, around 2.1 times higher than the ratio of 6.6 per 100,000 for non-Indigenous women [43, 53-57] (Table 12). For direct maternal deaths, the ratio of 6.9 per 100,000 for Indigenous women was 2.2 times the ratio of 3.2 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, 2008-2012

Indigenous status	Women who gave birth	Maternal deaths	Maternal mortality ratio
Indigenous	57,979		
Direct and indirect maternal deaths		8	13.8
Direct maternal deaths		4	6.9
Non-Indigenous	1,428,131		
Direct and indirect maternal deaths		94	6.6
Direct maternal deaths		45	3.2

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, Sullivan, 2010 [54], Li, McNally, Hilder, Sullivan, 2011 [55], Li, Zeki, Hilder, Sullivan, 2012 [56], Zeki, Hilder, Sullivan, 2013 [57], Hilder, Zhichao, Parker, Jahan, Chambers, 2014 [43], Humphrey, Bonello, Chughtai, Macaldowie, Harris, Chambers, 2015 [53]

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) [58].

There were 7,079 deaths from avoidable causes among Aboriginal and Torres Strait Islander people aged 0-74 years living in NSW, Qld, WA, SA and the NT in the five-year period 2008-2012 [50]. 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) [30]. Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander people aged 0-74 years living in NSW, Qld, WA, SA and the NT were CHD (19%), cancer (18%), diabetes (10%), and suicide (8.9%) [30]. 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 CHD, 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 Aboriginal and Torres Strait Islander people aged 0-74 years living in NSW, Qld, WA, SA and the NT [30].

Hospitalisation

Statistics on hospitalisation provide some insights into ill-health in the population [59]. 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 [59]. 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.

Separation rates¹¹

Of the 9.7 million hospital separations in Australia¹² during 2013-14, 408,165 (4.2%) were identified as Aboriginal and Torres Strait Islander (Table 13) [60]. Around 93% of Indigenous hospital separations were of Aboriginal people, 4% were of Torres Strait Islander people, and 4% were of people who identified as being of both Aboriginal and Torres Strait Islander descent.

In 2013-14, the overall age-standardised separation rate of 896 separations per 1,000 population for Aboriginal and Torres Strait Islander people was 2.3 times that for other Australians (Table 13) [60]. The highest age-standardised separation rate was for Aboriginal and Torres Strait Islander people living in the NT (1,874 per 1,000), almost six times the rate for non-Indigenous people.

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

¹² All hospitalisation data for the NT include only public hospitals.

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, 2013-14

Jurisdiction	Aboriginal and Torres Strait Islander		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	83,576	553	2,787,756	353	1.6
Vic	21,166	653	2,467,512	403	1.6
Qld	99,956	795	1,971,174	418	1.9
WA	85,801	1,554	984,598	394	3.9
SA	23,816	927	701,798	378	2.5
NT	86,536	1,874	37,297	319	5.9
Australia	408,165	896	9,294,139	384	2.3

- 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, 2015 [60]

Age-specific separation rates

The most recent national information available is from 2011-13 when hospital separation rates were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people in all age-groups except the 65 years and over (Table 14) [46].

Table 14. Age-specific hospital separation rates (excluding dialysis), by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, Australia, 2011-2013

Age-group (years)	Males			Females		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0-4	324	264	1.2	264	202	1.3
5-14	106	97	1.1	92	80	1.2
15-24	143	131	1.1	353	225	1.6
25-34	228	137	1.7	467	359	1.3
35-44	349	192	1.8	424	331	1.3
45-54	460	281	1.6	446	325	1.4
55-64	543	473	1.1	547	449	1.2
65+	794	980	0.8	753	837	0.9

- 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: AIHW, 2015 [46]

Causes of hospitalisation

In 2011-13, the most common reason for the hospitalisation of Indigenous people in Australia was for 'Care involving dialysis', responsible for 45% of Aboriginal and Torres Strait Islander separations (334,265 separations) [46]. 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 54,079 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 were respiratory conditions (responsible for 42,209 separations) and digestive diseases (37,612 separations) (Table 15).

Table 15. Numbers, proportions (%), age-standardised rates, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios for leading causes of hospital separations, Australia, 2011-13

Principal diagnosis (ICD)	Number of separations	Proportion of separations (%)	Age-standardised separation rate	Rate ratio
Injury, poisoning and certain other consequences of external causes	54,079	7.2	45	1.8
Pregnancy, childbirth and the puerperium	44,331	5.9	58	1.3
Diseases of the respiratory system	42,209	5.6	39	2.4
Diseases of the digestive system	37,612	5.0	36	0.9
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	36,054	4.8	37	1.4
Mental and behavioural disorders	31,402	4.2	28	2.0
Diseases of the circulatory system	22,580	3.0	31	1.5
Diseases of the genitourinary system	19,735	2.6	21	1.2
Diseases of the skin and subcutaneous tissue	16,304	2.2	14	2.2
Certain infectious and parasitic diseases	12,591	1.7	10	1.7
Endocrine, nutritional and metabolic diseases	11,066	1.5	12	2.3
Other	87,586	12	91	0.7
Care involving dialysis	334,265	45	432	9.9
All causes	751,698	100	827	2.2

Note: Information for the NT is for public hospitals only

Source: AIHW, 2015 [46]

Potentially preventable hospitalisations

Potentially preventable hospitalisations are admissions which 'could have been avoided with access to quality primary care and preventive care' [61]. 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 2011 to June 2013, potentially preventable hospitalisations accounted for 21% of all Aboriginal and Torres Strait Islander hospitalisations [50]. Rates of potentially preventable hospitalisation were around three times higher for Aboriginal and Torres Strait Islander people than those for non-Indigenous people.

In 2011-13, potentially preventable hospitalisations for chronic conditions accounted for 56% of all potentially preventable hospitalisations among Aboriginal and Torres Strait Islander people, acute conditions accounted for 41%, and vaccine-preventable conditions accounted for 4% [50]. 'Complications from diabetes' was the leading cause of potentially preventable hospitalisations among Aboriginal and Torres Strait Islander people with a hospitalisation rate of 41 per 1,000 which was 7.9 times higher than the non-Indigenous rate. Other potentially preventable conditions included chronic obstructive pulmonary disease (COPD), pyelonephritis, convulsions/epilepsy, congestive heart failure, ear, nose and throat infections, and oral health problems.

In 2011-13, the hospitalisation rates for all potentially preventable conditions were highest for Aboriginal and Torres Strait Islander people living in remote and very remote areas, and lowest in inner regional areas and major cities (Table 16) [50]. Rates were higher for Aboriginal and Torres Strait Islander people in all remoteness levels compared to those for their non-Indigenous counterparts which were relatively equal across remoteness classifications.

Table 16. Rates and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios for potentially preventable hospitalisations by remoteness area, Australia, 2011-13

Remoteness area	Aboriginal and Torres Strait Islander rate	Non-Indigenous rate	Rate ratio
Major cities	72	27	2.7
Inner regional	66	31	2.1
Outer regional	91	32	2.8
Remote	254	35	7.3
Very remote	118	34	3.5

Source: AIHW, 2015 [50]

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 [62]. CVD presents a significant burden for Aboriginal and Torres Strait Islander people in terms of prevalence, hospitalisation, and mortality [30, 63]. This is evident for a range of CVDs including CHD (or ischaemic heart disease), cerebrovascular disease (including stroke), hypertension (high blood pressure), and rheumatic heart disease (RHD).

Most types of CVD (excluding RHD) are subject to the same set of modifiable or non-modifiable risk factors [64]. Modifiable behavioural factors for CVD include tobacco use, physical inactivity, poor dietary behaviour, and excessive alcohol consumption [64, 65]. 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 [66, 67]. ARF, which is rare among non-Indigenous Australians, is caused by an untreated bacterial (group A streptococci or GAS) throat infection.¹³ Reducing ARF and RHD in Aboriginal and Torres Strait Islander communities requires initiatives that address poverty, overcrowded housing and poor sanitation, all of which contribute to the spread of GAS infection.

The persistence of ARF in Aboriginal and Torres Strait Islander communities highlights the impact of social determinants of health that underpin RHD [68, 69] and CVD more broadly.¹⁴ As with other areas of health, reducing the burden of CVD will require efforts to address the social, economic and environmental inequities that Aboriginal and Torres Strait Islander people experience.

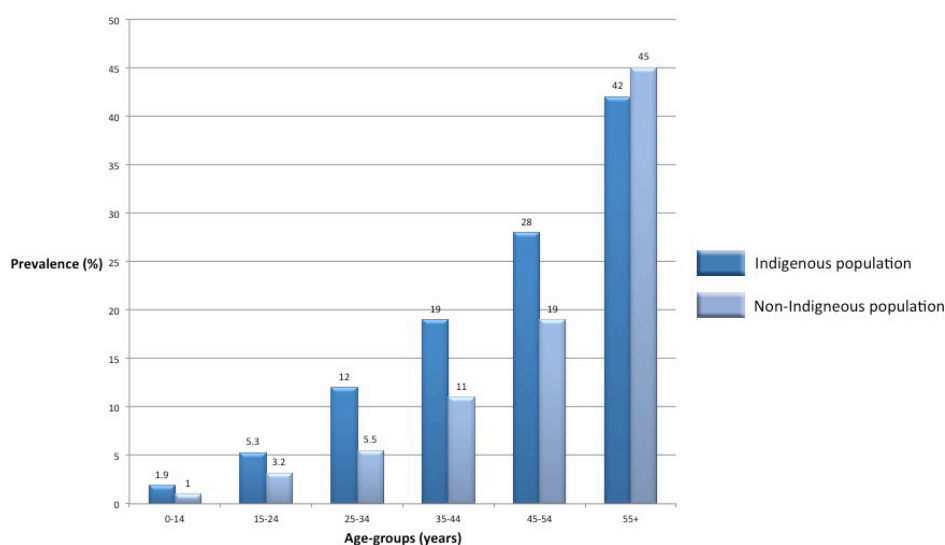
Extent of cardiovascular disease among Aboriginal and Torres Strait Islander people

Prevalence of cardiovascular disease

Around 13% of Aboriginal and Torres Strait Islander people aged 2 years and over reported in the 2012–2013 *Aboriginal and Torres Strait Islander health survey* (AATSIHS) that they had some form of CVD¹⁵ [63]. When the data for Aboriginal people¹⁶ and Torres Strait Islander people¹⁷ were analysed separately, the levels of CVD were similar (13% and 12% respectively) [70].

CVD was reported more frequently by Aboriginal and Torres Strait Islander females (14%) than by Aboriginal and Torres Strait Islander males (11%) [71]. After age-adjustment, CVD was reported 1.2 times more frequently by Aboriginal and Torres Strait Islander people than by non-Indigenous people. CVD increased with age for both Aboriginal and Torres Strait Islander and non-Indigenous people; the prevalence was higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people in all age-groups except those aged 55 years or older (Figure 2) [72]. Aboriginal and Torres Strait Islander people living in remote areas were more likely to report having heart disease than those living in non-remote areas (18% and 11% respectively) [73].

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 [72]

¹³ Some research suggests that ARF might also be caused by a streptococcal skin infection.

¹⁴ The effects of social determinants on Indigenous health are described in the section 'The context of Aboriginal and Torres Strait Islander health'.

¹⁵ Includes hypertensive disease; ischaemic heart diseases; other heart diseases; tachycardia; cerebrovascular diseases; oedema; diseases of the arteries; arterioles and capillaries; diseases of the veins, lymphatic vessels, etc; other diseases of the circulatory system; and symptoms and signs involving the circulatory system.

¹⁶ People of Aboriginal origin only.

¹⁷ People of Torres Strait Islander origin only or both Aboriginal and Torres Strait Islander origin.

Hypertensive heart disease was the form of CVD most commonly reported by Aboriginal and Torres Strait Islander people (5.8%) in 2012-2013 [71]. After age-adjustment, the prevalence of hypertensive heart disease among Aboriginal and Torres Strait Islander people was similar to that among non-Indigenous people (Table 17). The greatest disparities in prevalence between Aboriginal and Torres Strait Islander and non-Indigenous males and females were for 'Heart, stroke and vascular diseases'¹⁸ (age-adjusted ratios of 1.5 for males and 1.7 for females).

Table 17. Prevalence (%) of cardiovascular disease, Indigenous people by sex and type, and Indigenous:non-Indigenous age-adjusted rate ratios, Australia, 2012-20

Cardiovascular disease type	Males		Females	
	Prevalence	Rate ratio	Prevalence	Rate 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

Note: Prevalences are expressed as percentages

Source: ABS, 2014 [71]

Around 4% of Aboriginal and Torres Strait Islander people reported that they had 'Heart, stroke and/or vascular diseases' in 2012-2013 [63]. Heart disease, stroke and/or vascular diseases were reported in almost the same proportions by Aboriginal and Torres Strait Islander males and females (4.0% and 3.8% respectively) [71]. These diseases were prevalent from about 35 years of age onwards; 4.2% of Aboriginal and Torres Strait Islander 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 [72].

Around 6% of Aboriginal and Torres Strait Islander people (5.8% of Aboriginal people and 5.3% of Torres Strait Islander people [70]) reported that they had hypertensive heart disease [63]. Hypertensive heart disease was reported in almost the same proportions by Aboriginal and Torres Strait Islander males and females (5.6% and 6.0% respectively) [71]. Hypertensive disease increased in prevalence from about 25 years of age onwards; 12% of Aboriginal and Torres Strait Islander people aged 25 years and over reported hypertensive heart disease [63] with proportions ranging from 4.1% of those aged 25-34 years to 25% of those aged 55 years and over [72].

The 2012-13 AATSIHS also provided data for selected risk factors for CVD [63]. These self-reported results were supplemented—for the first time—by biomedical results obtained from a subset of Aboriginal and Torres Strait Islander adults (18 years and over) who provided blood and urine samples [74]. The self-reported [63] and biomedical results [74] show that some CVD risk factors are more prevalent among Aboriginal and Torres Strait Islander people than among their non-Indigenous counterparts, including: daily smoking (rate ratio 2.6¹⁹); obesity (rate ratio 1.6¹⁹); inadequate daily fruit and vegetable intake (rate ratios 0.9¹⁹ and 0.8¹⁹ respectively for meeting the guidelines); high blood pressure (rate ratio 1.2²⁰); abnormal high density lipoprotein (HDL) cholesterol (rate ratio 1.8²⁰); high triglycerides (rate ratio 1.9²⁰); and dyslipidaemia (rate ratio 1.1²⁰).

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, with a register for SA currently under development [50]. It is not possible to directly compare data from these registers²¹ but, despite low rates of RHD and ARF in Australia, it is clear that these diseases are disproportionately represented in the Aboriginal and Torres Strait Islander population.

The most recent data for RHD is for Qld at 1 July 2014, where of the recorded cases (1,035), 89% were Aboriginal and Torres Strait Islander people [75]. After age-adjustment the prevalence of RHD among Aboriginal and Torres Strait Islander people was 206 times higher than non-Indigenous people. Almost two-thirds (64%) of the Aboriginal and Torres Strait Islander people with RHD were females, with the highest number of cases (159 cases) in the 25-34 age-group, 733 times the rate of non-Indigenous females in this age-group. Aboriginal and Torres Strait Islander males made up just over one third (36%) of the Aboriginal and Torres Strait Islander cases of RHD, with the highest prevalence (120 cases) being in the 15-24 years age-group, 135 times the rate of non-Indigenous males [75]. However, the greatest disparity in prevalence between Aboriginal and Torres Strait Islander males and non-Indigenous males was in the 25-34 years age-group (308 times).

Of the recorded cases of RHD in the NT (1,573 at 31 December 2013), 94% were Aboriginal and Torres Strait Islander people [75]. After age-adjustment, the prevalence of RHD among Aboriginal and Torres Strait Islander people was 40 times higher than among other Australians. Two thirds (65%) of the Aboriginal and Torres Strait Islander people with RHD were females and around one-third (35%) were males. The prevalence of RHD in Aboriginal and Torres Strait Islander people was highest in the 45+ year age-group (26%), 22 times the rate of non-Indigenous people. The disparity in prevalence between Aboriginal and Torres Strait Islander people and non-Indigenous people was highest in the 25-34 years age-group, however (rate ratio: 164.5).

18 Which include ischaemic heart disease, stroke and other cerebrovascular disease, odema, heart failure, and disease of the arteries, arterioles and capillaries.

19 For Aboriginal and Torres Strait Islander people aged 15 years and over.

20 For Aboriginal and Torres Strait Islander people aged 18 years and over

21 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.

Detailed data for WA are not available for 2013, however there were 305 cases of RHD among Aboriginal and Torres Strait Islander people at 31 December 2013 [75]. The prevalence of RHD was highest in the 15-24 years age-group (24%).

Over the period 2010-13, of 787 total recorded cases of ARF in the NT, WA and Qld, 743 were Aboriginal and Torres Strait Islander people, with the prevalence of ARF being 329 times higher than that of non-Indigenous people. Cases of ARF in the NT (330), Qld (196) and WA (217) were 97%, 86% and 99% respectively for Aboriginal and Torres Strait Islander people [75]. As is the case for RHD, ARF incidence (new and recurrent cases) was higher in Aboriginal and Torres Strait Islander females than males (393 and 350 cases respectively).

The incidence of ARF in Qld, WA and the NT (combined) was highest in the 5-14 years age-group for both Aboriginal and Torres Strait Islander males (206 cases; 1.2 per 1,000) and females (180 cases; 1.1 per 1,000) [75].

Hospitalisation

There were 11,868 hospital separations for diseases of the circulatory system among Aboriginal and Torres Strait Islander people living in Australia in 2013-14, accounting for 2.9% of separations identified as Aboriginal and Torres Strait Islander [60]. Aboriginal and Torres Strait Islander people were hospitalised with a primary diagnosis of CVD at almost two times the rate of non-Indigenous people (31 compared with 18 per 1,000 population) [76].

In comparison with previous years, the rate of Aboriginal and Torres Strait Islander people hospitalised for CVD increased by 12%, from 28 per 1,000 in 2004-2005 to 32 per 1,000 in 2013-14 [76]. During this same period, the rate of non-Indigenous people hospitalised for CVD declined by 15%. The leading causes of CVD hospitalisations were CHD (40%: 4,771 hospitalisations) heart failure and cardiomyopathy (15%: 1,730 hospitalisations), stroke (7%: 838 hospitalisations), peripheral vascular disease (4%: 420 cases), ARF and RHD (4%: 516 hospitalisations) and hypertensive heart disease (3%: 356 hospitalisations).

There were 6,289 hospitalisations of Aboriginal and Torres Strait Islander males with CVD as the primary diagnosis, who were hospitalised at 1.6 times the rate of non-Indigenous males (35 per 1,000 and 22 per 1,000 respectively) [76]. The hospitalisation rate for Aboriginal and Torres Strait Islander females was 2.1 times higher than the rate for non-Indigenous females (28 per 1,000 and 14 per 1,000 respectively). In all age-groups, except for males aged 75 and over, Aboriginal and Torres Strait Islander people were hospitalised at higher rates than non-Indigenous people. The gap was highest in the 35-44 and 45-54 years age-groups, with Aboriginal and Torres Strait Islander people hospitalised at three times the rate of non-Indigenous people. Hospitalisation rates for CVD for Aboriginal and Torres Strait Islander people were highest in remote and very remote areas (41 per 1,000 population), 1.7 times higher than in major cities (25 per 1,000 population).

Mortality

CVD was the leading cause of death of Aboriginal and Torres Strait Islander people in 2013, being responsible for 24% (636) of the deaths in this population [51]. Of the various types of circulatory diseases, ischaemic heart diseases²² were the leading cause of death for Aboriginal and Torres Strait Islander people (321 deaths) in 2013, followed by cerebrovascular diseases²³ (122 deaths). Ischaemic heart diseases were also the overall leading cause of death for Aboriginal and Torres Strait Islander people, accounting for around 12% of all deaths [52]. After age-adjustment, death rates from ischaemic heart diseases and cerebrovascular diseases were both 1.6 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people. There were more deaths from ischaemic heart diseases among Aboriginal and Torres Strait Islander males (204) than among Aboriginal and Torres Strait Islander females (117), but more Aboriginal and Torres Strait Islander females (70) died from cerebrovascular diseases than Aboriginal and Torres Strait Islander males (52). Aboriginal and Torres Strait Islander males were more likely to die from ischaemic heart diseases and cerebrovascular diseases than non-Indigenous males (both rate ratios 1.6) and Aboriginal and Torres Strait Islander females were more likely to die from these diseases than non-Indigenous females (both rate ratios 1.6).

Despite disproportionately high death rates for CHD among Aboriginal and Torres Strait Islander people, there has been an improvement in the overall CHD mortality gap between 2001-2002 and 2009-2010 [77]. This is due in large part to declines in CHD mortality among Aboriginal and Torres Strait Islander women, particularly those in the age-groups 40-54 years and 70 years and over.

Avoidable mortality data²⁴ is available for the period 2008-2012 for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT [30]. There were 92 potentially avoidable deaths from rheumatic and other valvular heart disease among Aboriginal and Torres Strait Islander people in this period. After age-adjustment, potentially avoidable deaths from rheumatic and other valvular heart disease were 12.4 times more common for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

In 2010-12, there were 61 deaths of Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT due to RHD/ARF, which accounted for 3% of CVD deaths for Aboriginal and Torres Strait Islander people, compared to less than 1% for non-Indigenous CVD deaths [76]. More detailed RHD data are available for the period 2006-2010, when RHD was responsible for the deaths of 90 Aboriginal and Torres Strait Islander people in the same jurisdictions [45]. The age-adjusted death rate for Aboriginal and Torres Strait Islander people was 4.7 times that of non-Indigenous people. Both Aboriginal and Torres Strait Islander males and females were more likely to die from RHD than their non-Indigenous counterparts (3.5 and 5.3 times respectively).

²² Ischaemic heart diseases include angina, blocked arteries of the heart and heart attacks.

²³ Cerebrovascular diseases include haemorrhages, strokes, infarctions and blocked arteries of the brain.

²⁴ Mortality data associated with potentially preventable and treatable conditions for people aged less than 75 years.

The striking difference between Aboriginal and Torres Strait Islander people and non-Indigenous people in CVD mortality is the much greater impact among young and middle-aged Aboriginal and Torres Strait Islander adults. In 2010-12 in NSW, Qld, WA, SA and the NT, the death rate for CHD (the leading cause of CVD-related deaths) was 10 times higher for Aboriginal and Torres Strait Islander men and women in the 35-44 years age-group than for their non-Indigenous counterparts [76].

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) [78, 79]. If damaged cells spread into surrounding areas, or to different parts of the body (metastasis), 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, due in part to incomplete Indigenous identification in cancer notifications in several jurisdictions. There have been improvements for identification in cancer registries [80] but currently there are no nation-wide incidence data for cancer.

Extent of cancer among Aboriginal and Torres Strait Islander people

Incidence

For 2005-2009, an average of 840 Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT were diagnosed with cancer each year [9]. After age-adjustment, the cancer incidence rate for all cancers combined was slightly lower for Aboriginal and Torres Strait Islander people than for non-Indigenous people (421 and 443 per 100,000 people, respectively).²⁵ After age-adjustment, the incidence rates were significantly higher for Aboriginal and Torres Strait Islander 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). The incidence of pancreatic cancer was also higher for Aboriginal and Torres Strait Islander people than non-Indigenous people (rate ratio 1.3). After age-adjustment, cancer incidence rates were lower for Aboriginal and Torres Strait Islander people than non-Indigenous people for: colorectal cancer (rate ratio 0.8); breast cancer in females (rate ratio 0.7); non-Hodgkin lymphoma (rate ratio 0.7); and prostate cancer (rate ratio 0.6) (Table 18).

Table 18. Age-standardised incidence rates for selected cancers, by Aboriginal and Torres Strait Islander status, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, NSW, Qld, WA and the NT, 2005-2009

Primary cancer	Aboriginal and Torres Strait Islander people	Non-Indigenous people	Rate ratio
Lung	74	43	1.7
Breast (females)	78	107	0.7
Colorectal	45	59	0.8
Prostate (males)	95	156	0.6
Unknown primary site	20	11	1.8
Uterine (females)	25	15	1.6
Liver	15	5	2.8
Non-Hodgkin lymphoma	12	16	0.7
Cervical (females)	16	7	2.3
Pancreatic	13	11	1.3
All cancers	421	443	1.0

- Notes:
- 1 Cancers are ordered by numbers among Aboriginal and Torres Strait Islander people (not shown in table)
 - 2 Rates per 100,000 population, age-standardised to the Australian population at 30 June 2001
 - 3 Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate
 - 4 Due to the incomplete identification of Aboriginal and Torres Strait Islander status, these figures probably under-estimate the true difference between Aboriginal and Torres Strait Islander and non-Indigenous rates
 - 5 Rounding may result in inconsistencies in calculated ratios

Source: AIHW and Australasian Association of Cancer Registries, 2013 [9]

For 2005-2009, detailed information is available for the incidence of cervical and breast cancers for Aboriginal and Torres Strait Islander women living in NSW, Qld, WA and NT. After age-adjustment, the rate for cervical cancer for Aboriginal and Torres Strait Islander women aged 20-69 was higher than for non-Indigenous women of the same age (20 and 8.7 per 100,000 respectively) [81], and for breast cancer, significantly lower than for non-Indigenous women aged 50-69 (203 and 271 per 100,000 respectively) [82]. Despite this, breast cancer is still one of the most common cancers diagnosed for Aboriginal and Torres Strait Islander women in NSW, Qld, WA and NT [9].

For 2004-2008, detailed information for cancer incidence rates is available for Aboriginal and Torres Strait Islander males and females living in NSW, Qld, WA and the NT [83]. For all cancers combined, incidence rates were significantly higher for males than for females for both the Aboriginal and Torres Strait Islander and non-Indigenous populations. After age-adjustment, the rates for Aboriginal and Torres

²⁵ The ABS has revised upwards the estimated population of Indigenous Australians leading to an apparent decrease in cancer incidence rates [9].

Strait Islander 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).

Hospitalisation

There were 6,126 hospital separations for cancer among Aboriginal and Torres Strait Islander people in 2013-14 [84]. In 2012-2013, the age-standardised hospitalisation rate for cancer for Aboriginal and Torres Strait Islander people was lower than for non-Indigenous people (10 and 15 per 1,000, respectively).

In terms of specific cancers, the age-standardised hospitalisation rates for lung cancer and cervical cancer for Aboriginal and Torres Strait Islander people in 2012-13 were 1.8 and 1.6 times higher respectively than for their non-Indigenous counterparts [30]. Hospitalisation rates for lung cancer were similar for Aboriginal and Torres Strait Islander males and females (1.3 per 1,000), but higher for non-Indigenous males than females (0.9 per 1,000 and 0.6 per 1,000 respectively).

Mortality

Cancer was responsible for one-in-five deaths (541 deaths) of Aboriginal and Torres Strait Islander people living in NSW, Qld, SA, WA and the NT in 2013 [51]. After age-adjustment, the cancer death rate for Aboriginal and Torres Strait Islander people was 1.3 times higher than for their non-Indigenous counterparts. Cancers of the trachea, bronchus and lung were the fourth leading cause of death for Aboriginal and Torres Strait Islander people (140 deaths: 64 males and 76 females), with the overall death rate 1.8 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 Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT [9]. After age-adjustment, the mortality rate for all cancers combined for Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander people with 115 deaths per year (25% of all Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander 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 (rate ratio: 1.2), and breast cancer (in females) (rate ratio: 1.1) were also higher for Aboriginal and Torres Strait Islander people than non-Indigenous people. Mortality rates were lower for Aboriginal and Torres Strait Islander 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) (Table 19).

Table 19. Age-standardised death rates for selected cancers, by Indigenous status, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2008-2012

Primary cancer	Aboriginal and Torres Strait Islander people	Non-Indigenous people	Rate ratio
Lung	56	33	1.7
Liver	16	5	3.0
Breast (females)	24	21	1.1
Colorectal	13	16	0.8
Unknown primary site	14	9	1.5
Pancreatic	11	10	1.2
Prostate (males)	24	30	0.8
Cervix (females)	7	2	3.4
Non-Hodgkin lymphoma	5	6	0.9
Uterine (females)	5	3	1.6
All cancers	221	172	1.3

- Notes:
- 1 Cancers are ordered by numbers among Aboriginal and Torres Strait Islander people (not shown in table)
 - 2 Rates per 100,000 population, age-standardised to the Australian population at 30 June 2001
 - 3 Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate
 - 4 Due to the incomplete identification of Aboriginal and Torres Strait Islander status, these figures probably under-estimate the true difference between Aboriginal and Torres Strait Islander and non-Indigenous rates
 - 5 Rounding may result in inconsistencies in calculated ratios

Source: AIHW and National Mortality Database, 2013 [9]

The patterns of Aboriginal and Torres Strait Islander cancer incidence and mortality are largely explained by the higher level of risk factors, most notably tobacco use [85, 86]. For example, high rates of smoking are the likely cause of a high incidence of cancers of the lung, mouth and throat. High incidence rates of liver cancer are associated with heavy alcohol consumption [9].

Other contributing factors to the patterns of cancer incidence and mortality among, Aboriginal and Torres Strait Islander people include:

- they are significantly more likely to have cancers that have a poor prognosis
- they are usually diagnosed with cancer at a later stage (reportedly due to a combination of later presentation for health care and lower participation in screening programs)
- they are more likely to present with higher rates of co-morbidities (that may lead to poorer treatment outcomes)
- they are less likely to receive optimal treatment [87-90].

Diabetes

Diabetes is a group of disorders marked by high levels of glucose in the blood [91] 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 [91, 92].

There are several types of diabetes, of which the most frequently occurring are type 1, type 2 and gestational diabetes mellitus (GDM) [91, 93]. Type 1 diabetes is relatively uncommon in the Aboriginal and Torres Strait Islander population [94]. Type 2 diabetes, however, represents a serious health problem for many Aboriginal and Torres Strait Islander 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 [95] and is more common among Aboriginal and Torres Strait Islander women than among non-Indigenous women [96].

Diabetes can lead to life-threatening health complications, some of which may develop within months of diagnosis while others may take years to develop [97]. 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 [97, 98]. For many Aboriginal and Torres Strait Islander people diabetes is not diagnosed until after complications have developed [99].

Diabetes is known to have adverse effects on pregnant women and their babies [96]. 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.

Diabetes statistics for Aboriginal and Torres Strait Islander people are often underestimated for several reasons, including under-identification of Indigenous status.²⁶ Self-reported diabetes data may underestimate the prevalence of diabetes by up to 50% [100].

Extent of diabetes among Aboriginal and Torres Strait Islander people

Incidence and prevalence

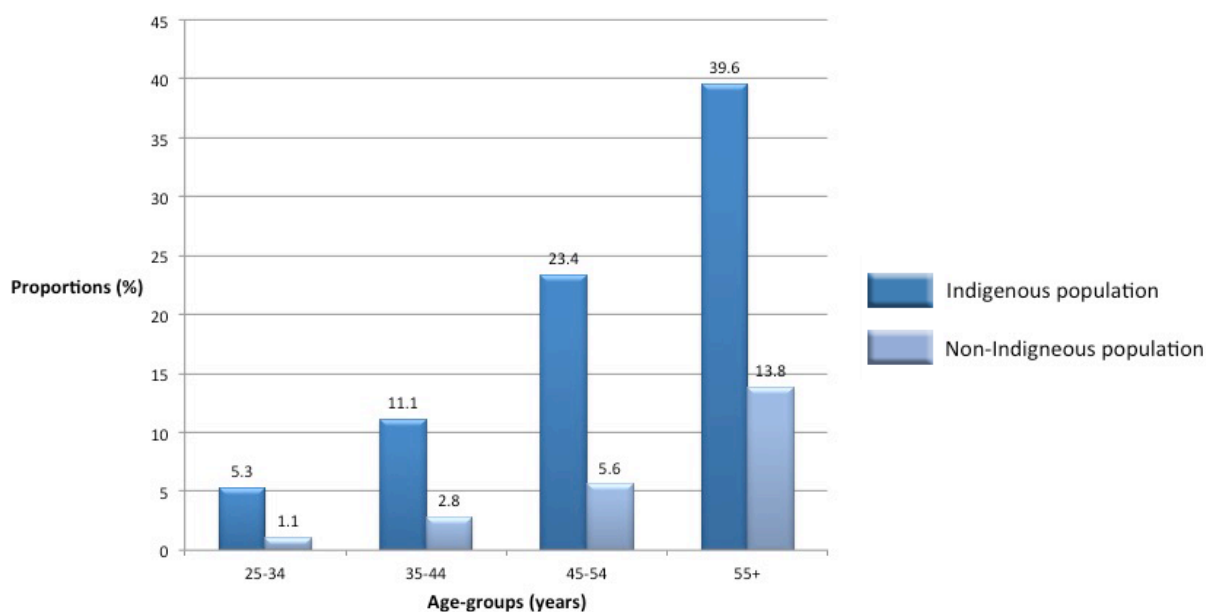
Around 8.6% of Aboriginal and Torres Strait Islander people (8.8% of Aboriginal people and 7.0% of Torres Strait Islander people) aged 2 years and over reported in the 2012-2013 AATSIHS that they had type 1 or type 2 diabetes and/or high sugar levels in their blood or urine [63, 70]. After age-adjustment, rates of diabetes and/or high sugar levels were more than three times higher among Aboriginal and Torres Strait Islander people than among non-Indigenous people [72]. Diabetes and/or high sugar levels were reported by a higher proportion of Aboriginal and Torres Strait Islander females (9.6%) than Aboriginal and Torres Strait Islander males (7.7%) [71].

The prevalence of diabetes and/or high sugar levels increased with age, for example 5.3% for Aboriginal and Torres Strait Islander people aged 25-34 years²⁷ to 40% for those aged 55 years and over (Figure 3) [72]. The age-specific levels from 25 years onwards were between three and five times higher than those for non-Indigenous people.

²⁶ For further details see 'Limitations of the sources of Aboriginal and Torres Strait Islander information'.

²⁷ 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 [72].

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 [72]

The prevalence of diabetes/high sugar levels was lower among Aboriginal and Torres Strait Islander people living in non-remote areas (7.5%) than among those living in remote areas (13%) [73]. After age-adjustment, the disparity in diabetes prevalence between Aboriginal and Torres Strait Islander adults (18 years and over) and non-Indigenous adults was greater in remote areas (six times greater) than in non-remote areas (three times greater) [76].

The self-reported results obtained from the AATSIHS were broadly consistent with biomedical results obtained for a subset of Aboriginal and Torres Strait Islander adults (18 years and over) who provided blood and urine samples [74]. In 2012-2013, results for fasting plasma glucose levels revealed that:

- 11% of Aboriginal and Torres Strait Islander adults had diabetes (9.6% had known diabetes and 1.5% were newly diagnosed from their test results) [101]
- a further 4.7% of Aboriginal and Torres Strait Islander adults were at high risk of diabetes [101]
- after age-adjustment, Aboriginal and Torres Strait Islander adults were more than three times as likely as non-Indigenous adults to have diabetes [102]
- diabetes prevalence among Aboriginal and Torres Strait Islander adults increased with age, with particularly high rates among those aged 55 years and over (35%) [102]
- diabetes tended to occur at earlier ages among Aboriginal and Torres Strait Islander adults, with age-specific rates being similar to those among non-Indigenous adults who were 20 years older [102]
- Aboriginal and Torres Strait Islander adults in remote areas were twice as likely to have diabetes as those living in non-remote areas (21% compared with 9.4%) [103]
- Aboriginal and Torres Strait Islander adults who were obese were around seven times more likely to have diabetes than those who were of normal weight or underweight (17% compared with 2.4%) [104]
- around half of Aboriginal and Torres Strait Islander adults with diabetes had signs of chronic kidney disease (53% compared with 11% without diabetes) [105]
- Aboriginal and Torres Strait Islander people with diabetes were more likely to have selected chronic disease biomarkers associated with cardiovascular disease (abnormal HDL, cholesterol and triglycerides), liver disease (abnormal gamma glutamyl transferase (GGT)) and anaemia, than those without diabetes [105].

National estimates of the prevalence of type 1 diabetes among Aboriginal and Torres Strait Islander adults have not been identified, but Aboriginal and Torres Strait Islander children have the lowest prevalence of type 1 diabetes among children aged 0-14 [106]. At the end of 2013, 6,091 children in Australia had type 1 diabetes (139 cases per 100,000 children), of these, only 167 were Aboriginal and Torres Strait Islander children (69 cases per 100,000 Indigenous children).

The most recent national estimates of the prevalence of GDM are for 2005-2007 when almost 7% of Aboriginal and Torres Strait Islander women who gave birth in NSW, Vic, Qld, WA, SA and the NT²⁸ had diabetes during pregnancy: 1.5% had pre-existing diabetes and 5.1% had GDM [96]. Aboriginal and Torres Strait Islander women who gave birth were three times more likely than their non-Indigenous counterparts to have pre-existing diabetes and almost twice as likely to have GDM.

National incidence data for diabetes are based on estimates for insulin-treated diabetes and obtained from the *National (insulin-treated) diabetes register* (NDR) [107]. Of the new cases of type 1 diabetes in 2013, 70 (3%) were among Aboriginal and Torres Strait Islander people [108]. Between 2005 and 2013, 489 Aboriginal and Torres Strait Islander people were diagnosed with type 1 diabetes. The incidence rate for Aboriginal and Torres Strait Islander people in this period was lower than the rate for non-Indigenous people (7 per 100,000 population compared with 10 per 100,000 population).

In 2011, Aboriginal and Torres Strait Islander 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) [107]. For 2006-2011, after age and sex adjustment, incidence rates for type 1 diabetes were lower for Aboriginal and Torres Strait Islander people (7 per 100,000) than for non-Indigenous people (10 per 100,000); they were almost 4 times higher for type 2 diabetes (134 per 100,000 for Aboriginal and Torres Strait Islander people compared with 36 per 100,000 for non-Indigenous people); and were similar for GDM (60 per 100,000 for Aboriginal and Torres Strait Islander women compared with 59 per 100,000 for non-Indigenous women).

There is growing concern regarding the emergence of type 2 diabetes in Aboriginal and Torres Strait Islander children and adolescents, although data are limited [109]. Between 2006 and 2011, 252 new cases of diabetes were reported among Aboriginal and Torres Strait Islander youth aged 10-19 years at diagnosis²⁹ [110]. Of these, 55% were type 2 and 43% were type 1 diabetes. The age-specific rates of type 2 diabetes for young Aboriginal and Torres Strait Islander people were much higher than for their non-Indigenous counterparts (8.3 times as high among 10-14 year olds and 3.6 times as high for 15-19 year olds).

General practice attendances and hospitalisation

General practitioners (GPs) are usually the initial point of contact for people with diabetes and often play a key role in coordinating the other specialised services and health professionals who are needed to manage the condition [111]. In the period April 2008 to March 2013, diabetes was managed in 5% of encounters (82 per 1,000 encounters) between Aboriginal and Torres Strait Islander patients and GPs [46]. After age-adjustment, diabetes was managed 2.8 times more frequently among Aboriginal and Torres Strait Islander patients than among other patients. This was due mainly to type 2 diabetes (77 per 1,000 encounters) and after age-adjustment, this was almost three times the rate for other patients. For type 1 diabetes, GP encounters occurred much less frequently (4.2 per 1,000 encounters) than for non-Indigenous patients (rate ratio 1.8 after age-adjustment). GP encounters with Aboriginal and Torres Strait Islander women for GDM also occurred much less frequently (1.1 per 1,000 encounters) than for non-Indigenous patients (rate ratio 2.7 after age-adjustment).

Hospital services are typically required to treat the advanced stages of complications of diabetes or acute episodes of poor glycaemic control [112]. There were 6,391 hospital separations for ICD 'Endocrine, nutritional and metabolic diseases' (which includes diabetes) among Aboriginal and Torres Strait Islander people in Australia in 2013-14, accounting for 1.6% of separations identified as Indigenous [60].

In 2012-13 there were 2,749 hospital separations for diabetes (excluding GDM) for Aboriginal and Torres Strait Islander people in Australia³⁰ [30]. After age-adjustment, Aboriginal and Torres Strait Islander people were four times more likely to be hospitalised for diabetes than non-Indigenous people. There were similar numbers of hospitalisations for Aboriginal and Torres Strait Islander males and females (1,379 and 1,370 respectively). However, the disparity in hospitalisation rates between Aboriginal and Torres Strait Islander males and females and their non-Indigenous counterparts was greater for females (4.7 times higher) than males (3.5 times higher). Hospitalisation rates for Aboriginal and Torres Strait Islander people with diabetes increased with increasing remoteness. Aboriginal and Torres Strait Islander people were 5.3 times more likely to be hospitalised for diabetes in remote and very remote areas, 3.4 times more likely to be hospitalised in inner and outer regional areas, and 2.8 times more likely to be hospitalised in major cities, than their non-Indigenous counterparts.

In 2012-13, Aboriginal and Torres Strait Islander people were more likely to be hospitalised for type 1 and type 2 diabetes (as the principal and/or an additional diagnosis) than non-Indigenous people (two and four times more likely respectively) [112]. Aboriginal and Torres Strait Islander females were 1.9 times more likely to be hospitalised with a principal or additional diagnosis of GDM than non-Indigenous females. Aboriginal and Torres Strait Islander males and females were more likely to be hospitalised for each type of diabetes than their non-Indigenous counterparts. The disparity was greatest for Aboriginal and Torres Strait Islander females with a principal diagnosis of type 2 diabetes, who were eight times more likely to be hospitalised than non-Indigenous females.

From 2011-12 to 2012-13, the majority of hospitalisations of Aboriginal and Torres Strait Islander people with a principal diagnosis of diabetes mellitus were for type 2 diabetes (61%), followed by GDM (21%) and type 1 diabetes (17%) [46]. In this period, age-specific hospitalisation rates for diabetes (all types excluding GDM) generally increased with age for both Aboriginal and Torres Strait Islander

²⁸ Data from the NT are for public hospitals only [96].

²⁹ Based on combined data from the National diabetes services scheme (NDSS) and the Australasian Paediatric Endocrine Group (APEG) [110].

³⁰ Data are for public and private hospitals in all jurisdictions [30].

people and non-Indigenous people, but Aboriginal and Torres Strait Islander males and females had higher hospitalisation rates for diabetes than their non-Indigenous counterparts in all age-groups from 15-24 years onwards. The disparity between Aboriginal and Torres Strait Islander and non-Indigenous hospitalisation rates was greatest for males in the 45-54 year age-group; and greatest for females in the 55-64 year age-group (six and eleven times higher respectively).

Hospitalisations for various chronic conditions, including complications of diabetes, are considered potentially preventable [30]. In 2012-13, diabetes complications accounted for the largest proportion (67%) of potentially preventable hospitalisations for Aboriginal and Torres Strait Islander people, resulting in an age-adjusted rate that was six times greater than the rate for non-Indigenous people.

In 2012-13, hospitalisation rates for complications of type 2 diabetes among Aboriginal and Torres Strait Islander people in Australia were consistently higher than for non-Indigenous people: ten times higher for renal complications; almost three times higher for circulatory and ophthalmic complications; and almost seven times higher for multiple complications of diabetes [30].

Mortality

In 2013, diabetes³¹ was the second leading underlying cause of death³² among Aboriginal and Torres Strait Islander people, with an age-adjusted death rate six times higher than that for non-Indigenous people [51, 52]. Diabetes was responsible for 7.6% of deaths (202 deaths) among Aboriginal and Torres Strait Islander people living in NSW, Qld, SA, WA and the NT [51, 52]. There were more deaths from diabetes among Aboriginal and Torres Strait Islander females (121 deaths) than among males (81 deaths) [52]. After age-adjustment, Aboriginal and Torres Strait Islander females and males were both more likely to die from diabetes than their non-Indigenous counterparts (eight and four times respectively).

From 2010-2012, diabetes was the underlying cause of death for 564 Aboriginal and Torres Strait Islander people (8% of all Indigenous deaths) in NSW, Qld, SA, WA and the NT [76]. Of these deaths, the underlying cause of death was recorded as: type 1 diabetes (5.0% of deaths); type 2 diabetes (46% of deaths); or the type of diabetes was unspecified (49% of deaths). In this period, diabetes was the underlying or associated cause of death for 1,474 Aboriginal and Torres Strait Islander people (21% of all Indigenous deaths).

Between 2009 and 2013, the greatest disparity in Indigenous:non-Indigenous age-specific death rates occurred in the 45-54 year age-group [52]. In this age-group Aboriginal and Torres Strait Islander people were 17 times more likely to die from diabetes than their non-Indigenous counterparts (rate ratios were 26.5 for females and 12.9 for males). Between 2008 and 2012, diabetes (excluding GDM) accounted for the largest proportion of the Indigenous:non-Indigenous mortality gap for females (21%) and the second largest for males (17%) [114]. Despite some annual variation, there was little change in the gap in death rates for diabetes as an underlying or associated cause of death between Aboriginal and Torres Strait Islander people and non-Indigenous people for 1998 to 2012 [76].

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 people [16, 115]. 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' [16]. 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' [16]. Understanding SEWB and mental health as cultural constructions enhances the capacity for culturally appropriate, strengths based approaches to managing emerging issues for individuals and communities. Colonisation has had a systematically profound impact on Aboriginal and Torres Strait Islander peoples' traditional cultural practices and by implication on their SEWB [13, 15]. A number of factors have been linked to SEWB concerns for Aboriginal and Torres Strait Islander people such as discrimination and racism, grief and loss, child removals and unresolved trauma, life stress, social exclusion, economic and social disadvantage, incarceration, child removal by care and protection orders, violence, family violence, substance use and physical health problems [15]. They also identify a number of important factors that enhance SEWB such as connection to country, spirituality and ancestry; kinship; and self-determination, community governance and cultural continuity.

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 [116, 117]. Like SEWB, mental health is influenced by a complex interplay of biological, psychological, social, environmental, and economic factors [118, 119]. Some individuals experience compromised mental health due to mental health problems or mental illness. 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 [116, 118]. Mental illness is a psychological 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. Severe mental illness, while evident in the anthropological or ethnographic records, was relatively rare in traditional Aboriginal societies [12].

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.

³¹ Based on the ICD-10-AM sixth edition codes E10-E14 (this excludes GDM) [52].

³² 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 [95, 113].

Extent of social and emotional wellbeing, mental illness and mental health problems among Aboriginal and Torres Strait Islander people

Prevalence

The 2012-2013 AATSIHS found that the SEWB of many Aboriginal and Torres Strait Islander people was compromised: 30% of respondents aged 18 years and over reported high or very high levels of psychological distress in the four weeks prior to the interview [120]. After age-adjustment, the proportion of Aboriginal and Torres Strait Islander 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 [120]. There were variations in psychological distress levels within the Aboriginal and Torres Strait Islander population in terms of sex and remoteness. Around one-third (36%) of Aboriginal and Torres Strait Islander females and one-quarter (24%) of males reported high or very high levels of psychological distress in the four weeks prior to the survey; the proportion of Aboriginal and Torres Strait Islander 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) [30]. Additionally, remoteness affected the level of mental illness among Aboriginal and Torres Strait Islander people 15 years and over, with 18% of those in non-remote areas reporting mental illness, compared with 8% in remote areas [121].

The 2012-13 AATSIHS found a relationship between education level and employment status, and the level of psychological distress for Aboriginal and Torres Strait Islander people [50]. Thirty-four percent of Aboriginal and Torres Strait Islander people who were educated to year 9 level experienced high/very high levels of psychological distress, whereas for those who were educated to year 12, the figure was 26%. Similarly, 42% of unemployed Aboriginal and Torres Strait Islander people experienced high/very high levels of psychological distress, compared with 22% of employed Aboriginal and Torres Strait Islander people. The higher overall levels of psychological distress reported by Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander people aged 15 years and over experienced one or more specific stressors in the 12 months prior to the survey: after age-adjustment, this was almost 1.4 times the proportion of non-Indigenous people [122]. The most prevalent stressors for Aboriginal and Torres Strait Islander people were death of a family member or close friend (37% of people surveyed), followed by; serious illness (23%); inability to get a job (23%); alcohol or drug related problems (18%); and mental illness (16%). 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, Aboriginal and Torres Strait Islander people were 5.0 times and 5.8 times more likely, respectively, than non-Indigenous people to report these stressors. Among Aboriginal and Torres Strait Islander people, commonly reported specific stressors were fairly consistent for males and females, however a greater proportion of females than males reported experiencing one or more specific stressors (72% and 65% respectively).

Psychological distress and the contributing life stressors are just one aspect of SEWB. Also providing an indication of a person's state of SEWB is the degree to which they experience positive feelings. In the AATSIHS 2012-13, survey respondents reported on feelings of calmness and peacefulness, happiness, fullness of life, and energy and 91% of Aboriginal and Torres Strait Islander people reported feeling happy either some, most, or all of the time [30]. However, 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%). The absence of comparable data precludes definitive statements about the relative positive wellbeing of Aboriginal and Torres Strait Islander and non-Indigenous people, but the greater frequency of psychological distress in the Aboriginal and Torres Strait Islander population, together with the types and numbers of stressors reported, suggests Aboriginal and Torres Strait Islander people experience lower levels of SEWB than non-Indigenous people. The 2008 *Household income and labour dynamics in Australia survey* (HILDA) offers mixed support for this suggestion: it found that holding a wide range of other factors constant, overall life satisfaction was significantly higher for Aboriginal and Torres Strait Islander people, compared with non-Indigenous Australians [123].

SEWB are influenced by the support a person receives from their social networks [124]. Information collected in the 2008 *National Aboriginal and Torres Strait Islander social survey* (NATSISS) showed that 89% of Aboriginal and Torres Strait Islander 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 [125]. Removal from one's natural family also has significant implications for a person's SEWB [126]. The 2008 NATSISS revealed that Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander people with high or very high levels of distress had not been removed from their natural family [126].

In terms of the SEWB of Aboriginal children, the *Western Australian Aboriginal child health survey (WAACHS)*, 2001-2002, remains the most recent and detailed source of information. It reported that 24% of Aboriginal children and young people aged 4-17 years were rated by their carers (parent or guardian) as being at high risk of clinically significant emotional or behavioural difficulties compared with 15% of their counterparts in the general WA population [127]. Children of Aboriginal 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 Aboriginal carers who had not been forcibly separated from their families. Around 71% of Aboriginal children were living in families that had experienced three or more major life stress events (such as death of a close family member, illness, family break-up, financial difficulties or arrest) in the 12 months prior to the survey, and 23% had experienced seven or more such events [Derived from 127]. The *Footprints in time: longitudinal study of Indigenous children* found that Indigenous boys had higher average behavioural and emotional difficulties scores than Indigenous girls, (scores of 13 and 11 respectively). Differences between boys and girls were significant on the hyperactivity, prosocial and total difficulties scales.

Hospitalisation

Reflecting the continuing high levels of distress experienced by many Aboriginal and Torres Strait Islander people, 16,070 of the hospital separations in 2013-14 with a principal diagnosis of ICD 'Mental and behavioural disorders' were identified as Aboriginal and Torres Strait Islander [60].³³

Information about hospitalisation for the specific sub-categories within the ICD chapter 'Mental and behavioural disorders' are not available for 2013-14, but data from 2008-10 show hospitalisation rates for each sub-category were generally higher for Indigenous people than for other Australians [45]. 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 non-Indigenous people.

Intentional self-harm categorised as a principal diagnosis chapter within the ICD, was responsible for 2,619 (0.6%) of all hospital admissions for Indigenous people in 2013-14 [Derived from 60]. 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 their non-Indigenous counterparts [45]. 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 [45].

Mortality

The most recent detailed information about Aboriginal and Torres Strait Islander mortality as a result of mental health related conditions is for those 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 20) [45]³⁴. After age-adjustment death rates were 1.7 times higher for Indigenous males and 1.3 times higher for Indigenous females than for their non-Indigenous counterparts.

Table 20. Numbers and rates of deaths from mental health related conditions, excluding intentional self-harm, and Aboriginal and Torres Strait Islander: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, and 'Other mental disorders' ICD codes F20-F99, G30, G47.0, G47.1, G47.2, G47.8, G47.9, O99.3, R44, R45.0, R45.1, R45.4, R48

3 Rates are deaths per 100,000, rounded to the nearest whole number, standardised using the Australian 2001 ERP

Source: AIHW, 2013 [45]

In 2013, the death rate for ICD 'Intentional self-harm' for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA, and the NT was 2.2 times the rate reported for non-Indigenous people [52]. It was the fourteenth leading specific cause of death among Aboriginal and Torres Strait Islander people.

For the period 2009-2013, deaths from intentional self-harm were much higher for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA, and the NT than those for their non-Indigenous counterparts, with age-standardised death rates ranging from 12 per 100,000 (NSW) to 36 per 100,000 (WA) [52]. Death rates were higher for Aboriginal and Torres Strait Islander males than females (in those jurisdictions for which details for females were available) (Table 21).

³³ 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'.

³⁴ Under the ICD, intentional self-harm is classified under 'External causes of morbidity and mortality' (codes X60-X84); details are provided separately.

Table 21. Age-standardised death rates for intentional self-harm, Aboriginal and Torres Strait Islander people by sex and jurisdiction, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2009-2013

Jurisdiction	Aboriginal and Torres Strait Islander people			Rate ratios		
	Persons	Males	Females	Persons	Males	Females
NSW	12	20	n.p.	1.4	1.5	n.p.
Qld	21	32	12	1.7	1.6	2.1
WA	36	52	20	3.0	2.9	3.7
SA	21	29	n.p.	1.8	1.7	n.p.
NT	29	44	15	2.5	2.2	n.p.

- Notes: 1 Rate per 100,000 population, rounded to the nearest whole number, standardised to the Australian 2011 ERP
 2 Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate
 3 n.p.: not published
 4 These figures probably under-estimate the differences between Aboriginal and Torres Strait Islander and non-Indigenous people due to the incomplete identification of Indigenous status

Source: ABS, 2015 [52]

These overall death rates conceal the very high rates of suicide among young Aboriginal and Torres Strait Islander people who die from suicide at much younger ages than non-Indigenous people. Combined data for NSW, Qld, WA, SA and the NT in 2009-2013 show the highest death rates for intentional self-harm were among Aboriginal and Torres Strait Islander people aged 15-24 and 25-34 years (39 and 40 deaths per 100,000 respectively) (Table 22) [52]. The burden of death by intentional self-harm is highest among Aboriginal and Torres Strait Islander males aged 15-24 and 25-34 years (rates of 54 and 59 per 100,000 respectively), but is also very high among young Aboriginal and Torres Strait Islander females. The suicide rates for females in the 1-14 years to 25-34 years age-groups ranged from more than two to around 23 times the rates for their non-Indigenous female counterparts. Even more striking is the fact that suicide rates for Aboriginal and Torres Strait Islander females in the 1-14 years to 25-34 years age-groups were all higher than the rates for non-Indigenous males in those age-groups.

Table 22. Age-standardised death rates for intentional self-harm, Aboriginal and Torres Strait Islander people by sex and age-group, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2009-2013

Age-group (years)	Aboriginal and Torres Strait Islander people			Rate ratios		
	Persons	Males	Females	Persons	Males	Females
1-14	2	2	2.1	7.8	6.7	9.5
15-24	39	54	23	4.3	4.2	4.5
25-34	40	59	21	3.1	2.9	3.8
35-44	31	48	16	1.9	1.9	2.2
45+	n.p.	28	n.p.	n.p.	1.2	n.p.
All ages	20	29	n.p.	1.9	1.8	n.p.

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

Source: ABS, 2015 [52]

Research in NSW, Qld, WA, SA, the ACT and the NT has highlighted the increasing impact of suicide among young Indigenous people [30, 128-130]. 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' [131, 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 [30].

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 filtering units of the kidneys (nephrons) which affect the kidneys ability to eliminate wastes and excess fluids [132]. 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 [133]. CKD is inclusive of different conditions, including diabetic nephropathy, hypertensive renal disease, glomerular disease, chronic renal failure, and end-stage renal disease (ESRD) [86]. 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 [134]. ESRD is expensive to treat [135] 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 [136].

A number of risk factors are associated with kidney disease, including obesity, hypertension, diabetes mellitus, tobacco use, established cardiovascular disease, age, family history, severe socioeconomic disadvantage and LBW [137, 138]. These factors are particularly common among Aboriginal and Torres Strait Islander people and contribute to high rates of CKD [134, 139].

Extent of kidney disease among Aboriginal and Torres Strait Islander people

Prevalence

Around 1.8% of Aboriginal and Torres Strait Islander people reported that they had kidney disease as a long-term health condition in the 2012-2013 AATSIHS [63]. After age-adjustment, the prevalence of kidney disease as a long-term health condition was 3.7 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people. The proportions of Aboriginal and Torres Strait Islander people reporting kidney disease were similar for males and females, but the age-adjusted Aboriginal and Torres Strait Islander:non-Indigenous rate ratio was slightly higher for males (3.9) than for females (3.6). The reported prevalence of kidney disease among Aboriginal and Torres Strait Islander people was less than 2% for all age-groups under 45 years, increasing to 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 [134, 140]. The overall incidence rate of ESRD for Aboriginal and Torres Strait Islander people is consistently reported as being considerably higher than for non-Indigenous people [140].

Data from the ANZDATA for the five-year period 2010-2014 reveal that the age-standardised notification rate of ESRD for Aboriginal and Torres Strait Islander people was 615 per 1,000,000 population, 6.6 times the rate for non-Indigenous people (Table 23) [Derived from 36, 141-143].

Notification rates of ESRD were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people in all states and territories, with the highest rates recorded for Aboriginal and Torres Strait Islander people living in the NT (1,696 per 1,000,000), WA (1,008 per 1,000,000), and SA (676 per 1,000,000).

Table 23. Numbers of notifications and age-standardised notification rates for end-stage renal disease, by Aboriginal and Torres Strait Islander status, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, selected jurisdictions, Australia, 2010-2014

Jurisdiction	Aboriginal and Torres Strait Islander		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	180	313	3,727	93	3.4
Vic	58	438	3,099	101	4.3
Qld	276	490	2,060	87	5.6
WA	261	1,008	1,090	90	11.3
SA	77	676	826	87	7.8
NT	381	1,696	64	84	20.2
Australia	1243	615	11,386	94	6.6

Notes: 1 Rates per 1,000,000 population have been standardised using the ERP from 30 June 2001
 2 Rate ratio is the Aboriginal and Torres Strait Islander 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
 4 Rounding may result in inconsistencies in calculated ratios

Source: Derived from ANZDATA, 2015 [143], ABS, 2013 [141], ABS, 2003 [142], ABS, 2014 [36]

Of people newly registered with the ANZDATA in 2010-2014, 59% of Aboriginal and Torres Strait Islander people were aged less than 55 years, compared with 31% of non-Indigenous people. Notification rates were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people across all age-groups (except for the 0-14 years age-group) (Table 24) [Derived from 36, 141-143]. Rate ratios were particularly high for people aged 45-54 years (11.5).

Table 24. Numbers of notifications and notification rates of end-stage renal disease, by Aboriginal and Torres Strait Islander status and age-group, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, Australia, 2010-2014

Age-group (years)	Aboriginal and Torres Strait Islander		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-14	7	6	170	8	0.7
15-24	27	39	261	18	2.2
25-34	72	152	518	33	4.7
35-44	224	547	927	60	9.2
45-54	401	1,237	1,604	107	11.5
55-64	361	1,857	2,487	195	9.5
65+	151	1,255	5,419	339	3.7
All ages	1,243	615	11,386	94	6.6

Notes: 1 Rates per 1,000,000 population
 2 Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate
 3 Rates for 'All ages' are age-standardised
 4 Rounding may result in inconsistencies in calculated ratios

Source: Derived from ANZDATA, 2015[143], ABS, 2013 [141], ABS, 2003 [142], ABS, 2014 [36]

Detailed information from ANZDATA is available for 2013 when a total of 264 Aboriginal and Torres Strait Islander people commenced dialysis, representing an increase from 2012 [140]. In 2013, there were 31 new transplant operations for Aboriginal and Torres Strait Islander recipients, compared with 851 operations performed for non-Indigenous recipients. At 31 December 2013, 34 (3%) of the 1,056 patients on the waiting list for a transplantation were Aboriginal and/or Torres Strait Islander people.

Haemodialysis (HD), conducted in urban or regional clinics and hospitals, is the most common form of dialysis treatment for Aboriginal and Torres Strait Islander people with ESRD [134, 140, 144, 145]. In 2013, HD accounted for the majority of treatment (90%) with only 10% of Aboriginal and Torres Strait Islander dialysis patients receiving peritoneal dialysis (PD) [140]. The majority of non-Indigenous dialysis patients also received HD, but 21% of non-Indigenous dialysis patients received PD. In 2013, there were 1,478 prevalent dialysis patients in Australia (including both PD and HD) identified as Aboriginal and Torres Strait Islander, with a level 4.2 times higher for Aboriginal and Torres Strait Islander people (2,116 per 1,000,000) than for non-Indigenous people (509 per 1,000,000).

Hospitalisation

In 2013-14 hospitalisation rates for CKD were nearly five times higher among Aboriginal and Torres Strait Islander people (5,192 per 100,000) than for non-Indigenous people (1,067 per 100,000) where CKD was the principal and/or additional diagnosis (excluding regular dialysis) [76]. For Aboriginal and Torres Strait Islander males, rates were 3.6 times higher than for non-Indigenous males for hospitalisation for CKD as the principal and/or an additional diagnosis (4,770 and 1,325 per 100,000 respectively). For Aboriginal and Torres Strait Islander females, rates were 6.5 times higher than for non-Indigenous females for hospitalisation for CKD as the principal and/or an additional diagnosis (5,568 and 862 per 100,000 respectively).

There were 172,151 hospital separations for ESRD among Aboriginal and Torres Strait Islander people in 2012-13 [30]. After age-adjustment, the hospitalisation rate for ESRD was 9.9 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people. Aboriginal and Torres Strait Islander females had the highest rate of hospitalisation for ESRD, 15.1 times that of other females; Aboriginal and Torres Strait Islander males were hospitalised for ESRD, at 6.7 times the rate of other males.³⁵ Contributing factors to the higher rates for Aboriginal and Torres Strait Islander females include the higher prevalence of type 2 diabetes among Aboriginal and Torres Strait Islander women and the large proportion of women carrying high levels of body fat around their abdomen; both factors place them at higher risk for CKD [146].

In 2012-13 after age-adjustment, hospitalisation rates for ESRD for Aboriginal and Torres Strait Islander people increased with remoteness [30]. In remote and very remote areas the hospitalisation rate for Aboriginal and Torres Strait Islander people was over 50 times higher than for non-Indigenous people. For Aboriginal and Torres Strait Islander people living in remote and very remote areas, the hospitalisation rate was over twice the rate of Aboriginal and Torres Strait Islander people living in major cities.

In 2013-14, there were 896 hospital separations per 1,000 population for Aboriginal and Torres Strait Islander people for all conditions [60]. The same-day acute separation rate for Aboriginal and Torres Strait Islander people was almost three times the rate for non-Indigenous people with 'care involving dialysis' accounting for a large proportion of these admissions. Hospitalisation rates for regular dialysis as the principal diagnosis were 10 times higher for Aboriginal and Torres Strait Islander people (45,084 per 100,000) than for non-Indigenous people (4,389 per 100,000) [76]. For Aboriginal and Torres Strait Islander males, hospitalisation rates were 6.9 times higher than for non-Indigenous males for regular dialysis (39,049 and 5,682 per 100,000 respectively). For females, hospitalisation rates were almost 16 times higher than for non-Indigenous females for regular dialysis (50,854 and 3,259 per 100,000 respectively).

Mortality

There were 66 deaths from disease of the urinary system among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT in 2013, accounting for 2.5% of all Aboriginal and Torres Strait Islander deaths in those jurisdictions [51].³⁶ After age-adjustment, the death rate for Aboriginal and Torres Strait Islander people was 3.1 times that for non-Indigenous people.

During the period 2008-2012, after age-adjustment, the death rate for kidney disease for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and NT (30 per 100,000) was 2.6 times the rate for non-Indigenous people (11 per 100,000) [30].

More detailed information is available for people living in NSW, Qld, WA, SA and the NT for 2010-2012. During this period, CKD was the underlying cause of death of 260 Aboriginal and Torres Strait Islander people and the underlying or associated cause of death of 1,166 Aboriginal and Torres Strait Islander people [76]. After age-adjustment, the death rate for CKD as an underlying or associated cause of death for Aboriginal and Torres Strait Islander people was 3.2 times higher than the rate for non-Indigenous people. The Aboriginal and Torres Strait Islander:non-Indigenous rate ratios were higher for females (3.9) than for males (2.6).

³⁵ 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.

³⁶ 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 [147], but in public health practice attention is almost entirely confined to physical harm [148]. 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 [149] other than those collected as part of population surveys, such as the ABS national health surveys.

The classification of injury has generally followed the WHO's ICD, which includes particular attention to the external cause and intention of the injury [150].³⁷ 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; 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 [147, 149].

Extent of injury among Aboriginal and Torres Strait Islander 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 reported levels in the 35-44 and 45-54 years age-groups [152, 153]. Long-term conditions caused by injury were reported more frequently by Aboriginal and Torres Strait Islander people than by non-Indigenous people across all age-groups except for the 55+ years age-group [152]. After age-adjustment, Aboriginal and Torres Strait Islander 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) [153].

In relation to violence, almost one-quarter (23%) of Aboriginal and Torres Strait Islander people reported in the 2008 NATSISS that they had been a victim of physical or threatened violence in the previous 12 months [124]. Victimization was higher among younger Aboriginal and Torres Strait Islander people, with males and females aged 15-24 years having the highest reported proportions (29% and 31%, respectively) [154]. Victimization levels were highest among Aboriginal and Torres Strait Islander people in the 15-24 years age-group across all levels of remoteness except for regional areas where the highest level was for the 25-34 years age-group. For Aboriginal and Torres Strait Islander males in the 15-24 years age-group, victimisation was highest in major cities and remote/very remote areas (both 31%), followed by regional areas (26%). Across all levels of remoteness, more than 30% of Aboriginal and Torres Strait Islander females aged 15-24 years experienced victimisation.

According to the 2008 NATSISS, 74% of Aboriginal and Torres Strait Islander people aged 15 years or over reported problems in their neighbourhood or community, with 25% reporting family violence and 23% reporting assault [45]. WA had the highest proportion of Aboriginal and Torres Strait Islander 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%). Aboriginal and Torres Strait Islander 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 28,402 hospital separations for injuries for Aboriginal and Torres Strait Islander people in 2013-14 [60]. The leading external causes of injury-related hospitalisations were ICD 'Complications of medical and surgical care' (27%), falls (17%), assault (16%), and exposure to mechanical forces (14%). After age-adjustment, the separation rate for injury was more than twice as high for Aboriginal and Torres Strait Islander people than for other Australians.

In 2012-13, the age-standardised hospitalisation rates for injury for Aboriginal and Torres Strait Islander 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 [30]. In terms of age, the greatest disparity between Aboriginal and Torres Strait Islander and non-Indigenous people was in the 30-34 years age-group, where the rate of injury was 3.6 times higher. The highest proportion of injury, however, was in the 25-44 years age-group (42% for Aboriginal and Torres Strait Islander females, 36% for Aboriginal and Torres Strait Islander males). Rates of hospitalised injury are consistently higher for Aboriginal and Torres Strait Islander people in the middle years, however from about 65+ years, the rates are high for both Aboriginal and Torres Strait Islander people and non-Indigenous people [155].

In terms of remoteness, hospitalisation rates for injury for Aboriginal and Torres Strait Islander people living in NSW, Vic, Qld, WA, SA and the NT increased with remoteness in 2012-13 [30]. The rate increased from 35 per 1,000 in major cities to 77 per 1,000 in remote and very remote areas. Hospitalisation rate ratios (Aboriginal and Torres Strait Islander/non-Indigenous) were higher in remote areas than major cities for a number of principal diagnoses, including:

- 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)

³⁷ This system is followed in this section, but it has its limitations (for more details, see [151]).

- 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 Aboriginal and Torres Strait Islander people than among non-Indigenous people; in 2013-14, 16% of injury-related hospitalisations among Aboriginal and Torres Strait Islander people were for assaults compared with 2% among other Australians [60].

The most recent data for assaults on Aboriginal and Torres Strait Islander males and females is for the period 2012-13. Assault was responsible for 19% of all hospitalisations for Aboriginal and Torres Strait Islander males and 27% for Aboriginal and Torres Strait Islander females living in NSW, Vic, Qld, WA, SA and the NT [30]. Aboriginal and Torres Strait Islander males and females were 9 and 34 times, respectively, more likely to be hospitalised for assault than non-Indigenous males and females.

Rates of hospitalisations due to family violence-related assaults among Indigenous people living in NSW, Vic, Qld, WA, SA and the NT were higher than their non-Indigenous counterparts in 2012-13 [30]. After age-adjustment, Indigenous people were hospitalised for assaults relating to family violence at 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 (18 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 (14 and 42 times respectively the rates for non-Indigenous people).

Mortality

Injury was the third leading cause of death among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT in 2013, accounting for 15% of all Aboriginal and Torres Strait Islander deaths [51]. Important specific causes of injury deaths were intentional self-harm (138 deaths, 5.2% of all Aboriginal and Torres Strait Islander deaths), land transport accidents (72 deaths, 2.7% of all Aboriginal and Torres Strait Islander deaths), and assault (33 deaths, 1.2% of all Aboriginal and Torres Strait Islander deaths). After age-adjustment, deaths from intentional self-harm were 2.2 times as common for Aboriginal and Torres Strait Islander people than for non-Indigenous people, and those from land transport accidents 2.4 times as common. After age-adjustment, the death rate for injury from assault was 6.0 times higher (5.5 per 100,000) than for non-Indigenous people (0.9 per 100,000).

The most recent detailed information for death from injury is available for the five-year period 2008-2012, in this period there were 1,766 Aboriginal and Torres Strait Islander deaths from injury in NSW, Qld, WA, SA and the NT, representing 15% of all Aboriginal and Torres Strait Islander deaths [75]. Aboriginal and Torres Strait Islander people died from injury at twice the rate of non-Indigenous people. Death rates for injury were particularly high among Aboriginal and Torres Strait Islander people aged 25-34 years (107 per 100,000), 35-44 years (103 per 100,000) and 75+ years (171 per 100,000 respectively).

Important specific causes of injury deaths during 2008-2012 remained relatively similar in NSW, Qld, WA, SA and the NT, with intentional self-harm, land transport accidents, accidental poisoning by and exposure to noxious substances and assault being the leading causes of death for both Aboriginal and Torres Strait Islander males (6.4, 4.8, 2.0 and 1.8 percent of total deaths, respectively) and females (2.9, 2.8, 1.4 and 1.4 percent of total deaths, respectively) [46].

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 [156]. Respiratory disease, which includes chronic obstructive pulmonary disease (COPD)³⁸, asthma, pneumonia and invasive pneumococcal disease, represents a significant burden of ill-health and hospitalisation among Aboriginal and Torres Strait Islander people [50], particularly among the very young [50, 157] and older people [50].

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 [158, 159]. Infants and children are particularly susceptible to developing respiratory conditions, due to factors like exposure to tobacco smoke, poor environmental conditions, poor nutrition, and limited access to medical care [160, 161].

Extent of respiratory disease among Aboriginal and Torres Strait Islander people

Prevalence

Long-term diseases of the respiratory system³⁹ were reported by 31% of Aboriginal and Torres Strait Islander people who participated in the 2012-2013 AATSIHS [153]. After age-adjustment, the overall level of respiratory disease among Aboriginal and Torres Strait Islander people was 1.2 times higher than for non-Indigenous people. For Aboriginal and Torres Strait Islander people respiratory conditions were more frequently reported by women (34%) than men (28%). Respiratory conditions were the most commonly reported condition for those less than 35 years of age.

³⁸ COPD relates to long-term lung diseases for which the symptoms are not fully reversible, and includes chronic bronchitis, emphysema, and some asthma [156].

³⁹ Individuals who reported a current respiratory condition that had lasted, or was expected to last, for 6 months or more [153].

Asthma was the most commonly reported long-term respiratory condition for Aboriginal and Torres Strait Islander people (18%) and the second most commonly reported long-term condition [153]. After age-adjustment, the level of asthma among Aboriginal and Torres Strait Islander people was 1.9 times higher than for non-Indigenous people. Asthma was reported more commonly by females (20%) than by males (15%) and by people living in non-remote areas (20%) than remote areas (10%) [162]. Other long-term respiratory conditions reported included chronic sinusitis (8%) and COPD (4%) [153].

Hospitalisation

There were 20,702 hospital separations for respiratory disease as a principal diagnosis among Aboriginal and Torres Strait Islander people in 2013-14 [60]. This represents 5.1% of all Aboriginal and Torres Strait Islander hospitalisations (including dialysis).

For selected respiratory diseases, the age-standardised hospitalisation rates for Aboriginal and Torres Strait Islander people in 2012-13 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 [30]. Aboriginal and Torres Strait Islander young people aged 15-24 years were hospitalised for whooping cough at 5.5 times the rate of non-Indigenous young people. Hospitalisation rates were higher for Aboriginal and Torres Strait Islander 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 in 2012-13 was particularly high for Aboriginal and Torres Strait Islander people living in remote/very remote areas (21 per 1,000) compared with those living in major cities areas (5.5 per 1,000), with a rate ratio of 3.9 [30].

Mortality

In 2013, respiratory disease was the underlying cause of death for 216 Aboriginal and Torres Strait Islander people living in NSW, Qld, SA, WA and the NT, accounting for 8.2% of Aboriginal and Torres Strait Islander deaths [51]. After age-adjustment, the death rate for Aboriginal and Torres Strait Islander people from respiratory disease was 2.0 times higher than for non-Indigenous people. Chronic lower respiratory diseases (including asthma, bronchitis, bronchiectasis, emphysema, and other COPD) were responsible for 148 Aboriginal and Torres Strait Islander deaths; the age-adjusted death rate for Aboriginal and Torres Strait Islander people was 2.4 times higher than for non-Indigenous people.

The death rate from chronic lower respiratory diseases for Aboriginal and Torres Strait people aged 45-54 years living in NSW, Qld, SA, WA and the NT in 2009-2013 (28 per 100,000) was 7.6 times higher than for their non-Indigenous counterparts [51]. Among people aged 55-64 years, the rate of 88 per 100,000 for Aboriginal and Torres Strait Islander people was 5.1 times higher than for their non-Indigenous counterparts. Influenza and pneumonia were responsible for 37 Aboriginal and Torres Strait Islander deaths: the age-adjusted death rate was 1.7 times higher than for non-Indigenous people.

The most recent detailed information on specific causes of respiratory-related deaths for Aboriginal and Torres Strait Islander males and females is for the period 2006 to 2010 [45]. The leading specific cause of death from respiratory disease for both males and females living in NSW, Qld, WA, SA and the NT was chronic lower respiratory diseases (Table 25). Age-adjusted death rates for chronic lower respiratory diseases were around three times higher for Aboriginal and Torres Strait Islander males and females than for their non-Indigenous counterparts. COPD accounted for 87% of the deaths of Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Table 25. Age-standardised death rates for respiratory disease, Aboriginal and Torres Strait Islander people, by sex and condition, and Aboriginal and Torres Strait Islander: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, bronchiectasis, emphysema and other COPD
 2 Rates, in deaths per 100,000, are directly age-standardised using the Australian 2001 ERP, by 5-year age-groups to 75+ years
 3 Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate

Source: AIHW, 2013 [45]

Death rates from respiratory disease are still higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people, but the disparity has closed over recent decades, largely because of significant decreases in rates among Aboriginal and Torres Strait Islander people since 1998 [1]. Age-standardised death rates for respiratory disease in NSW, Qld, WA, SA and NT declined by 26% over the period 1998-2012 for Aboriginal and Torres Strait Islander people.

Eye health

Eye health can be affected by a number of factors, including genetics, ageing, premature birth, diseases (such as diabetes), injuries, ultraviolet (UV) exposure, nutrition and tobacco use [124, 163]. 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 [164, 165]. Even partial loss of vision can reduce an individual's ability to live independently and increase the risk of mortality [164, 166].

Vision loss is responsible for 11% of years of life lived with a disability⁴⁰ for Aboriginal and Torres Strait Islander people; is the fourth leading cause of the gap in health between Indigenous and non-Indigenous people; and increases mortality at least two-fold [167, 168]. However, evidence suggests that Indigenous children, particularly those living in remote areas, experience generally better vision than non-Indigenous children, and 94% of vision loss among Indigenous people is preventable or treatable [169]. The *Roadmap to close the gap for vision* is currently guiding national efforts to increase the accessibility and uptake of culturally appropriate eye care services among Indigenous people [170].

Extent of eye health problems among Aboriginal and Torres Strait Islander people

Eye and sight problems⁴¹ (also referred to as diseases of the eye and adnexa) were reported in the 2012-2013 AATSIHS by one-third (33%) of Aboriginal and Torres Strait Islander people (33% of Aboriginal people and 34% of Torres Strait Islander people) [50, 172, 173], making it the most commonly reported long-term health condition [171]. Eye and sight problems were reported by 38% of females and by 29% of males [174]. After age-adjustment, Aboriginal and Torres Strait Islander people were slightly less likely to report eye and sight problems than their non-Indigenous counterparts (ratios of 0.9 for: males; females; and total persons) [153].

In the 2012-2013 AATSIHS, self-reported eye and sight problems increased with age for both Aboriginal and Torres Strait Islander people and non-Indigenous people [152]. Age-specific proportions ranged from: 9% for Aboriginal and Torres Strait Islander people in the 0-14 years age-group to 92% for those aged 55 years and over; and 11% to 95% for non-Indigenous people in the comparable age-groups. The proportion of eye and sight problems reported by Aboriginal and Torres Strait Islander people was lower than that reported by their non-Indigenous counterparts in all age-groups, apart from those reported for the 35-44 and 45-54 years age-groups in which the proportions were slightly higher among Aboriginal and Torres Strait Islander people. The proportion of Aboriginal and Torres Strait Islander people reporting eye or sight problems was similar in non-remote areas⁴² and remote areas (both 35%), but lower among those living in very remote areas (25%) [162].

Specific eye conditions

The most common eye conditions reported by Aboriginal and Torres Strait Islander people in the 2012-2013 AATSIHS were: hyperopia (long sightedness: 19%), myopia (short sightedness: 13%), other diseases of the eye and adnexa⁴³ (5.6%), blindness (3.0%), and cataract (1.1%) (Table 26) [153]. After age-adjustment, Aboriginal and Torres Strait Islander people were more likely to report hyperopia, cataract and blindness than non-Indigenous people (ratios of 1.1, 1.4 and 7.4 respectively), but were less likely to report myopia (ratio: 0.8) and other diseases of the eye and adnexa (ratio: 0.5). Blindness showed the greatest disparities in Indigenous:non-Indigenous ratios, with Aboriginal and Torres Strait Islander males and females both more likely to report blindness than their non-Indigenous counterparts (ratios: 6.3 for males and 8.8 for females) [153].

Table 26. Proportions (%)¹ of people reporting specific diseases of the eye and adnexa as long-term health conditions², by sex and Indigenous status, and Indigenous:non-Indigenous ratios, Australia, 2012-2013

Diseases of the eye and adnexa	Males			Females			Persons		
	Indigenous (%)	Non-Indigenous ³ (%)	Ratio ⁴	Indigenous (%)	Non-Indigenous ³ (%)	Ratio ⁴	Indigenous (%)	Non-Indigenous ³ (%)	Ratio ⁴
Cataract	1.2	1.4	1.7	1.0	2.0	1.2	1.1	1.7	1.4
Myopia	10	21	0.8	15	27	0.8	13	24	0.8
Hyperopia	15	25	1.1	23	31	1.2	19	28	1.1
Blindness ⁵	2.7	0.6	6.3	3.2	0.5	8.8	3.0	0.6	7.4
Other ⁶	5.7	16	0.5	5.5	16	0.5	5.6	16	0.5

Notes: 1 Proportions are non-age standardised 2 The condition has lasted, or is expected to last, for 6 months or more 3 Data for non-Indigenous people are for 2011-12

4 Ratios are age standardised with the Indigenous proportion divided by the non-Indigenous proportion and based on the 2001 Australian ERP 5 Includes complete and partial blindness

6 Other diseases of the eye and adnexa include: glaucoma, macular degeneration, astigmatism and presbyopia

Source: ABS, 2014 [153]

⁴⁰ Calculated in this case as the multiplication of prevalent cases of vision loss multiplied by the appropriate disability weight for mild, moderate and severe vision loss [167].

⁴¹ Eye and sight problems include: cataract; glaucoma; disorders of the choroid and retina; disorders of the ocular muscles, binocular movement, accommodation and refraction; visual disturbances and blindness; and other diseases of the eye and adnexa [171].

⁴² Non-remote areas include major cities and inner and outer regional areas [162]

⁴³ Other diseases of the eye and adnexa include: glaucoma, macular degeneration, astigmatism and presbyopia [153].

Among Aboriginal and Torres Strait Islander people who reported having diabetes, 29% reported having sight problems due to this condition [46]. After age-adjustment, this proportion was 2.6 times greater than the proportion reported by their non-Indigenous counterparts with diabetes.

The 2012-2013 AATSIHS provides some age-specific data for selected eye diseases (Table 27) [152]. The proportion of Aboriginal and Torres Strait Islander people reporting myopia or other diseases of the eye and adnexa is less in each age-group than that reported by their non-Indigenous counterparts. Hyperopia is also less common among young Aboriginal and Torres Strait Islander people aged 0-14 and 15-24 years of age than among their non-Indigenous counterparts, but more common among Aboriginal and Torres Strait Islander people from 25 years of age onwards. Cataract and blindness are more common among Aboriginal and Torres Strait Islander people than among non-Indigenous people in all age-groups for which data are available.

Table 27. Proportions (%) of people reporting specific diseases of the eye and adnexa as long-term health conditions², by age-group and Indigenous status, and Indigenous:non-Indigenous ratios, Australia, 2012-2013

Diseases of the eye and adnexa	Indigenous people						Non-Indigenous people ³						Total		Ratio ⁴
	Age- groups (years)						Age- groups (years)								
	0-14 (%)	15-24 (%)	25-34 (%)	35-44 (%)	45-54 (%)	55+ (%)	0-14 (%)	15-24 (%)	25-34 (%)	35-44 (%)	45-54 (%)	55+ (%)	Indig (%)	Non-Indig ⁵ (%)	
Cataract	np ⁵	np ⁵	0.9 ⁹	1.0 ⁸	1.3 ⁸	7.4	0.0	np ⁵	np ⁵	0.2 ⁸	0.5 ⁸	6.3	1.1	1.7	1.4
Myopia	2.2 ¹⁰	11 ¹⁰	12 ¹⁰	18 ¹⁰	30	36	4.2 ¹⁰	19 ¹⁰	25 ¹⁰	26 ¹⁰	30	36	13	24	0.8
Hyperopia	3.9	8.6	11	22 ¹⁰	60 ¹⁰	68 ¹⁰	4.5	9.5	8.6	15 ¹⁰	53 ¹⁰	62 ¹⁰	19	28	1.1
Blindness ⁶	1.0 ⁸	2.5 ¹⁰	2.9	5.7 ¹⁰	5.0 ¹⁰	6.4 ¹⁰	np ⁵	0.4 ^{8,10}	np ⁵	0.4 ^{8,10}	0.5 ^{8,10}	1.4 ¹⁰	3.0	0.6	7.4
Other ⁷	2.7 ¹⁰	3.8 ¹⁰	5.2 ¹⁰	8.1 ¹⁰	9.5 ¹⁰	14 ¹⁰	4.9 ¹⁰	8.8 ¹⁰	13 ¹⁰	14 ¹⁰	21 ¹⁰	27 ¹⁰	5.6	16	0.5

- Notes:
- 1 Proportions are non-age-standardised and are expressed as percentages
 - 2 The condition has lasted, or is expected to last, for 6 months or more
 - 3 Data for non-Indigenous people are for 2011-12
 - 4 Ratios are age-standardised with the Indigenous proportion divided by the non-Indigenous proportion and based on the 2001 Australian ERP
 - 5 Not available for publication but included in totals where applicable, unless otherwise indicated
 - 6 Includes complete and partial blindness
 - 7 Other diseases of the eye and adnexa include: glaucoma, macular degeneration, astigmatism and presbyopia
 - 8 Proportion has a relative standard error between 25% and 50% and should be used with caution
 - 9 Proportion has a relative standard error greater than 50% and is considered too unreliable for general use
 - 10 The difference between the proportion for Aboriginal and Torres Strait Islander people and the comparable proportion for non-Indigenous people is statistically significant

Source: ABS, 2014 [152]

The National Trachoma Surveillance and Reporting Unit provides prevalence data for trachoma detected through screening [175]. In 2014, screening was undertaken in 125 communities in the NT, WA, SA and NSW, and the overall prevalence of active trachoma among children aged 5-9 years (using projected data) was 4.7%. A total of 158 cases were detected (32 in WA, 27 in SA, and 99 in the NT). If left untreated, trachoma can cause scarring and in-turned eyelashes that lead to blindness (trichiasis) [169]. In 2014, at risk communities in the NT, SA and WA were screened for trichiasis, and the condition was detected in 0.5% of adults aged 15 years and over and 0.9% of those aged 40 years and over [175]. A total of 50 cases were detected (11 in WA, 12 in SA, and 27 in the NT).

General practice attendances and hospitalisation

Among Aboriginal and Torres Strait Islander patients, 1.1% of all problems that were managed by GPs in the period April 2008 to March 2013 were related to eye health [46, 75]. After age-adjustment, eye health problems among Aboriginal and Torres Strait Islander patients were managed by GPs at a similar rate as that for other patients (rate ratio: 1.0). However they were 3.5 times more likely than other patients to see GPs for the management of cataracts.

In 2013-14, there were 3,150 hospital separations for diseases of the eye and adnexa among Aboriginal and Torres Strait Islander people in Australia, accounting for 0.8% of separations identified as Indigenous [60]. A more detailed analysis of hospitalisation data is available for the period 2011-12 to 2012-13 [75]. In this period, there were 5,674 hospitalisations for diseases of the eye and adnexa among Aboriginal and Torres Strait Islander people, the majority of which (58%) were for cataracts [46]. After age-adjustment, Aboriginal and Torres Strait Islander males and females were less likely to be hospitalised for diseases of the eye and adnexa than their non-Indigenous counterparts (rate ratios of 0.7 and 0.8 respectively) [75]. Aboriginal and Torres Strait Islander people were less likely to be hospitalised for these eye conditions in non-remote areas than their non-Indigenous counterparts (rate ratio 0.7), but they were more likely to be hospitalised for them in remote and very remote areas (rate ratios of 1.2 and 1.5 respectively).

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 [176]. 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) [177].

OM can be caused by viruses or bacteria or both, and often occurs as a result of another illness such as a cold [176]. It can cause intermittent or persistent hearing impairment and the risk of permanent hearing loss increases if OM becomes chronic and is not adequately treated and followed up. Persistent ear discharge through a perforation (hole) in the tympanic membrane (eardrum) is referred to as chronic suppurative otitis media (CSOM) [177]. For a diagnosis of CSOM, the tympanic membrane perforation must be able to be seen and large enough to allow the discharge to flow out of the middle ear space.

OM, particularly in suppurative forms, is associated with impairment of hearing, with major implications for language development and learning [124, 178-180]. OM can affect Aboriginal and Torres Strait Islander 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 [179].

Extent of ear disease among Aboriginal and Torres Strait Islander people

Prevalence

Exceptionally high levels of ear disease and hearing loss have been reported for many years in Aboriginal and Torres Strait Islander communities, particularly in remote areas [178, 181-183]. The levels described among children living in some remote communities in northern and central Australia have been such that they would be classified by the WHO as being 'a massive public health problem' requiring 'urgent attention' [184, p.2].

Diseases of the ear and mastoid and/or hearing problems were reported as a long-term health condition by 12% of Aboriginal and Torres Strait Islander people who participated in the 2012-2013 AATSIHS [172]. Ear/hearing problems were reported by the same proportion of those in non-remote areas and remote areas (both 12%). Ear/hearing problems were reported by 13% of males and by 12% of females. After age-adjustment, rates for ear and mastoid and/or hearing problems for Aboriginal and Torres Strait Islander people were higher than for non-Indigenous people (rate ratio: 1.3), (rate ratio for males: 1.2 and rate ratio for females: 1.5), and in all age-groups under 55 years.

The proportion of Aboriginal and Torres Strait Islander people with ear/hearing problems increased with age, ranging from 7% of children aged 0-14 years, to 28% of those aged 55 years and over [172]. The same proportions of Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander 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 2014-15 provided audiology or ear, nose and throat (ENT) services to 2,410 Aboriginal and Torres Strait Islander children and young people: 64% of those who received audiology or ENT services were diagnosed with at least one type of middle ear condition [185]. The most common condition among the children and young people was otitis media with effusion (OME) (24%) followed by Eustachian tube dysfunction⁴⁴ (15%), CSOM without discharge (13%), CSOM with discharge (11%), and acute OM (AOM) (5.2%). Of the children who received audiology services, 46% had some form of hearing loss: 31% had bilateral hearing loss; 16% had loss in one ear; and around 8.4% had moderate, severe or profound hearing impairment.

General practice attendances and hospitalisation

According to *Bettering the evaluation of care and health* (BEACH) survey data, the rates of GP attendance for the period from April 2008 to March 2013 were about the same for Aboriginal and Torres Strait Islander and non-Indigenous children aged 0-14 years for OM (70 per 1,000 encounters), and similar for total diseases of the ear (107 per 1,000 encounters compared with 101 per 1,000 encounters) [75].

In 2013-14, there were 2,620 hospital separations for diseases of the ear and mastoid process (portion of the temporal bone of the skull behind the ear) among Aboriginal and Torres Strait Islander people [60]. In 2012-13, the hospitalisation rate for middle ear and mastoid conditions for Aboriginal and Torres Strait Islander children aged 0-3 years was 9.2 per 1,000, slightly lower, 0.8 times, than the rate for non-Indigenous children (12 per 1,000) [30]. Rates for Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander children aged 0-14 years (16 per 1,000) was over twice as high as the rate for non-Indigenous children (7.3 per 1,000).

As with many other areas of Aboriginal and Torres Strait Islander 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 [30]. Importantly, ear infections can lead to hearing loss, which may be a major contributor to poor education and to unemployment [178].

⁴⁴ Eustachian tubes are small passageways that connect the upper part of the throat (pharynx) to the middle ears. When a person sneezes, swallows or yawns, the Eustachian tubes open, allowing air to flow in and out. If the Eustachian tube gets plugged, it is called a Eustachian tube dysfunction, sounds may be muffled and the ear may feel full, ear pain can occur.

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' ([186] cited in [187, 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 [188]. 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 is related to health conditions including diabetes and CVD.

Extent of oral health problems among Aboriginal and Torres Strait Islander people

Prevalence

Oral health problems were reported for 32% of Aboriginal and Torres Strait Islander children aged 0-14 years in the 2008 NATSISS [45]. 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%).

Information about oral health status was not collected in the most recent AATSIHS; however, participants were asked about their oral health in the 2004-2005 NATSIHS. According to the 2004-2005 NATSIHS, 78% of Aboriginal and Torres Strait Islander 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) [189]. The proportion of Aboriginal and Torres Strait Islander 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)					All ages
	15-24	25-34	35-44	45-54	55+	
Number of teeth lost						
0	80	50	27	17	8	45
1-4	18	40	48	37	22	33
5-9	1	6	16	21	14	9
10-14	-	1	2	7	10	3
15+	1	1	4	15	37	8
Dentures						
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 [189]

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 [190]. 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.

In 2010 in Qld, WA, SA, Tas, ACT and the NT, Aboriginal and Torres Strait Islander children aged 5-15 years who received a school dental service examination were more likely to experience caries in both their deciduous and permanent teeth than their non-Indigenous counterparts [191]. The proportion of children aged 5-10 years with dmft ranged from 66% to 82% (which was higher than for non-Indigenous children the same age.) Differences were most pronounced at ages 5-7 years, where Aboriginal and Torres Strait Islander children were around one-and-a-half times more likely to have dmft than non-Indigenous children. For permanent teeth, Aboriginal and Torres Strait Islander children aged 6-15 years were 1.2 times (aged 12 years) to 1.7 times (aged 9 years) more likely to have DMFT than were non-Indigenous children.

Recent information about the oral health of Aboriginal and Torres Strait Islander children is available from the *Stronger futures in the Northern Territory oral health program* (SFNT-OHP) [192]. In 2013, 41% of children who received a clinical service were treated for caries. The proportions of children aged 1-15 years that had dmft/DMFT ranged from 56% of those aged 1-3 years to 89% of those aged 8 years. The proportion of children with caries decreased in most age-groups between 2009 and 2013.⁴⁵

According to the most recent *National survey of adult oral health* (NSAOH), Aboriginal and Torres Strait Islander adults had more caries than non-Indigenous adults in 2004-2006 [193]. Aboriginal and Torres Strait Islander people aged 15 years or older had 2.3 times more untreated caries than their non-Indigenous counterparts: 57% of Aboriginal and Torres Strait Islander adults and 25% of non-Indigenous adults had one or more teeth affected. Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander children and adults than among their non-Indigenous counterparts [193, 194]. Aboriginal and Torres Strait Islander people are affected by periodontal diseases at younger ages than non-Indigenous people [193].

Children rarely develop severe periodontal disease but gingivitis is relatively common, particularly among older children [194]. Gingival bleeding, a common symptom of gingivitis, was generally more common among Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander children aged 13-14 years living in NSW than among their non-Indigenous counterparts. Almost one-half (49%) of Aboriginal and Torres Strait Islander 12 year-olds living in SA had gingival bleeding, compared with 23% of non-Indigenous 12 year-olds. In 2000-2003, around 60% of Aboriginal and Torres Strait Islander children living in remote communities around Alice Springs (NT), in the Far West Area Health Service District (NSW) and in the Nganampa lands (SA) showed some evidence of gingivitis and 21% of children were at moderate risk of developing gingivitis. Almost 42% of 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 Aboriginal and Torres Strait Islander people aged 15 years and older had gingivitis [193]. The prevalence of moderate or severe periodontitis was about 1.3 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Edentulism

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

Dentist visits and hospitalisation

Dentist visits to manage dental issues and for routine check-ups are vital for good oral health, and can result in lower prevalence of caries and periodontal disease [195]; dental hospitalisations can generally be avoided with preventative care and early intervention [187]. Aboriginal and Torres Strait Islander people report barriers to accessing dental services, including long wait times, lack of suitable appointments, and high cost [30] [193].

According to the 2012-2013 AATSIHS, around 4.8% of Aboriginal and Torres Strait Islander people reported visiting a dentist in the two weeks prior to the survey [196].

Results from the NSAOH for 2004-2006 show that 51% of Aboriginal and Torres Strait Islander people visited a dentist in the previous 12 months, and 43% reported usually visiting a dentist at least once per year [193].

The *Footprints in time: longitudinal study of Indigenous children* found that less than half of the children who participated in the study in 2012 (at ages 4.5 to 9 years) had seen a dentist or dental nurse in the 12 months prior to the interview [197].

In 2012-13, after age-adjustment, national hospitalisation rates for dental conditions were 1.3 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people [30]. The hospitalisation rate for Aboriginal and Torres Strait Islander people living in remote areas was more than twice as high as for those in non-remote areas. The hospitalisation rates were higher for Aboriginal and Torres Strait Islander 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).

⁴⁵ 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.

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 [30]

Aboriginal and Torres Strait Islander people undergo more intensive hospital dental treatments at younger ages than the general population [187]. In 2011-12 for all Australians, dental procedures requiring a general anaesthetic were most common in people aged 15-24 years (16 per 1,000 persons); for Aboriginal and Torres Strait Islander people, the procedure rate was highest among 5-9 year-olds (15 per 1,000 people).

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 [198]. 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 [199, 200]. 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)' [201].

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 collects information about the prevalence of disability and also data about individual's need for assistance with core activities [198]. Information about disability at a population level is also collected in Australia's five-yearly censuses [33] and information about disability among Indigenous people is collected in surveys such as the 2012-2013 AATSIHS [172]. Being based on self-reported information, each of these sources has limitations in capturing precise estimates of disability. This is particularly true for Aboriginal and Torres Strait Islander people, whose level of participation in surveys and censuses is lower than that of non-Indigenous people. Also some Aboriginal and Torres Strait Islander people may perceive the concept of disability differently [202].

The greater burden of disability experienced by Aboriginal and Torres Strait Islander people is associated with poorer physical and mental health, increased exposure to risk factors, and higher levels of socio-economic disadvantage [94, 202].

Extent of disability among Aboriginal and Torres Strait Islander people

In the 2011 *Census*, around 29,560 Aboriginal and Torres Strait Islander people (5.7%) needed assistance with core activities (self-care, mobility or communication) some or all of the time [33, 46]. The need for assistance increased with age among both Indigenous and non-Indigenous people, with the proportions requiring assistance higher among Aboriginal and Torres Strait Islander people than among their non-Indigenous counterparts for all age-groups. The proportion of Aboriginal and Torres Strait Islander males needing assistance with core activities was higher than for Aboriginal and Torres Strait Islander females up to the 35-39 year age-group (4.8% and 3.8% respectively), and both were higher than their non-Indigenous males and females counterparts (1.8% and 1.7% respectively). Beyond that age, proportions were higher for Aboriginal and Torres Strait Islander males than females up to 75+ years (37% and 46% respectively) and both were higher than their non-Indigenous counterparts (25% and 35% respectively).

In the 2012-2013 AATSIHS, 36% of Aboriginal and Torres Strait Islander people reported that they had a disability or restrictive long-term health condition [46]. The prevalence of disability increased with age ranging from 19% for those aged 0-14 years, to 67% for those aged 55 years and over.

For those with a disability:

- Physical disability was overall the most common disability type for Aboriginal and Torres Strait Islander people living in non-remote (57%) and remote (59%) areas, with females having a slightly higher proportion for physical disability (63%) compared with males (51%).
- 'Sight, hearing, speech' was the overall second most reported disability type for Aboriginal and Torres Strait Islander people living in non-remote areas (44%) and remote areas (54%), with males having a slightly higher proportion (49%) compared with females (43%). For infants 0-5 years, the highest proportion of disability type was for 'sight, hearing and speech' (68%).

For the disability type; intellectual disability, Aboriginal and Torres Strait Islander people living in non-remote areas had over twice the proportion (23%) than those living in remote areas (9.9%) with males having the highest proportion (24%) compared with females (15%).

Table 30. Aboriginal and Torres Strait Islander people reporting a disability/restrictive long-term health condition, by remoteness, age, sex, and state/territory, 2012-13

Age-group (years) ³	Non-remote		Remote		Australia		Overall population distribution
	Number	Rate ⁽¹⁾	Number	Rate ⁽¹⁾	Number	Rate ⁽¹⁾	Per cent ⁽²⁾
0-14	36,204	20	8,137	18	44,341	19	35
15-24	32,841	32	6,223	24	39,064	31	20
25-34	23,976	36	7,013	34	30,989	36	14
35-44	30,260	51	8,538	48	38,798	50	12
45-54	28,830	62	8,367	62	37,197	62	9.4
55+	29,291	67	8,489	66	37,780	67	8.9
Sex							
Males	90,402	36	22,585	33	112,987	36	50
Females	91,001	36	24,181	35	115,182	36	50
State/territory							
NSW	72,331	38	4,203	46	76,534	38	32
Vic	20,156	44	20,156	44	7.2
Qld	46,561	32	10,416	30	56,977	32	28
SA	11,782	40	2,147	36	13,930	39	5.6
WA	14,317	29	14,284	44	28,602	35	13
Tas	9,110	40†	464†	60†	9,573	40	3.7
NT	4,427	39	15,252	29	19,687	31	10
ACT	2,718	46	2,718	46	0.9
Total per cent	..	36	..	34	..	36	100
Total number	181,403	..	46,766	..	228,169	..	638,324

Notes: † Estimate has a relative standard error between 25% and 50% and should be used with caution

1 Rates per 100

2 Distribution of total Indigenous population. Percentages add within columns

3 Data for specific age-groups are not age-standardised, only the totals

4 Data excludes not stated responses

Source: AIHW, 2015 [46]

The 2012 SDAC reported that for Aboriginal and Torres Strait Islander people the crude disability rate was 23% in 2012, a slight increase from 21% in 2009 [203]. The overall disability rates for Aboriginal and Torres Strait Islander males and females were similar (25% and 22% respectively). Aboriginal and Torres Strait Islander children aged 0-14 years were more than twice as likely as non-Indigenous children to have a disability (15% compared with 6.6%). The proportion for Aboriginal and Torres Strait Islander boys (21%) was 2.5 times higher than for Aboriginal and Torres Strait Islander girls (8.5%). Aboriginal and Torres Strait Islander people had higher rates of disabilities than non-Indigenous people across all age-groups and for both males and females. Aboriginal and Torres Strait Islander people aged 35-54 years old were 2.7 times more likely as non-Indigenous people of the same age to have a disability (38% compared with 14%). After age-adjustment, Aboriginal and Torres Strait Islander people were 1.7 times as likely as non-Indigenous people to be living with disability. After age-adjustment, Aboriginal and Torres Strait Islander people living in non-remote areas were 1.6 times more likely than their non-Indigenous counterparts to be living with a disability.

The 2012 SDAC reported that Aboriginal and Torres Strait Islander people had a higher overall need for assistance compared with non-Indigenous people (63% compared with 60%) [203]. Aboriginal and Torres Strait Islander people were almost twice as likely to require assistance with communication compared with non-Indigenous people (11% compared with 6.6%) and they were more likely to need assistance with cognitive or emotional tasks (29% compared with 22%). The proportions of Aboriginal and Torres Strait Islander people with profound/severe core activity limitation, were 1.7 times higher than for non-Indigenous people for all age-groups; 7.8% of Aboriginal and Torres Strait Islander 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.

Services

Increasing the access to disability services for the Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander people with disability [204, 205]. The *National Indigenous access framework* forms part of the NDA and aims to ensure that the needs of Aboriginal and Torres Strait Islander people with disability are addressed through accessible and appropriate service delivery [206]. NDA services include accommodation support, community support, community access, respite and employment services [207]. In 2013-14, 5.8% of service users were Aboriginal and Torres Strait Islander people, with most of these aged under 50 [208] (Table 31). Forty per cent of Aboriginal service users lived in major cities, 27% lived in an inner regional area, 20% lived in an outer regional area and 13% lived in a remote or very remote area.

Table 31. Numbers and proportions (%) of service users by Indigenous status, Australia, 2012-13 to 2013-14

Year	Indigenous		Non-Indigenous		Not stated/ collected		Total	
	Number	%	Number	%	Number	%	Number	%
2012-13	17,406	5.8	283,306	94	11,827	..	312,539	100
2013-14	18,021	5.8	291,631	94	11,879	..	321,531	100

Notes: 1 Service user data are estimates after use of a statistical linkage key to account for individuals who received services from more than one service type outlet during the 12-month period
 2 Service user data were not collected for all NDA service types
 3 Percentages are of the total excluding service users for whom Indigenous status was 'not stated/not collected'

Source: AIHW, 2015 [208]

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 Aboriginal and Torres Strait Islander 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' [207, p.14-18].

In 2012-13, around 29% of the Indigenous potential population aged 0-64 years used NDA disability support services provided by the states and territories (Table 32). The highest proportions of disability support service use by the Indigenous potential population were in ACT (52%), followed by the NT (45%).

Table 32. Indigenous users of state/territory delivered NDA disability support services (aged 0-64 years) as a proportion (%) of the Indigenous estimated potential population, by jurisdiction and year, Australia, 2011-2013

Years	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
2011-12	29	33	20	33	41	14	51	45	29
2012-13	30	27	21	29	40	16	52	45	29

Note: State/territory delivered disability support services comprise accommodation support, community support, community access and respite
 Steering Committee for the Review of Government Service Provision, 2015 [209]

The NDA specialist disability support service most commonly used by Indigenous people in 2012-13 was community support services (25% of the potential population) (Table 33) [207]. A higher proportion of Indigenous people than non-Indigenous people used community support services.

Table 33. 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, 2012-13

Type of specialist service	Indigenous	Non-Indigenous	Ratio
Accommodation support	5.1	6.3	0.8
Community support	25	23	1.1
Community access	5.5	8.1	0.7

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

Source: Steering Committee for the Review of Government Service Provision, 2015 [209]

Some Aboriginal and Torres Strait Islander people face significant barriers to accessing disability support services, due to social marginalisation, concern about approaching government agencies, differences in cultural attitudes towards disability and services that are culturally inappropriate [30, 210].

Education and employment

After age-adjustment, Aboriginal and Torres Strait Islander 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 in 2012 [203]. Aboriginal and Torres Strait Islander 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). Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander people with a disability was nearly three times as high as the comparable rate for non-Indigenous people with a disability (25% compared with 9.0%).

Communicable diseases

Communicable (infectious) diseases of particular relevance to Aboriginal and Torres Strait Islander people include: tuberculosis, hepatitis (A, B, and C), sexually transmissible infections (STIs), human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS), *Haemophilus influenzae type b* (Hib), pneumococcal disease, meningococcal disease and skin infections [211]. 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) [212, 213]. Risk factors for communicable diseases vary according to the type of disease [211]. Improvements to sanitation, and the increased use of vaccination and antibiotics (for bacterial infections), have markedly reduced some infectious diseases in Australia [199, 214].

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 - for STIs, hepatitis and HIV/AIDS and the National Centre for Immunisation Research and Surveillance - for vaccine-preventable diseases [215, 216].

Tuberculosis

Tuberculosis (TB) is primarily a lung infection caused by the inhalation of the bacterium *Mycobacterium tuberculosis* [217]. 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 [218-220], other risk factors are diabetes, tobacco use, alcohol use and advanced kidney disease [218, 219]; these risk factors are all common in many Aboriginal and Torres Strait Islander communities. Another risk factor for TB is HIV infection [219, 221].

Extent of tuberculosis among Aboriginal and Torres Strait Islander people

The most recent information about TB among Indigenous people is for 2009-2013, when 158 (21%) of the 761 notifications of TB among Australian-born people in Australia were identified as Indigenous [222-225]. Around one-third (35%) of the new cases among Indigenous people were reported in the NT (56 cases), and around another one-third (32%) in Qld (51 cases) (Table 34).

Table 34. Numbers of new cases and crude notification rates of tuberculosis among Indigenous people, by jurisdiction, Australia, 2009-2013

Jurisdiction	Number	Rate
NSW	33	3.9
Vic	3	1.6
Qld	51	6.2
WA	9	2.3
SA	5	3.2
Tas	1	1.0
ACT	0	0.0
NT	56	16

Notes: 1 Population figures are for 30 June 2011 (the mid-point of the five-year period, 2009-2013)

2 Rates are crude incidence rates per 100,000 population

Source: Derived from Barry, 2012 [222], Bareja, 2014 [223], Bareja, 2014 [224], Toms, 2015 [225], ABS, 2009 [226], ABS, 2011 [227]

Australia-wide, the crude notification rate in 2009-2013 was 5.5 cases per 100,000 population for Indigenous people; the crude notification rate was highest for the NT (16 cases per 100,000 population) [Derived from 222-225, 226, 227]. After age-adjustment, the notification rate for Indigenous people was 11.3 times than for Australian-born non-Indigenous people (Table 35).⁴⁶ 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 45-54 years and 55-64 years age-groups (Table 35) [Derived from 222-225, 226, 227].

⁴⁶ 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.

Table 35. Numbers of new cases and notification rates of tuberculosis, 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	
0-4	4	1.1	70	1.0	1.2
5-14	10	1.5	31	0.2	7.0
15-24	13	2.2	87	0.6	4.0
25-34	21	5.2	69	0.4	12.3
35-44	29	8.3	56	0.4	23.7
45-54	45	17	64	0.4	40.3
55-64	22	14	57	0.4	31.1
65+	14	14	169	1.1	12.9
All ages	158	5.5	603	0.5	11.3

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 Barry, 2012 [222], Bareja, 2014 [223], Bareja, 2014 [224], Toms, 2015 [225], ABS, 2009 [226], ABS, 2011 [227]

Hepatitis

Hepatitis is an inflammation of the liver, most commonly caused by a viral infection [228]. The viruses identified most frequently are referred to as types A, B, C⁴⁷.

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 [229, 230] (including sexual contact, particularly between men) [229]. HAV is often asymptomatic among young children, but symptoms among older people may include fever, fatigue, nausea, diarrhoea, jaundice, and vomiting. The mortality rate due to HAV is low.

Extent of HAV among Aboriginal and Torres Strait Islander people

The impact of HAV among Aboriginal and Torres Strait Islander people has declined markedly since 2000, particularly after the introduction in 2005 of HAV vaccination into the national childhood vaccination schedule for Aboriginal and Torres Strait Islander children living in Qld, WA, SA and the NT [216, 231]. Previously, HAV infections were much more common among Aboriginal and Torres Strait Islander children than among non-Indigenous children, particularly for those living in northern Qld, WA, SA and the NT [231]. Children aged 0-4 years were at greatest risk of HAV infection [231]. 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) [230]. The great decline among Aboriginal and Torres Strait Islander people in Australia is reflected in notification figures for the three-year period 2011-2013 when of the 498 notifications of HAV for people living in Australia, 5 were identified as Aboriginal and/or Torres Strait Islander [Derived from 232, 233, 234].

Hepatitis B

Transmission of hepatitis B virus (HBV) is from contact with blood and other body fluids (semen, vaginal fluids and a low risk from saliva) from an infected individual, commonly through sexual contact or use of contaminated injecting equipment [213]. A mother may also transmit HBV to the foetus during pregnancy or to the infant during birth [213]. 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 [213, 229].

Extent of HBV among Aboriginal and Torres Strait Islander people

Of the 884 people with newly acquired HBV in Australia in the five-year period 2010-2015, 84 (9.5%) were identified as Aboriginal and Torres Strait Islander [Derived from 234, 235]. The crude notification rate of newly acquired HBV of 2.9 per 100,000 for Aboriginal and Torres Strait Islander people was 3.6 times the rate of 0.8 per 100,000 for non-Indigenous people. [Derived from 226, 234, 235, 236]. There was a 44% decline in notification rates for Aboriginal and Torres Strait Islander people from 90 per 100,000 in 2010 to 50 per 100,000 in 2014 [235]. It is suggested that this reduction is due to immunisation programs for HBV.

The rates of newly diagnosed HBV in 2014 were substantially higher for males than females across all age-groups, particularly among males 30-39 years and 60 years and above [235]. The male to female ratio of newly acquired HBV among Aboriginal and Torres Strait Islander people was 13:1 compared with 3:1 in the non-Indigenous population.

⁴⁷ There is little information about Hepatitis D and E for Aboriginal and Torres Strait Islander people.

In 2014, for Aboriginal and Torres Strait Islander people living in major cities and inner regional areas in WA, SA, Tasmania, the NT and the ACT, the rates of newly diagnosed HBV infection were similar or lower than those for non-Indigenous people [235]. In outer regional, remote and very remote areas, rates of newly diagnosed HBV infection were 3, 4 and 6 times higher than the rate for the non-Indigenous people respectively.

Hepatitis C

Transmission of hepatitis C virus (HCV) typically occurs via blood-to-blood contact [237]. Injecting drug use is the most common method of contracting the virus and is responsible for the vast majority of cases [232, 235, 238]. The likelihood of transmission of HCV via sexual contact is generally very low [229]. 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 [237]. Some people with HCV can live relatively normal lives, largely unaffected by the virus, but others may develop cirrhosis, liver cancer, or liver failure [239]. 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 [229].

Extent of HCV among Aboriginal and Torres Strait Islander people

Unlike for HBV, the identification of Indigenous status in notifications of HCV is not good: for the five year period 2010 to 2014 Aboriginal and Torres Strait Islander status was not reported in 59% of newly diagnosed HCV cases across Australia [Derived from 226, 236, 240].

Of the 52,763 people diagnosed with HCV in Australia in the five-year period 2010-2014, 3,775 (7.2%) were identified as Aboriginal and Torres Strait Islanders [Derived from 226, 236, 240]. In this period, the crude notification rate for HCV was 7.8 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (128 and 16 per 100,000, respectively).

In contrast to some other reported communicable diseases, the rates of newly diagnosed HCV infection for Aboriginal and Torres Strait Islander people were highest for those living in inner major cities and inner regional areas: 12 and 9 times higher respectively than the rates reported for non-Indigenous people [235]. For newly acquired HCV in the Aboriginal and Torres Strait Islander population in NSW, WA, SA, Tas, Vic, the NT and the ACT, the notification rate increased from 6 per 100,000 in 2010, to 16 per 100,000 in 2014 [235].

In 2014, the greatest disparity in age-specific rates between Aboriginal and Torres Strait Islander people and non-Indigenous people was in the 20-29 years age-group: the rate of newly acquired HCV was almost 20 times higher for Aboriginal and Torres Strait Islander males and 9 times higher for Aboriginal and Torres Strait Islander females, compared with non-Indigenous males and females [235].

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 [213, 216, 241, 242]. 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 [243]. Higher rates in Indigenous populations worldwide suggest socioeconomic disadvantage, particularly high rates of tobacco use and crowded living conditions, as the probable cause [216].

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 [244]. 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 [242].

In 2010-2013, 14 (19%) of the 72 cases of invasive Hib disease notified in all jurisdictions were identified as Indigenous [Derived from 244, 245, 246, 247]. Children (Indigenous and non-Indigenous) aged 0-4 years accounted for 46% of all cases.

In 2007-2010, 25 (29%) of the 85 cases of invasive Hib disease notified in all jurisdictions were identified as Indigenous [216]. 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 Indigenous cases. 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 two deaths reported in 2012 and one death in 2013 associated with Hib [244, 247]. No infant deaths were reported in 2013 [247]. 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 [216].

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 [216]. 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 [248]. Recognised risk factors for pneumococcal disease include: diabetes; chronic respiratory and cardiac diseases; other immune-compromised conditions; tobacco use; and high levels of alcohol consumption [158, 216, 249, 250]. In children, asthma, previous pneumonia, exposure to smoke and attendance at childcare increases susceptibility to IPD [250].

Nationally-funded vaccination for pneumococcal disease was made available in 1999 to Aboriginal and Torres Strait Islander adults aged 50 years and older and to Aboriginal and Torres Strait Islander people aged 15-49 years at high risk [216, 248]. In 2001, vaccination was funded for Aboriginal and Torres Strait Islander infants and young children and for all Australian children medically at risk. From 2005, nationally-funded vaccination was made available to all Australian infants and to all people aged 65 years and older, in addition to those eligible since 1999.

Extent of invasive pneumococcal disease among Aboriginal and Torres Strait Islander people

Detailed data are available for IPD because it has been a notifiable disease in Australia since 2001 [251]. Aboriginal and Torres Strait Islander people have a significantly higher incidence of IPD than non-Indigenous people, however the rate of IPD for Aboriginal and Torres Strait Islander people has decreased between 2011 and 2013 [247]. Based on notifications for all jurisdictions in 2011-2013, the age-adjusted rate of IPD for Aboriginal and Torres Strait Islander people was: 53 per 100,000 in 2011, 41 per 100,000 in 2012 and 32 per 100,000 in 2013 [244, 246, 247]. In 2013, the notification rate for IPD in Aboriginal and Torres Strait Islander children aged under five years (36 per 100,000) reached its lowest rate since 2005 [247].

Age-specific rates for IPD among Aboriginal and Torres Strait Islander 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) [216]. Importantly, age-specific rates for Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander and non-Indigenous people.

After age-adjustment, the IPD hospitalisation rate for Aboriginal and Torres Strait Islander 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 [216]. Among Aboriginal and Torres Strait Islander 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). Aboriginal and Torres Strait Islander people aged 25-49 years were hospitalised at a rate 14.2 times higher than for non-Indigenous people. Hospitalisation rates for pneumococcal pneumonia (not identified as IPD) were more than twice those for IPD for Aboriginal and Torres Strait Islander adults aged 25-49 years and almost four times higher for Aboriginal and Torres Strait Islander people aged 50 years and older.

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 Aboriginal and Torres Strait Islanders [216]. In children under 5 years of age, there were 30 deaths notified; five (17%) of which were of Aboriginal and Torres Strait Islander children.

Meningococcal disease

Meningococcal disease is caused by the bacterium *Neisseria meningitidis* (also known as meningococcus) [216, 252]. 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 health issues. Meningococcal disease is more common in infants and young children [216, 252, 253]. Possible risk factors for the disease include living in crowded housing conditions, exposure to smokers, recent illness and multiple kissing partners [252].

The most common groups of meningococcus found in Australia are serogroups⁴⁸ B and C, with B responsible for most disease in both Indigenous and other people [216, 252, 253]. 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 [253]. Vaccination has reduced the burden of serogroup C meningococcal disease in Australia, but currently there is no vaccination program for serogroup B [216]. 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 Aboriginal and Torres Strait people

Notification rates for both serogroups of meningococcal disease are higher for Aboriginal and Torres Strait Islander people than for other Australians [216]. In 2013, there were 149 cases of meningococcal disease notified in Australia; a 33% decrease from the number of cases reported in 2012 (223) [244, 247]. Of these, 13 cases (9%) were identified as Aboriginal and 1 (0.7%) was identified as Torres Strait Islander; similar proportions were reported in 2012 where 22 (10%) of cases were identified as Aboriginal (10%) and 3 were

⁴⁸ A serogroup is a group of bacteria containing a common antigen.

Torres Strait Islander (1.3%) [244]. More in depth information was provided for 2007-2010, where 104 (10%) of the 1,079 cases of meningococcal disease notified in all jurisdictions were identified as Aboriginal and Torres Strait Islander. Around one-third (36%) of all cases were children (0-4 years), and 60% of all cases which were identified as Aboriginal and Torres Strait Islander occurred among children aged 0-4 years; rates generally decreased with age for both Aboriginal and Torres Strait Islander and non-Indigenous people. The average annual age-specific rate of 23 per 100,000 for Aboriginal and Torres Strait Islander children aged 0-4 years was 3.8 times that for their non-Indigenous counterparts; the rate for Aboriginal and Torres Strait Islander children aged 5-14 years was 4.1 times higher than for other children. After age-adjustment, the overall rate for Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander [216]. Over one-third (37%) of cases were children (0-4 years), and 67% of all cases identified as Aboriginal and Torres Strait Islander occurred among children aged 0-4 years. After age-adjustment, the hospitalisation rate for meningococcal disease was 2.2 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people. Average annual age-specific rates for Aboriginal and Torres Strait Islander 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 [216]. Among Aboriginal and Torres Strait Islander people, up to four deaths⁴⁹ 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 [211]. 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 [254]. 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 [255, 256].

The majority of STIs are asymptomatic or produce only mild symptoms [257, 258]. 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 [211].

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 [259, 260].

Human papillomavirus (HPV) and genital herpes are common STIs in Australia, but they are not notifiable diseases [214]. 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 [246]. 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* [261]. 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 Aboriginal and Torres Strait Islander people

Aboriginal and Torres Strait Islander people accounted for 23% of gonorrhoea notifications in 2014 (Indigenous status was not reported for 33% of notifications) [235]. The notification rate was 18 times higher for Aboriginal and Torres Strait Islander people than for their non-Indigenous counterparts (859 and 49 per 100,000, respectively). Notification rates were substantially higher in the Aboriginal and Torres Strait Islander population than in the non-Indigenous population in all areas of residence especially in outer regional, remote and very remote areas of Australia, 31 times, 69 times and 44 times higher, respectively.

In 2014, the majority (70%) of gonorrhoea notifications for the Aboriginal and Torres Strait Islander population in Vic, WA, SA, Tas, NT and the ACT occurred in the 15-29 years age-group, with 30% in the 15-19 years age-group compared with 7% in the same age-group in the non-Indigenous population and 40% in the 20-29 year old age-group compared with 49% in the same age-group in the non-Indigenous population [235].

Aboriginal and Torres Strait Islander females were marginally more likely to be diagnosed with gonorrhoea than Aboriginal and Torres Strait Islander males however in the non-Indigenous population, the number of diagnoses for males was four times the number

⁴⁹ The ABS only provides a range for numbers of deaths when actual numbers are low.

reported for females [235]. This suggests the transmission of gonorrhoea occurs largely through heterosexual contact in the Aboriginal and Torres Strait Islander population, whereas sex between males is the predominate 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 [262]. 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 [215]. 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 [263].

Extent of syphilis among Aboriginal and Torres Strait Islander people

In 2014, 235 (12%) of the 1,999 people newly diagnosed with infectious syphilis were identified as Aboriginal and Torres Strait Islander (Indigenous status was not reported for 9% of notifications) [235]. The notification rate for Aboriginal and Torres Strait Islander people was over 3 times more than the rate for non-Indigenous people (32 per 100,000 and 8 per 100,000 respectively). Notification rates in the Aboriginal and Torres Strait Islander population were highest among remote, outer regional and very remote areas, with notification rates ranging from twice the rate in major cities up to 304 times the rate in remote areas for the non-Indigenous population in the same areas. In 2014, the notification rate in the Aboriginal and Torres Strait Islander population for infectious syphilis was highest for the 15-19 year age-group, 72 and 128 per 100,000 in males and females respectively; and in the non-Indigenous population it was highest for the 30-39 age-group, 31 per 100,000 in males.

In 2014, the percentage of infectious syphilis diagnoses in the Aboriginal and Torres Strait Islander population was slightly higher for males (52%) than for females (48%) [235]. A different pattern was observed in the non-Indigenous population with males accounting for 97% of diagnoses. This indicates that transmission of infectious syphilis is mainly through heterosexual contact in the Aboriginal and Torres Strait Islander population and through sex between males in non-Indigenous population.

Chlamydia

Chlamydia is caused by the bacterium *Chlamydia trachomatis* [257]. 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.

Extent of chlamydia among Aboriginal and Torres Strait Islander people

Chlamydia was the most reported notifiable disease in Australia in 2014 [235]. Aboriginal and Torres Strait Islander people accounted for 8% of the notifications of chlamydia in 2014 (Indigenous status was not reported for 63% of notifications). The notification rate for chlamydia was more than 3 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (1,341 per 100,000 compared with 389 per 100,000).

Chlamydia is typically diagnosed among adolescents and young adults in both the Aboriginal and Torres Strait Islander and non-Indigenous populations [235]. In 2014, people aged 15-29 years accounted for around 80% of chlamydia notifications in both populations.

For both the Aboriginal and Torres Strait Islander and non-Indigenous populations, females accounted for a greater proportion of chlamydia diagnoses than males in 2014 [235]. Higher notification rates for Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander population compared with the non-Indigenous population, twice as high in inner regional areas, five times higher in outer regional areas, seven times higher in remote and very remote areas [235].

HIV/AIDS

The human immunodeficiency virus (HIV) is a retrovirus that destroys cells in the body's immune system [264]. Untreated, the virus weakens immune system functioning to the point where minor infections may become fatal [265]. 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 [237, 264].

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 [266].

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 [94]. However, Aboriginal and Torres Strait Islander 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 [267].

Extent of HIV/AIDS among Aboriginal and Torres Strait Islander people

National surveillance data show that in 2014 there were 1,081 cases of newly diagnosed HIV infection of which 33 (3%) were among Aboriginal and Torres Strait Islander people [Derived from 235]⁵⁰. Age-standardised rates of HIV diagnosis were 1.6 times higher for Indigenous people than non-Indigenous people (5.9 and 3.7 per 100,000 respectively). Prior to this period, the age-adjusted notification rate of newly diagnosed HIV infection in the Indigenous population was 3.6 per 100,000 in 2005, then rates mostly remained stable until 2011 and then increased in 2012-14 reaching 5.9 per 100,000 in 2014. In this period, the rate remained stable for the non-Indigenous population at 4.0 per 100,000 in 2005 and 3.7 per 100,000 in 2014.

In 2014, the median age of diagnosis among Aboriginal and Torres Strait Islander people was 34 years, and males accounted for 76% of new HIV cases [235]. Rates among Aboriginal and Torres Strait Islander males were 9.6 per 100,000, and among non-Indigenous males were 7.0 per 100,000. Rates among Aboriginal and Torres Strait Islander and non-Indigenous women were lower than men, 2.4 and 0.3 per 100,000 respectively.

Three-quarters of all new HIV infections among the Aboriginal and Torres Strait Islander population in 2014 were reported in Qld (42%) and NSW (21%) [Derived from 235]. Among the non-Indigenous population, half of all new infections occurred in NSW (32%) and Vic (28%) [Derived from 240]. The highest rates of new HIV diagnoses, among both Indigenous people and non-Indigenous people were among those living in major cities 11 per 100,000 and 6.0 per 100,000 respectively [235]. The lowest rates among Aboriginal and Torres Strait Islander people were found in remote areas compared with very remote areas for non-Indigenous people.

In terms of exposure to HIV, men who have sex with men accounted for 39% of new HIV cases among Aboriginal and Torres Strait Islander people in 2014 [235]. Heterosexual contact was also identified as a common form of exposure to HIV among Indigenous people (15%). Among non-Indigenous people, 74% of all new HIV cases in 2014 were attributed to the categories 'men who have sex with men' and 'heterosexual contact' (19%) [Derived from 240].

The proportion of new HIV cases attributed to injecting drug use among Aboriginal and Torres Strait Islander Australians decreased substantially from 2010 (18%) to 2011 (4%), then there was a substantial increase from 6% in 2012 to 23% in 2013 and 27% in 2014 [235]. Illicit drug use was responsible for 2% of new cases among non-Indigenous people [Derived from 240].

Information about the occurrence of AIDS in the Aboriginal and Torres Strait Islander population in 2014 is not available, but the number of new AIDS cases for the total population in 2009 was only 90 [268]. 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 [269, 270]. High rates of skin infections can be a burden on communities and require management for individuals and general measures for families and communities [271]. 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 [272]. Evidence shows that there are benefits associated with swimming pools for reducing the prevalence and severity of skin sores in children, as seen in studies in remote communities of the NT, WA and SA [273].

Extent of skin diseases, infections and infestations among Aboriginal and Torres Strait Islander people

Scabies

Scabies is a skin disease caused by the mite *Sarcoptes scabiei* and produces skin inflammation and itching [274]. It is endemic in some remote central and northern Aboriginal and Torres Strait Islander communities affecting both adults and children, however, most prevalence information is available about children [275, 276]. 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 [276]. The *East Arnhem Land scabies control program*, which monitored and evaluated three East Arnhem Land remote communities in the NT between August 2011 and June 2013, reported a significant reduction of crusted scabies and scabies-related presentations. This was achieved through a preventive and long-term case management approach, active surveillance was recommended to improve outcomes for communities with endemic levels of scabies [277].

A 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 [272]. A study conducted in an urban Indigenous population in North Qld in 2005-2006 reported 19% of young people had scabies [278].

⁵⁰ Previous reports have included all diagnosis (including those who were overseas when first diagnosed) meaning the number of diagnosis in this report will be lower than reported in previous years.

Pyoderma

Scratching in response to the inflammation and itching of scabies infestation can result in pyoderma (also referred to as impetigo or skin sores), a bacterial infection of the skin that can lead to kidney disease and possibly heart disease [274]. A study of a remote community in the NT found that 82% of children had presented with pyoderma in their first year of life and 87% in their first two years [272]. Sixty-five per cent of Indigenous youths were diagnosed with pyoderma in a study conducted in an urban community of North Qld in 2005-2006 [278]. The pyoderma in Aboriginal and Torres Strait Islander communities commonly involves GAS, which is responsible for continuing outbreaks of acute post-streptococcal glomerulonephritis and ARF [279, 280].

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 [279].

A review of non-infectious skin diseases in Indigenous people found the prevalence 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 [281].

Hospitalisation

Skin conditions can be linked to serious complications, which can result in hospitalisation and, very uncommonly, death [270, 272]. ICD 'Diseases of the skin and subcutaneous tissue' was responsible for 9,271 hospital separations among Aboriginal and Torres Strait Islander people nationally in 2013-14, accounting for 2.3% of all Indigenous hospitalisations (including care involving dialysis) [60]. In 2011-12, 'diseases of the skin and subcutaneous tissue' was responsible for 7,994 hospital separations among Aboriginal and Torres Strait Islander people nationally, accounting for 3.9% of all Indigenous hospitalisations (excluding dialysis) [282]. After age-adjustment, the separation rate was 2.5 times higher for Aboriginal and Torres Strait Islander 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 [283]. 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) [284]. 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 Aboriginal and Torres Strait Islander health

Selected health risk and protective factors

The factors contributing to the poor health status of Aboriginal and Torres Strait Islander people should be seen within the broad context of the social determinants of health [285, 286]. 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 [287]. 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 [285, 286].

In addition to indicators of Aboriginal and Torres Strait Islander 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 [288, 289]. Poor nutrition is an important factor contributing to overweight and obesity, malnutrition, CVD, type 2 diabetes, and tooth decay [289, 290]. 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 [291]. The guidelines also recommend including reduced fat varieties of milk, yoghurts and cheeses, and limiting the intake of added sugar and salt and the consumption of 'discretionary'⁵¹ foods and drinks.

Fruit consumption

According to the 2012-2013 *National Aboriginal and Torres Strait Islander nutrition and physical activity survey* (NATSINPAS), less than one-half (46%) of Aboriginal and Torres Strait Islander people consumed fruit products and dishes (fruit) in the 24 hours prior to the survey; 59% of children aged 2-18 years and 37% of adults aged 19 years or older consumed fruit [292]. Based on self-reported usual serves of fruit eaten per day, 54% of Aboriginal and Torres Strait Islander people met the recommendations for usual serves [293]. Females were

⁵¹ Foods that are energy dense but do not provide many/any nutrients [291].

more likely than males to have eaten an adequate amount of fruit (57% and 51% respectively). After age-adjustment, Aboriginal and Torres Strait Islander people aged 15 years or older were less likely than non-Indigenous people to be eating adequate amounts of fruit (ratio 0.9) [63]. Aboriginal and Torres Strait Islander people living in non-remote areas were more likely than those in remote areas to have consumed fruit in the 24 hours prior to the survey (49% and 35% respectively) [292]; however, similar proportions of Aboriginal and Torres Strait Islander people living in remote and non-remote areas usually met the guidelines for daily serves of fruit [293].

Vegetable consumption

According to the 2012-2013 NATSINPAS, almost two thirds (65%) of Aboriginal and Torres Strait Islander people consumed vegetable products and dishes (vegetables) in the 24 hours prior to the survey; 63% of children aged 2-18 years and 66% of adults aged 19 years or older consumed vegetables [292]. Based on self-reported usual serves of vegetables eaten per day, only 8% of Aboriginal and Torres Strait Islander people met the recommendations for usual serves [293]. Females aged 15 years and over were more likely than their male counterparts to have eaten an adequate amount of vegetables (7% and 3% respectively) [294]. After age-adjustment, Aboriginal and Torres Strait Islander people aged 15 years or older were less likely than non-Indigenous people to be eating adequate amounts of vegetables (ratio 0.8) [63]. Aboriginal and Torres Strait Islander people living in non-remote areas were more likely than those in remote areas to have consumed some vegetables in the 24 hours prior to the survey (67% and 56% respectively) [292].

Fruit and vegetable dietary behaviour, labour force and education

The 2012-2013 AATSIHS examined associations between dietary behaviour and labour force status and educational attainment [63]. After age-adjustment, unemployed Aboriginal and Torres Strait Islander people were more likely to have an inadequate daily fruit intake (63%) and inadequate vegetable intake (98%) than those who were employed (54% and 94% respectively) or not in the labour force (60% and 95% respectively). When considering educational levels, Aboriginal and Torres Strait Islander people who had completed year 10 or below were more likely to consume inadequate amounts of fruit (59%) and vegetables (95%) than those who had completed year 12 or equivalent (54% and 93% respectively).

Dairy food consumption

According to the 2012-2013 NATSINPAS, milk products and dishes (dairy foods) were consumed by 83% of Aboriginal and Torres Strait Islander people, which was similar to the proportion of non-Indigenous people who consumed dairy foods (85%) [292]. Similar proportions of males and females consumed dairy foods (84% and 82% respectively), and people in remote areas were just as likely as those in non-remote areas to have consumed these products (83%). Adults were about as likely to consume these products as children (81% and 84% respectively).

Discretionary foods

According to the 2012-2013 NATSINPAS, discretionary foods were consumed by a large proportion of Aboriginal and Torres Strait Islander people in the 24 hours prior to the survey, including confectionary (25%), snack foods (20%) and alcoholic beverages (11%) [292]. On average, Aboriginal and Torres Strait Islander people consumed 41% of their total daily energy in the form of discretionary foods; including 8.8% of daily energy as cereal-based products (such as cakes, biscuits and pastries), and 6.9% of daily energy as non-alcoholic beverages (such as soft drinks) [293]. Similar proportions of females and males consumed all discretionary foods except for alcoholic beverages for which twice as many males as females reported consuming (15% and 7.7% respectively) [292]. People in non-remote areas were more likely to consume all discretionary foods types than those in remote areas, except for non-alcoholic beverages.

Sugar consumption

According to the 2012-2013 NATSINPAS, sugar products and dishes (sugar) were consumed by more than half the Aboriginal and Torres Strait Islander population (54%) in the day prior to the survey [292]. Similar proportions of males and females consumed sugar (54% and 53% respectively) but more people in remote areas than non-remote areas consumed sugar (65% and 50% respectively). Although the consumption of sugar only contributed 2.5% to the total energy intake of Aboriginal and Torres Strait Islander people, this was still more than for non-Indigenous people (1.8%) [293].

Sodium (salt) consumption

According to the 2012-2013 NATSINPAS, the average daily amount of sodium consumed from food by Aboriginal and Torres Strait Islander people was 2,379mg (approximately one teaspoon of salt) [293]. This excludes salt added by consumers in household cooking or when preparing food. Sodium consumption was higher among males than females (2,638mg and 2,122mg respectively). Males in all age-groups, except for those 51 years and older, had average intakes that exceeded the upper level of sodium intake recommended by the NHMRC.

Almost half of Aboriginal and Torres Strait Islander people did not use salt in household cooking or preparing food (47%) [295]. This proportion was slightly higher for females than males (50% and 45% respectively), and higher for people living in non-remote areas compared with those in remote areas (48% and 44% respectively) and for children aged 2-18 years compared with people aged 19 years

or older (51% and 44% respectively). For those who used salt in household cooking or preparing food, fewer people used iodised salt than non-iodised salt (21% and 24% respectively).

The average daily sodium intake was similar for Aboriginal and Torres Strait Islander people and non-Indigenous people (2,379mg and 2,408mg respectively) [293]. Males recorded a higher consumption of sodium than females in both populations.

Bush foods

Participants in the 2012-2013 NATSINPAS were asked about their consumption of foods that were naturally harvested or wild-caught, such as fish and seafood, wild harvested fruit and vegetables, reptiles and insects [292]. Aboriginal and Torres Strait Islander people in remote areas were more likely than their non-remote counterparts to eat non-commercially caught fin fish (7.8% and 1.8% respectively), crustacea and molluscs (1.2% and 0.3% respectively), wild harvested meat (7.7% and 0% respectively) and reptiles (3.9% and 0.1% respectively).

Biomarkers of nutrition

The *National Aboriginal and Torres Strait Islander health measures survey* (NATSIHMS) 2012-2013 collected information on biomarkers of nutrition, including vitamin D, anaemia and iodine [74]. 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 Aboriginal and Torres Strait Islander males and females, and across all age-groups (ranging from 25% to 29%). Vitamin D deficiency was more common among Aboriginal and Torres Strait Islander people living in remote areas (39%) than those in non-remote areas (23%).
- The proportion of Aboriginal and Torres Strait Islander adults who were at risk of anaemia was 7.6%. Aboriginal and Torres Strait Islander adults were at higher risk of anaemia than their non-Indigenous counterparts in all age-groups (ratio 1.9 after age-adjustment). 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 [296, 297].

Food security

The 2012-2013 NATSINPAS addressed the issue of food security by asking respondents if they had run out of food and couldn't afford to buy more in the last 12 months [298]. This has been a problem for 22% of respondents; 7% of respondents had run out and gone without food, while 15% had run out but not gone without food. People in remote areas were more likely to run out of food than people in non-remote areas (31% and 20% respectively) and slightly more likely to go without (9.2% and 6.4% respectively).

Physical activity

To maintain good overall health, physical activity is important. Low levels of activity including high levels of sedentary behaviour are risk factors for a range of health conditions. [299]. *Australia's physical activity and sedentary behaviour guidelines* for adults 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 [300]. However, doing any physical activity is better than doing none and the health benefits of physical activity are continuous, starting with any activity above zero [301]. 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 SEWB conditions, overweight and obesity, a weakened musculoskeletal system and osteoporosis [299, 300].

According to the 2012-2013 AATSIHS, 47% 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 that of their non-Indigenous counterparts [172].

A smaller proportion (41%) of Aboriginal and Torres Strait Islander 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 (29%) of Aboriginal and Torres Strait Islander 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. Aboriginal and Torres Strait Islander 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 [299]. Those who participated in the survey's 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 (52% compared with 42%) and had exercised for at least 150 minutes over five sessions in the

previous week (45% compared with 38%) [172]. Aboriginal and Torres Strait Islander males in non-remote areas were significantly more likely than Aboriginal and Torres Strait Islander females to have exercised at moderate intensity (32% 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 Aboriginal and Torres Strait Islander 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 [299]. The most common type of physical activity for adults was 'walking to places' (71%). Around 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, 61% 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 [172]. A higher proportion of Aboriginal and Torres Strait Islander women than Aboriginal and Torres Strait Islander men were physically inactive (68% compared with 53%); this pattern was evident for all age-groups [172]. Aboriginal and Torres Strait Islander adults spent an average of 5.3 hours per day on sedentary activities, including 2.3 hours of watching television (TV), DVDs and videos [299].

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) [299]. Aboriginal and Torres Strait Islander children aged 2-4 years spent an average of 1.5 hours per day 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 [299]. Around half (48%) of Aboriginal and Torres Strait Islander children met the recommended amount of physical activity, compared with 35% of non-Indigenous children. The most common physical activities among Aboriginal and Torres Strait Islander children were active play and children's games (57%) and swimming (18%). Those who participated in the survey's 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). Aboriginal and Torres Strait Islander 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). Aboriginal and Torres Strait Islander 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) [299].

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 [299]. 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) [302]. 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 [214, 291, 302, 303]. 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) [291].

Abdominal obesity, a risk factor for the development of the metabolic syndrome, can be measured by waist circumference (WC) alone (greater than 94cm for men and greater than 80cm for women), or waist-hip ratio (WHR) (greater than or equal to 0.90 for men and greater than or equal to 0.85 for women) [304].

Obesity and abdominal obesity, as measured by BMI and WC, have been shown to be risk factors for type 2 diabetes and hypertension in Aboriginal and Torres Strait Islander people. However, optimal BMI and WC cut-offs are still uncertain for Aboriginal and Torres Strait Islander people (due to differences in body shape and other physiological factors) when calculating diabetes type 2 and cardiovascular risk [305-307]. It has been suggested that a BMI of 22 might be more appropriate than 25 as a measure of acceptable BMI for Aboriginal people. There is also evidence that measuring the WHR in Indigenous people is more accurate and easier to measure than BMI [307]. More recently, Hughes and colleagues [308] have developed an equation for calculating fat free mass in Aboriginal and Torres Strait Islander adults using the easily acquired variables of resistance⁵², height, weight, age and gender for use in the clinical assessment and management of obesity.

⁵² 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.

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%) [63]. 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 Aboriginal and Torres Strait Islander males and females were overweight or obese (66% 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 Aboriginal and Torres Strait Islander people aged 15 years or older than for their non-Indigenous counterparts (ratio 1.2) and Aboriginal and Torres Strait Islander people were 1.6 times as likely as non-Indigenous people to be obese (ratio 1.4 for males and 1.7 for females).

In 2012-2013, around 3.5% of Aboriginal and Torres Strait Islander people aged 15 years or older were underweight, with about 2.8% of Aboriginal and Torres Strait Islander males and 4.2% of Aboriginal and Torres Strait Islander females having a BMI of less than 18.5 [309]. After age-adjustment, Aboriginal and Torres Strait Islander people were 1.6 times more likely to be underweight than non-Indigenous people (rate ratio for males 1.8 and females 1.4) but less likely to be of normal weight (rate ratio 0.7).

Measurements of WC 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 [63]. Based on WC, a higher proportion of Aboriginal and Torres Strait Islander females (81%) than Aboriginal and Torres Strait Islander males (62%) aged 18 years or older were found to be at increased risk. Based on WHR, 81% of males and 73% of females aged 18 years or older were at increased risk of developing chronic diseases. The proportions of Aboriginal and Torres Strait Islander males and females who were at increased risk of developing chronic diseases based on both measures of WC and WHR increased with age.

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 [63]. Similar proportions of Aboriginal and Torres Strait Islander 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 Aboriginal and Torres Strait Islander children aged 2-14 years than those for their non-Indigenous counterparts (ratio 1.2) mainly due to higher obesity rates in both genders (boys - 10% compared with 6% respectively; and girls - 11% compared with 7% respectively).

Similar to this, a study of a child health program in remote central Australia in 2010 found that 21% of the Aboriginal children aged 3 to 17 years were overweight and 5.4% were obese (there was no difference between boys and girls).

A 2012 study of 277 Indigenous children aged 5 to 17 years in the Torres Strait in 2003 found that 46% were overweight or obese and 35% had abdominal obesity [310]. Girls had higher levels of abdominal obesity (50%) than boys (18%). The study also found a consistent association between overweight/obesity and low levels of physical activity.

Hardy and colleagues [311] found that from 1997 to 2010, overweight/obesity and WHR increased more rapidly in Aboriginal children aged 5-16 years than in non-Aboriginal children in the same age-group 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

In recent decades, vaccination has been very successful in contributing to improvements in Aboriginal and Torres Strait Islander health and child survival [248] and national immunisation coverage rates for Aboriginal and Torres Strait Islander children have improved steadily since 2008 [312]. The *National immunisation program* schedule for the Australian population recommends vaccinations at different stages of life and additional recommendations for specific high risk populations, these include: hepatitis A; hepatitis B; diphtheria; tetanus; whooping cough; *haemophilus influenzae type b*; polio; pneumococcal conjugate; rotavirus; meningococcal C; measles; mumps and rubella (MMR); varicella (chickenpox); human papillomavirus (HPV) and influenza [248]. Due to some vaccine-preventable diseases still being experienced at higher rates among Aboriginal and Torres Strait Islander people, other supplementary vaccines⁵³ are also specifically prescribed depending on age, location and health risk factors.

Childhood vaccination

The *National immunisation program* for all children includes vaccines for hepatitis B, diphtheria-tetanus-pertussis (DTP), *Haemophilus influenzae type B* (Hib), measles, mumps, rubella (MMR), pneumococcal disease, meningococcal C, varicella (chickenpox), rotavirus, HPV, and influenza [248].

For December 2014 and March, June and September 2015, coverage estimates for full immunisation for Aboriginal and Torres Strait Islander children were [248]:

- 88% by 12 months

⁵³ These include vaccinations for Bacille Calmette-Guérin (BCG) for newly born babies 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 against hepatitis B, influenza for all persons aged 6 months or over, 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 invasive pneumococcal disease (IPD) and all persons aged 50 years and older [248].

- 85% by 24 months
- 93% by 60 months.

According to the Australian Childhood Immunisation Register (ACIR), the national coverage for full immunisation for Aboriginal and Torres Strait Islander children has increased for the following age-groups [248]:

- the 12-≥15 month cohort by 2.2% (from 2003-2014)
- the 24-≥27 month cohort by 4.5% (from 2003-2014)
- the 60-≥63 month cohort by 15% (from 2008 to 2014).

The analysis of data from the rolling annualised percentage of Indigenous children fully immunised by 12 months of age for Australia increased from the previous report, ending September 2014, by 0.5 percent to 88% [313]. For individual vaccines due by 12 months of age, all states except WA had coverage levels above 85%. For 24 month old Indigenous children 'full immunised' coverage had decreased by 1.4 percent to 85% for all states except Tas which increased marginally. The percentage of Indigenous children 'fully immunised' by 60 months of age decreased from previous report by 0.1 percent to 93%. Coverage for individual vaccines due by 60 months remained greater than 90% in all states.

Immunisation coverage estimates comparisons at 31 December 2013 indicated that [46]:

- 86% of Aboriginal and Torres Strait Islander children aged 1 year were fully immunised compared with 90% of non-Indigenous children
- 91% of Aboriginal and Torres Strait Islander children aged 2 years were fully immunised compared with 92% of non-Indigenous children
- 93% of Aboriginal and Torres Strait Islander children aged 5 years were fully immunised compared with 92% of non-Indigenous children
- the gap between full immunisation of Aboriginal and Torres Strait Islander and other non-Indigenous children was highest in children aged 1 year, a significant difference of 4 percentage points. By age 2 years, immunisation rates for Indigenous and other Australian children were similar.

Adult vaccination

Vaccination for 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 [30]. The AATSIHS 2012-2013 reported that for Aboriginal and Torres Strait Islander adults aged 50 years and older, influenza vaccination in the previous 12 months 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.

Vaccination rates for pneumococcus vaccination in the last 5 years for Aboriginal and Torres Strait Islander people were: 23% of 50-64 year olds, 44% of 65 year olds and older, and 29% overall of 50 years and older.

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 [314]. 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' [291]. The WHO recommends exclusive breastfeeding for six months followed by complementary feeding with continued breastfeeding for up to two years or beyond [314]. Breastfeeding also contributes to the health of the mother by reducing the risk of ovarian and breast cancers.

According to the 2012-13 AATSIHS, 83% of Aboriginal and Torres Strait Islander children aged 0-3 years had been breastfed, compared with 93% of non-Indigenous children [46]. Aboriginal and Torres Strait Islander children aged 0-3 years were 2.3 times more likely than non-Indigenous infants to have never been breastfed (17% compared with 7% respectively). Of those who had been breastfed, Aboriginal and Torres Strait Islander infants were more likely than non-Indigenous infants to have been breastfed for less than 1 month (16% compared with 10% respectively). Aboriginal and Torres Strait Islander infants were less likely than non-Indigenous infants to have been breastfed for 12 months or more (12% compared with 21% respectively). Breastfeeding rates of Aboriginal and Torres Strait Islander children aged 0-3 years did not vary significantly by remoteness, 82% in non-remote areas and 84% in remote areas were breastfed.

According to the 2010 *Australian national infant feeding survey*, breastfeeding initiation levels were similar among Aboriginal and Torres Strait Islander and non-Indigenous mothers (87% and 90%, respectively), but levels of exclusive breastfeeding declined more

rapidly among Indigenous mothers [Derived from 315]. At 5 months of age, only 11% of Indigenous babies were exclusively breastfed, compared with 27% of non-Indigenous babies.

The *Footprints in time – the longitudinal study of Aboriginal children* collected data from 11 sites (rural, remote and urban) around Australia in 2008-2009 [316]. 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 [164]. 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 the burden of disease and injury among Indigenous people, responsible for 12% of the total burden of disease [317]. Tobacco use accounted for one-in-five deaths in the Indigenous population.

Extent of tobacco use among Aboriginal and Torres Strait Islander people

The 2012-2013 AATSIHS found that 44% of Aboriginal and Torres Strait Islander people aged 15 years and over reported that they were current smokers [318]. This represents a significant reduction from levels reported in the NATSISS 2008 (47%), and 2002 (51%) [319, 320]. The NATSISS 2008 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 [321].

In 2012-2013, the proportion of Aboriginal and Torres Strait Islander men who were current smokers (46%) was similar to the proportion of Aboriginal and Torres Strait Islander women (42%) [318]. After age-adjustment, Aboriginal and Torres Strait Islander people were 2.5 times more likely to smoke than non-Indigenous people (43% compared with 17%, respectively).

In 2012-2013, Aboriginal and Torres Strait Islander people living in remote areas reported a higher proportion of current smokers (53%) than those living in non-remote areas (41%) [322]. 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 since 2002.

When comparing smoking prevalence in non-remote areas over the ten years between the AATSIHS 2012-2013 and the NATSISS 2002, the highest reductions have been found in the younger age-groups [322]. This drop in smoking among these age-groups is reflected in the increased prevalence of young people who have 'never smoked'. The 2012-2013 AATSIHS found that more than one-third (36%) of Aboriginal and Torres Strait Islander people had never smoked, compared with 34% in 2008 and 33% in 2002.

High rates of smoking have been reported for Indigenous mothers [57]. In 2011, half of Aboriginal and Torres Strait Islander mothers (50%) reported smoking during pregnancy, compared with 12% of non-Indigenous mothers. The proportion of smoking cessation for Aboriginal and Torres Strait Islander women during the second 20 weeks of pregnancy was 11%, compared with 22% among non-Indigenous women. Between 2005 and 2011, after age-adjustment, there was a significant decline of 6% in the proportion of Aboriginal and Torres Strait Islander mothers who smoked during pregnancy [44].

In 2012-2013, 57% of Aboriginal and Torres Strait Islander children aged 0-14 years lived in households with a daily smoker [50]. For those children living with a daily smoker, Aboriginal and Torres Strait Islander children were 2.4 times more likely to live in households where people smoked indoors when compared with non-Indigenous children (28% and 12% respectively).

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 [323]. 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 including central nervous system dysfunction, poor growth, characteristic facial features and developmental delay [324, 325].

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%) [326, 327]. Of 11 selected risk factors, alcohol was the fifth leading cause of the burden of disease among Indigenous people [326]. 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 Aboriginal and Torres Strait Islander 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 [45, 328, 329].

Extent of alcohol use among Aboriginal and Torres Strait Islander people

Assessing risks from use of alcohol

In 2009, the NHMRC introduced revised guidelines that depart from specifying 'risky' and 'high risk' levels of drinking [323]. 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.

Abstinence or no consumption of alcohol in the last 12 months

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 [329]. After age-adjustment, abstinence was 1.6 times more common among Aboriginal and Torres Strait Islander people than among non-Indigenous people. Most of the difference in abstinence between the Aboriginal and Torres Strait Islander and non-Indigenous population was attributable to those Aboriginal and Torres Strait Islander people who had stopped drinking for at least 12 months (16% of Aboriginal and Torres Strait Islander people and 7% of non-Indigenous people). Similar proportions of Aboriginal and Torres Strait Islander and non-Indigenous people have never consumed alcohol (10% and 8.9%, 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 [329]. 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 6.0% and 8.7%, respectively).

Short-term and single occasion risk

The 2012-2013 AATSIHS reported that 22% of the Aboriginal and Torres Strait Islander people 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) [329, 330].

Similar proportions of Aboriginal and Torres Strait Islander and non-Indigenous people exceeded the 2009 guidelines for drinking at short-term/single occasion risk (52% and 45% respectively after age-adjustment) [329]. However, levels of short-term/single occasion risky drinking (as defined by the 2001 guidelines) were 1.4 times higher for the Aboriginal and Torres Strait Islander population compared to their non-Indigenous counterparts. Aboriginal and Torres Strait Islander men were 1.5 times more likely than Aboriginal and Torres Strait women to exceed the 2009 guidelines for drinking at risk on a single occasion (68% compared with 46%, respectively).

The proportion of Aboriginal and Torres Strait people exceeding the guidelines for single occasion risk was lower in very remote areas compared with other areas [30].

Lifetime risk

According to the 2013 *National drug household survey* (NDSHS), since 2010 there has been significant decline for risky drinking in the proportion (from 32% to 23%) of Indigenous people exceeding the 2009 NHMRC guidelines for lifetime risk⁵⁴ [331]. 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 [332]. After age-adjustment, lifetime drinking risk was similar for both Aboriginal and Torres Strait Islander people and non-Indigenous people (ratio 1.0). However, Aboriginal and Torres Strait Islander people were 1.4 times more likely to drink at 'high risk' levels of long-term harm (2001 guidelines). Aboriginal and Torres Strait Islander men were 2.7 times more likely than Aboriginal and Torres Strait Islander women to exceed the guidelines for risk of long-term harm (29% compared with 11%, respectively).

⁵⁴ No more than two standard drinks on any single day.

A lower proportion of Aboriginal and Torres Strait Islander people in very remote areas has been found to exceed the guidelines for lifetime risk when compared with those in other areas (specifically inner regional and remote areas) [30].

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 [45]. The proportion of mothers who drank the same or more alcohol during pregnancy was greatest in Tas/ACT (6.0%), followed by Vic (5.4%), and WA (5.0%).

Hospitalisation

For 2011-12 to 2012-13, there were 9,995 hospitalisations of Aboriginal and Torres Islander people for alcohol-related diagnoses, after age-adjustment, the rate was 9.3 per 1,000, which was 4.1 times the rate for non-Indigenous people [46]. Aboriginal and Torres Islander males were hospitalised at 4.5 times the rate for non-Indigenous males and Aboriginal and Torres Islander females were hospitalised at 3.6 times the rate for non-Indigenous females.

For 2011-12 to 2012-13, in inner regional areas, Aboriginal and Torres Islander people were hospitalised for alcohol-related diagnoses at 2.9 times the rate for non-Indigenous people [46]. In remote areas, Aboriginal and Torres Islander people were hospitalised for alcohol-related diagnoses at 9.3 times the rate for non-Indigenous people.

Among Aboriginal and Torres Strait Islander people living in NSW, Vic, Qld, WA, SA and the NT, between 2004-2005 and 2012-2013, age-adjusted hospital separations due to acute intoxication increased from 2.1 per 1,000 to 5.4 per 1,000 [30]. This was an increase from 5.7 to 12 times the rates for non-Indigenous people. In 2012-13, the highest rate of hospital separations related to alcohol use for Aboriginal and Torres Strait Islander people was for mental/behavioural disorders (8.3 per 1000) which was 4.2 times the rate of non-Indigenous people.

Hospital separation rates related to alcohol use due to acute intoxication for Aboriginal and Torres Strait Islander people in 2012-2013 varied by level of remoteness [30]. Aboriginal and Torres Strait Islander people living in remote and very remote areas had the highest rate of hospitalisation due to acute intoxication (9.9 per 1,000) while Aboriginal and Torres Strait Islander people in inner and outer regional areas had the lowest (3.4 per 1,000).

Mortality

From 2008-2012, after age-adjustment, the Aboriginal and Torres Strait Islander death rate due to alcohol was 4.9 times greater than that for non-Indigenous people (22 per 100,000 in NSW, Qld, WA, SA and NT combined compared with 4.5 per 100,000 for non-Indigenous people) [30, 333]. Aboriginal and Torres Strait Islander males were 2.5 times as likely to die due to alcohol use compared with Aboriginal and Torres Strait Islander women. The NT had the highest Aboriginal and Torres Strait Islander death rate from alcohol (37 per 100,000) which was 5.1 times the rate for non-Indigenous people in the NT.

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 [30]. Illicit substance use is associated with an increased risk of mental illness, poisoning, self-harm, infection with blood borne viruses from unsafe injection practices and death [30, 334].

In 2003, illicit substance use accounted for 2.0% of the overall burden of disease in Australia including 8.0% of the mental health burden of disease, and 3.6% of the injury burden of disease [327]. For the Indigenous population, illicit substance use was responsible for 3.4% of the burden of disease. The highest level of disease burden attributable to illicit substances was for mental health (13%) and injury (3.6%) [326].

Extent of illicit substance use among Aboriginal and Torres Strait Islander people

Surveys consistently show that most Aboriginal and Torres Strait Islander people do not use illicit drugs. According to the 2012-2013 AATSIHS, more than half (52%) of Aboriginal and Torres Strait Islander people aged 15 years and older had never used illicit substances [335], which is slightly lower than the proportions that were reported in the 2008 NATSISS (57%) [309].

The 2012-2013 AATSIHS reported that 22% of Aboriginal and Torres Strait Islander people aged 15 years and over had used an illicit substance in the previous 12 months [335], a slight decrease from that reported in the 2008 NATSISS (23%) [309]. Similarly, after age-adjustment, the 2013 NDSHS found that 23% of Aboriginal and Torres Strait Islander people aged 14 years and older had 'recently used' an illicit substance, compared with 15% of non-Indigenous people [331].⁵⁵ When comparing different age cohorts, the 2012-2013 AATSIHS found that illicit substance use in the previous 12 months was highest among younger age-groups: 15-24 years (28%) and 25-34 years (27%), but decreased for the 35-44 and 45-54 years age-groups (23% and 19%, respectively) and 55 and older age-groups (7.0%) [335].

⁵⁵ Because of the small sample size, comparison of data between Aboriginal and Torres Strait Islander people and non-Indigenous people should be viewed with caution.

The 2012-2013 AATSIHS found that cannabis was the most commonly used illicit substance being used by 19% of Aboriginal and Torres Strait Islander people aged 15 years and over in the previous 12 months [335]. This was followed by analgesics and sedatives (3.9%), other drugs (heroin, cocaine, petrol, LSD/synthetic hallucinogens, naturally occurring hallucinogens, ecstasy/designer drugs, methadone and other inhalants) (2.8%) and amphetamines (2.3%).

Aboriginal and Torres Strait Islander 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) in 2012-2013 [335]. The higher proportions of use by males were found for all drug types, except analgesics and sedatives where proportions were similar for males and females (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%). Use of illicit drugs in the previous 12 months was greater among Aboriginal and Torres Strait people aged 15 years or over living in non-remote areas than among those living in remote areas in 2012-2013 (23% compared with 19%) [335].

In 2013-14, for alcohol and other drug treatment services in Australia, 14% of clients seeking treatment were Indigenous [336]. The principal illicit drugs of concern for both Indigenous and non-Indigenous clients seeking treatment were cannabis, amphetamines, and heroin.

For the 5 year period April 2008-March 2013, GPs managed drug use for Indigenous patients at an age-adjusted rate of 10 per 1,000 encounters [46].

Hospitalisation

In 2012-2013, the most common drug-related conditions resulting in hospitalisation for Aboriginal and Torres Strait Islander people were for 'poisoning' and 'mental and behavioural disorders' [30]. The hospitalisation rate for Aboriginal and Torres Strait Islander people for poisoning (2.8 per 1,000) was more than twice the rate for non-Indigenous people (1.2 per 1,000). The hospitalisation rate for mental and behavioural disorders for Aboriginal and Torres Strait Islander people (2.6 per 1,000) was around three times the rate for non-Indigenous people (0.9 per 1,000). Hospitalisation for mental/behavioural disorders from use of amphetamines⁵⁶ had the highest rate of separations due to drug use and was more than three times higher for Aboriginal and Torres Strait Islander people when compared with non-Indigenous people. Hospitalisation rates due to drug use were higher for Aboriginal and Torres Strait Islander people in major cities (3.7 per 1000) than in inner and outer regional areas (2.6 per 1,000) and remote areas (1.8 per 1000).

Mortality

The rate of drug-induced deaths was around 1.5 times higher for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT than for their non-Indigenous counterparts in 2008-2012 (Table 36) [30]. Rates of drug-induced deaths for Aboriginal and Torres Strait Islander people in SA (22 per 100,000) were significantly higher than those in NSW (13 per 100,000), Qld (7.2 per 100,000) or WA (8.7 per 100,000). The rate for Indigenous males (11 per 100,000) was higher than for Indigenous females (8.9 per 100,000).

Table 36. 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	13	6.2	2.0
Qld	7.2	6.3	1.1
WA	8.7	7.1	1.2
SA	22	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 Deaths where Indigenous status was not stated are excluded from the analysis
 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 [30]

In 2003-2007, 63 of the deaths of Indigenous people living in NSW, Qld, WA, SA and the NT were attributed to drug use [337]. 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, in order to reach the closing the gap targets such as life expectancy the rate of improvement will need to accelerate [338]. It is clear from this Overview that Indigenous people remain the least healthy sub-population in Australia. As a 'snapshot' of the most recent indicators of health status – with limited attention to trends – the Overview doesn't fully reflect the evidence for improvements in key closing the gap targets.

56 ICD code F15 hospitalisation from use of other stimulants includes amphetamine-related disorders and caffeine but not cocaine

With respect to life expectancy, there have been no new data available recently, the next estimate for 2015-2017 is expected to be published in 2018 or 2019 [339]. 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 [338]. 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 [340, p.7]. More recently Holland alluded to difficulties in the estimates due to changes in the methodology for estimation [339]. Nevertheless, the relative magnitude of the task is noted in the Prime Minister's *Closing the gap report* where it was stated that life expectancy will have to improve by almost 21 years for males and 16 years for females in the 2006-2031 period (it is also expected that life expectancy for non-Indigenous people will increase) [338]. Put another way, the life expectancy increases of 0.32 per year for males and 0.12 per year for females would need to increase to 0.6 to 0.80 per year to meet the 2030 targets [339].

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 [338]. As noted earlier in the *Overview*, from 1998 to 2012, the IMR for Aboriginal and Torres Strait Islander people has declined by 64%; there was also a significant closing of the gap in IMRs between Aboriginal and Torres Strait Islander and non-Indigenous infants during this time period (by 83%) [30]. This has been described as very significant, indicating that the rate of improvement for Aboriginal and Torres Strait Islander infants was higher than the non-Indigenous population [339].

Looking forward, key stakeholders and representative bodies have emphasised the importance of the *Closing the gap strategy* as a bipartisan, intergenerational commitment of past and successive Australian Governments [339]. Working towards constitutional recognition for Aboriginal and Torres Strait Islander people also remains a key bipartisan Australian government commitment [338]. This has previously been linked to positive health outcomes [31].

There is a natural tendency for readers of this *Overview* to focus on the plethora of health impacts and challenges that face Aboriginal and Torres Strait Islander people. As noted in the introduction, the shift to a strengths based narrative is not intended to obscure or minimise the importance of these challenges but rather to balance them with reference to the increasing number of positive initiatives and programs making a material difference to Aboriginal and Torres Strait Islander health outcomes. Patterns of negative health impacts across almost all health indicators are complex and interrelated and it remains important not to minimise the challenges and harm faced by Aboriginal and Torres Strait Islander people. However, in addition to life expectancy and mortality, there are encouraging signs and clear evidence of many positive health practices that challenge the stereotypical and homogenising views of Aboriginal and Torres Strait Islander people and their health that are not well known or publicised. In this review we have highlighted many of them including:

- Age standardised death rates for respiratory disease in NSW, Qld, WA, SA and NT declined by 26% over the period 1998-2012 for Aboriginal and Torres Strait Islander people
- In 2012-13, 91% of Indigenous people reported on feelings of calmness and peacefulness, happiness, fullness of life and energy either some, most, or all of the time.
- The great decline in HAV among Aboriginal and Torres Strait Islander people in Australia is reflected in notification figures for the three-year period 2011-2013 when of the 498 notifications of HAV for people living in Australia, 5 were identified as Aboriginal and/or Torres Strait Islander
- The East Arnhem Land scabies control program, which monitored and evaluated three East Arnhem Land remote communities in the NT between August 2011 and June 2013, reported a significant reduction from 70% (2002-2005) of crusted scabies and scabies-related presentations. This was achieved through a preventive and long-term case management approach.
- According to the Australian Childhood Immunisation Register, the national coverage for full immunisation for Aboriginal and Torres Strait Islander children has increased.
- The current level of 44% of Aboriginal and Torres Strait Islander people aged 15 years and over who reported that they were current smokers in the 2012-2013 AATSIHS represent a significant reduction from levels reported in the NATSISS 2008 (47%), and 2002 (51%).
- In non-remote areas over the ten years between the AATSIHS 2012-2013 and the NATSISS 2002, the highest reductions in smoking have been found in the younger age-groups. In the 2012-2013 AATSIHS after age-adjustment, abstinence from alcohol was 1.6 times more common among Aboriginal and Torres Strait Islander people than among non-Indigenous people.
- According to the 2013 NDSHS, since 2010 there has been significant decline for risky drinking in the proportion (from 32% to 23%) of Indigenous people exceeding the 2009 NHMRC guidelines for lifetime risk. Surveys consistently show that most Aboriginal and Torres Strait Islander people do not use illicit drugs.

A greater focus on the lessons learned from these strengths based indicators and practices, coupled with bipartisan and sector support for emerging collaboration and culturally respectful policy and program development will make a strong and enduring contribution to positive health outcomes for Aboriginal and Torres Strait Islander people in the years to come.

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. The ICD-10-AM (Australian modification) was introduced in hospitals and other healthcare agencies in the late 90s to report morbidity data

life expectancy

see **expectation of life**

maternal mortality ratio

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

median age at death

the age above and below which 50% of deaths occurred

morbidity

state of being diseased or otherwise unwell

mortality

death

non-Indigenous Australians

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

prevalence

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

risk factor

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

standardisation

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

standardised mortality ratio (SMR)

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

standardised rate

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

total fertility rate

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

Glossary references

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

Abbreviations

- **AATSIHS** - Australian Aboriginal and Torres Strait Islander health survey
- **ABS** - Australian Bureau of Statistics
- **ACIR** - Australian Childhood Immunisation Register
- **ACT** - Australian Capital Territory
- **AHMAC** – Australian Health Ministers’ Advisory Council
- **AIDS** - Acquired immune deficiency syndrome
- **AIHW** - Australian Institute of Health and Welfare
- **ANZDATA** - Australia and New Zealand Dialysis and Transplant Registry
- **AOM** – Acute otitis media
- **APEG** - Australasian Paediatric Endocrine Group
- **ARF** - Acute rheumatic fever
- **BCG** – Bacille Calmette-Guerin
- **BEACH** - Bettering the evaluation and care of health
- **BMI** - Body mass index
- **CHD** – Coronary heart disease
- **CKD** - Chronic kidney disease
- **COAG** - Council of Australian Governments
- **COPD** – Chronic obstructive pulmonary disease
- **CSOM** - Chronic suppurative otitis media
- **CVD** - Cardiovascular disease
- **DMFT/dmft** – Decayed missing and filled teeth
- **DNA** – Deoxyribonucleic acid
- **DSM** - Diagnostic and statistical manual of mental disorders
- **DTP** - Diphtheria, tetanus, and pertussis
- **ENT** - Ear, nose, throat
- **ERP** – Estimated resident population
- **ESRD** - End-stage renal disease
- **FASD** - Fetal alcohol spectrum disorder
- **GAS** - Group A streptococcus
- **GDM** - Gestational diabetes mellitus
- **GGT** - Gamma glutamyl transferase
- **GP** - General practitioner
- **GSS** - General Social Survey
- **HAV** - Hepatitis A virus
- **HBV** - Hepatitis B virus
- **HCV** - Hepatitis C virus
- **HD** – Haemodialysis

- **HDL** - High density lipoprotein
- **Hib** - *Haemophilus influenzae* type b
- **HILDA** - Household Income and Labour Dynamics in Australia
- **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
- **IMR** - Infant mortality rate
- **IPD** - Invasive pneumococcal disease
- **LBW** - Low birthweight
- **MMR** – Maternal mortality ratio
- **MMR** - Measles, mumps, rubella
- **NAGATSIHID** – National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data
- **NATSIHMS** - National Aboriginal and Torres Strait Islander Health Measures Survey
- **NATSIHS** - National Aboriginal and Torres Strait Islander Health Survey
- **NATSINPAS** - National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey
- **NATSISS** - National Aboriginal and Torres Strait Islander Social Survey
- **NDA** – National Disability Agreement
- **NDR** - National (insulin-treated) Diabetes Register
- **NDSS** - National diabetes services scheme
- **NDSHS** - National Drug Strategy Household Survey
- **NHMRC** - National Health and Medical Research Council
- **NNDSS** - National Notifiable Diseases Surveillance System
- **NSAOH** - National Survey of Adult Oral Health
- **NSW** - New South Wales
- **NT** - Northern Territory
- **OM** - Otitis media
- **OME** – Otitis media with effusion
- **PD** - Peritoneal dialysis
- **Qld** - Queensland
- **RHD** - Rheumatic heart disease
- **SA** - South Australia
- **SAB** - *Staphylococcus aureus* bacteraemia
- **SCRGSP** – Steering Committee for the Review of Government Service Provision
- **SDAC** - Survey of Disability, Ageing and Carers
- **SEWB** – Social and emotional wellbeing
- **SFNT-OHP** – Stronger futures in the Northern Territory oral health program
- **SIDS** - Sudden infant death syndrome
- **SMR** - Standardised mortality ratio
- **STI** - Sexually transmitted infection

- **Tas** - Tasmania
- **TB** - Tuberculosis
- **UV** - Ultraviolet
- **Vic** - Victoria
- **WA** - Western Australia
- **WAACHS** - Western Australian Aboriginal Child Health Survey
- **WC** – Waist circumference
- **WHO** - World Health Organization
- **WHR** - Waist to hip ratio

References

1. Australian Institute of Health and Welfare (2015) *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2015*. (AIHW Catalogue no IHW 147) Canberra: Australian Institute of Health and Welfare
2. National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data (2011) *National Advisory Group on Aboriginal and Torres Strait Islander Health Information strategic plan 2011-2015*. (AIHW Catalogue no IHW 57) Canberra: Australian Institute of Health and Welfare
3. Biddle N (2012) *CAEPR Indigenous population project 2011 census papers: population and age structure*. (2011 Census Papers No 5) Canberra: Centre for Aboriginal Economic Policy Research
4. Australian Bureau of Statistics (2012) *Census of population and housing - counts of Aboriginal and Torres Strait Islander Australians, 2011*. (ABS Catalogue no. 2075.0) Canberra: Australian Bureau of Statistics
5. Taylor J, Biddle N (2008) *Locations of Indigenous population change: what can we say?* (CAEPR Working Paper no. 43/2008) Canberra: Centre for Aboriginal Economic Policy Research
6. Australian Bureau of Statistics (2013) *Information paper: death registrations to census linkage project - key findings for Aboriginal and Torres Strait Islander peoples, 2011-2012*. Retrieved 15 November 2013 from <http://www.abs.gov.au/ausstats/abs@nsf/mf/3302.0.55.005?OpenDocument>
7. Australian Bureau of Statistics (2007) *Births, Australia, 2006*. (ABS Catalogue no. 3301.0) Canberra: Australian Bureau of Statistics
8. Australian Institute of Health and Welfare (2013) *Indigenous identification in hospital separations data: quality report*. (AIHW Catalogue No IHW 90) Canberra: Australian Institute of Health and Welfare
9. Australian Institute of Health and Welfare (2014) *Cancer in Australia: an overview 2014*. (AIHW Catalogue no CAN 88, cancer series no 90) Canberra: Australian Institute of Health and Welfare
10. NSW Department of Health (2004) *Communicating positively: a guide to appropriate Aboriginal terminology*. Sydney: NSW Department of Health
11. Dudgeon P, Wright M, Paradies Y, Garvey D, Walker I (2014) Aboriginal social, cultural and historical contexts. In: Dudgeon P, Milroy H, Walker R, eds. *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice*. 2nd ed. Canberra: Department of The Prime Minister and Cabinet:3-24
12. Parker R, Milroy H (2014) Aboriginal and Torres Strait Islander mental health: an overview. In: Dudgeon P, Milroy H, Walker R, eds. *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice*. 2nd ed. Canberra: Department of The Prime Minister and Cabinet:25-38
13. Sherwood J (2013) Colonisation - it's bad for your health: the context of Aboriginal health. *Contemporary Nurse*;46(1):28-40
14. Zubrick SR, Holland C, Kelly K, Calma T, Walker R (2014) The evolving policy context in mental health and wellbeing. In: Dudgeon P, Milroy H, Walker R, eds. *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice*. 2nd edition ed. Canberra: Department of The Prime Minister and Cabinet:69-90 (chapter 5)
15. Zubrick SR, Shepherd CCJ, Dudgeon P, Gee G, Paradies Y, Scrine C, Walker R (2014) Social determinants of social and emotional wellbeing. In: Dudgeon P, Milroy H, Walker R, eds. *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice*. 2nd edition ed. Canberra: Department of The Prime Minister and Cabinet:93-112 (chapter 6)
16. Gee G, Dudgeon P, Schultz C, Hart A, Kelly K (2014) Aboriginal and Torres Strait Islander social and emotional wellbeing. In: Dudgeon P, Milroy H, Walker R, eds. *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice*. 2nd ed. Canberra: Department of The Prime Minister and Cabinet:55-68
17. Jackson LR, Ward JE (1999) Aboriginal health: why is reconciliation necessary? *Medical Journal of Australia*;170(9):437-440
18. Butlin NG (1993) *Economics and the dreamtime: a hypothetical history*. Melbourne: Cambridge University Press
19. Campbell J (2002) *Invisible invaders: smallpox and other diseases in Aboriginal Australia 1780-1880*. Melbourne: Melbourne University Press
20. Webb S (2009) *Palaeopathology of Aboriginal Australians: health and disease across a hunter-gatherer continent*. Cambridge: Cambridge University Press
21. Anderson W (2007) The colonial medicine of settler states: comparing histories of Indigenous health. *Health and History*;9(2):144-154
22. Butlin NG (1983) *Our original aggression: Aboriginal populations of southeastern Australia, 1788-1850*. Sydney: Allen & Unwin

23. Thomson N (1991) Tuberculosis among Aborigines. In: Proust AJ, ed. *History of tuberculosis in Australia, New Zealand and Papua New Guinea*. Canberra, ACT: Brolga Press:61-67
24. Reynolds H (1982) *The other side of the frontier: Aboriginal resistance to the European invasion of Australia*. Ringwood, Victoria: Penguin Books
25. Elder B (2003) *Blood on the wattle: massacres and maltreatment of Aboriginal Australians since 1788*. 3rd ed. Frenchs Forest, N.S.W: New Holland
26. Harrison B (1978) The Myall Creek massacre. In: McBryde I, ed. *Records of times past : ethnohistorical essays on the culture and ecology of the New England tribes*. Canberra: Australian Institute of Aboriginal Studies:17-51
27. Parker R, Milroy H (2014) Mental illness in Aboriginal and Torres Strait Islander peoples. In: Dudgeon P, Milroy H, Walker R, eds. *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice*. 2nd ed. Canberra: Department of The Prime Minister and Cabinet:113-124
28. National Aboriginal Health Strategy Working Party (1989) *A national Aboriginal health strategy*. Canberra: Department of Aboriginal Affairs
29. Haswell MR, Blignault I, Fitzpatrick S, Jackson Pulver L (2013) *The social and emotional wellbeing of Indigenous youth: reviewing and extending the evidence and examining its implications for policy and practice*. Sydney: Muru Marri, University of New South Wales
30. Steering Committee for the Review of Government Service Provision (2014) *Overcoming Indigenous disadvantage: key indicators 2014*. Canberra: Productivity Commission
31. Australian Department of Health and Ageing (2013) *National Aboriginal and Torres Strait Islander Health Plan 2013-2023*. Canberra: Australian Department of Health and Ageing
32. Nakata M (2013) The rights and blights of the politics in Indigenous higher education. *Anthropological Forum*;23(3):289-303
33. Australian Bureau of Statistics (2012) *Census of population and housing: characteristics of Aboriginal and Torres Strait Islander Australians, 2011*. (ABS Catalogue no 2076.0) Canberra: Australian Bureau of Statistics
34. Australian Bureau of Statistics (2014) *Schools, Australia, 2013*. (ABS Catalogue no. 4221.0) Canberra: Australian Bureau of Statistics
35. Australian Curriculum Assessment and Reporting Authority (2015) *National Assessment Program - Literacy and Numeracy achievement in reading, persuasive writing, language conventions and numeracy: national report for 2015*. Sydney: Australian Curriculum, Assessment and Reporting Authority
36. Australian Bureau of Statistics (2014) *Estimates and projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026*. (ABS Catalogue no.3238.0) Canberra: Australian Bureau of Statistics
37. Australian Bureau of Statistics (2013) *Population projections, Australia, 2012 (base) to 2101*. (ABS Catalogue no 3222.0) Canberra: Australian Bureau of Statistics
38. Yap M, Biddle N (2012) *Indigenous fertility and family formation: CAEPR Indigenous population project: 2011 census papers*. (CAEPR census paper no 2/2012) Canberra: Centre for Aboriginal Economic Policy Research
39. Biddle N (2013) *CAEPR Indigenous population project 2011 census papers: population projections*. (2011 Census Papers No. 14/2013) Canberra: Centre for Aboriginal Economic Policy Research
40. Australian Bureau of Statistics (2012) *Australian demographic statistics, March quarter 2012*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics
41. Australian Bureau of Statistics (2015) *Births, Australia, 2014*. Retrieved 29 October 2015 from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3301.0Main+Features12014?OpenDocument>
42. Eldridge D, Johnson D, Sedgwick K (2015) *Australia's mothers and babies 2013: in brief*. Canberra: Australian Institute of Health and Welfare
43. Hilder L, Zhichao Z, Parker M, Jahan S, Chambers GM (2014) *Australia's mothers and babies 2012*. (AIHW Catalogue no PER 69, perinatal statistics series no 30) Canberra: Australian Institute of Health and Welfare
44. Australian Institute of Health and Welfare (2014) *Birthweight of babies born to Indigenous mothers*. (AIHW Catalogue no IHW 138) Canberra: Australian Institute of Health and Welfare
45. Australian Institute of Health and Welfare (2013) *Aboriginal and Torres Strait Islander health performance framework 2012: detailed analyses*. (AIHW Cat. no. IHW 94) Canberra: Australian Institute of Health and Welfare

46. Australian Institute of Health and Welfare (2015) *Aboriginal and Torres Strait Islander health performance framework 2014 report: detailed analyses*. (AIHW Cat. no. IHW 167) Canberra: Australian Institute of Health and Welfare
47. Australian Bureau of Statistics (2015) *Deaths, Australia, 2014*. Retrieved 12 November 2015 from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3302.0?OpenDocument>
48. Australian Bureau of Statistics (2013) *Life tables for Aboriginal and Torres Strait Islander Australians, 2010-2012*. (ABS Cat. no. 3302.0.55.003) Canberra: Australian Bureau of Statistics
49. Australian Institute of Health and Welfare (2011) *Principles on the use of direct age-standardisation in administrative data collections: for measuring the gap between Indigenous and non-Indigenous Australians*. (AIHW Catalogue no CSI 12) Canberra: Australian Institute of Health and Welfare
50. Australian Health Ministers' Advisory Council (2015) *Aboriginal and Torres Strait Islander health performance framework 2014 report*. Canberra: Department of the Prime Minister and Cabinet
51. Australian Bureau of Statistics (2015) *Causes of death, Australia, 2013*. (ABS Catalogue no 3303.0) Canberra: Australian Bureau of Statistics
52. Australian Bureau of Statistics (2015) *Causes of death, Australia, 2013: Deaths of Aboriginal and Torres Strait Islander Australians [data cube]*. Retrieved 31 March 2015 from http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&3303_12%20%20deaths%20of%20aboriginal%20and%20torres%20strait%20islander%20australians.xls&3303.0&Data%20Cubes&4D9A9ADDB3C2F0ACCA257E18000F913C&0&2013&31.03.2015&Latest
53. Humphrey MD, Bonello MR, Chughtai A, Macaldowie A, Harris K, Chambers GM (2015) *Maternal deaths in Australia 2008-2012*. (AIHW Catalogue no PER 70, maternal deaths series no 5) Canberra: Australian Institute of Health and Welfare
54. Laws PJ, Li Z, Sullivan EA (2010) *Australia's mothers and babies 2008*. (Perinatal statistics series no. 24. Cat. no. PER 50) Canberra: Australian Institute of Health and Welfare
55. Li Z, McNally L, Hilder L, Sullivan EA (2011) *Australia's mothers and babies 2009*. (AIHW Catalogue no PER 52) Canberra: Australian Institute of Health and Welfare
56. Li Z, Zeki R, Hilder L, Sullivan EA (2012) *Australia's mothers and babies 2010*. (AIHW Catalogue no PER 57, perinatal statistics series no 27) Canberra: Australian Institute of Health and Welfare
57. Li Z, Zeki R, Hilder L, Sullivan EA (2013) *Australia's mothers and babies 2011*. (AIHW Catalogue no PER 59, perinatal statistics series no 28) Canberra: Australian Institute of Health and Welfare
58. Page A, Tobias M, Glover J, Wright C, Hetzel D, Fisher E (2006) *Australian and New Zealand atlas of avoidable mortality*. Adelaide: Public Health Information Development Unit, University of Adelaide
59. Thomson N, Ali M (2003) Births, deaths, and hospitalisation. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:44-74
60. Australian Institute of Health and Welfare (2015) *Admitted patient care 2013-14: Australian hospital statistics*. (AIHW Catalogue no HSE 156, health services series no 60) Canberra: Australian Institute of Health and Welfare
61. Clinical Epidemiology and Health Service Evaluation Unit (2009) *Potentially preventable hospitalisations: a review of the literature and Australian policies: final report*. Sydney: Australian Commission on Safety and Quality in Health Care
62. Baker IDI (2012) *Cardiovascular disease*. Retrieved 2012 from http://www.bakeridi.edu.au/health_fact_sheets/cardiovascular_disease/
63. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012-13*. (ABS Catalogue no. 4727.0.55.006) Canberra: Australian Bureau of Statistics
64. Australian Institute of Health and Welfare (2011) *Cardiovascular disease: Australian facts 2011*. (AIHW Catalogue no. CVD 53, cardiovascular disease series no. 35) Canberra: Australian Institute of Health and Welfare
65. World Heart Federation (2012) *Cardiovascular disease risk factors*. Retrieved 2012 from <http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/>
66. Australian Institute of Health and Welfare (2013) *Rheumatic heart disease and acute rheumatic fever in Australia: 1996-2012*. (AIHW Catalogue no CVD 60, cardiovascular disease series no 36) Canberra: Australian Institute of Health and Welfare
67. Rheumatic Heart Disease Australia, National Heart Foundation of Australia, Cardiac Society of Australia and New Zealand (2012) *The Australian guideline for prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease: 2nd edition*. Winnellie, NT: Menzies School of Health Research

68. Maguire GP, Carapetis JR, Walsh WF, Brown ADH (2012) The future of acute rheumatic fever and rheumatic heart disease in Australia [editorial]. *Medical Journal of Australia*;197(3):133-134
69. Murdoch J, Davis S, Forrester J, Masuda L, Reeve C (2014) Acute rheumatic fever and rheumatic heart disease in the Kimberley: using hospitalisation data to find cases and describe trends. *Australian and New Zealand Journal of Public Health*;Early View(<http://dx.doi.org/10.1111/1753-6405.12240>)
70. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012-13 - Australia: table 21.3 [data cube]*. Retrieved 6 June 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&472705500621.xls&4727.0.55.006&Data%20Cubes&166861F2585F8D85CA257CEE0010DAE7&0&2012%9613&06.06.2014&Latest>
71. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012-13 - Australia: table 5.3 [data cube]*. Retrieved 6 June 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&472705500605.xls&4727.0.55.006&Data%20Cubes&A95A701E3429A625CA257CEE0010D780&0&2012%9613&06.06.2014&Latest>
72. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012-13 - Australia: table 6.3 [data cube]*. Retrieved 6 June 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&472705500606.xls&4727.0.55.006&Data%20Cubes&7F2DBD07A515E7A2CA257CEE0010D7BF&0&2012%9613&06.06.2014&Latest>
73. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012-13 - Australia: table 2.3 [data cube]*. Retrieved 6 June 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&472705500602.xls&4727.0.55.006&Data%20Cubes&A0A5C6AE5F15C5DECA257CEE0010D6DC&0&2012%9613&06.06.2014&Latest>
74. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: biomedical results, 2012-13*. (ABS Catalogue no 4727.0.55.003) Canberra: Australian Bureau of Statistics
75. Australian Institute of Health and Welfare (2015) *Aboriginal and Torres Strait Islander health performance framework 2014: data tables*. Retrieved 11 June 2015 from <http://www.aihw.gov.au/indigenous-data/health-performance-framework/>
76. Australian Institute of Health and Welfare (2015) *Cardiovascular disease, diabetes and chronic kidney disease - Australian facts: Aboriginal and Torres Strait Islander people*. Canberra: Australian Institute of Health and Welfare
77. Australian Institute of Health and Welfare (2014) *Trends in coronary heart disease mortality: age groups and populations*. (AIHW Catalogue no CVD 79) Canberra: Australian Institute of Health and Welfare
78. Australian Cancer Research Foundation (2014) *What is cancer?* Retrieved 1 December 2014 from <http://www.acrf.com.au/on-cancer/>
79. Cancer Council Australia (2014) *What is cancer?* Retrieved 1 December 2014 from <http://www.cancer.org.au/about-cancer/what-is-cancer/>
80. Zhang X, Condon JR, Rumbold AR, Cunningham J, Roder DM (2011) Estimating cancer incidence in Indigenous Australians. *Australian and New Zealand Journal of Public Health*;35(5):477-485
81. Australian Institute of Health and Welfare (2015) *Cervical screening in Australia 2012-2013*. (AIHW Catalogue no CAN 91) Canberra: Australian Institute of Health and Welfare
82. Australian Institute of Health and Welfare (2015) *BreastScreen Australia monitoring report 2012-2013*. Canberra: Australian Institute of Health and Welfare
83. Australian Institute of Health and Welfare, Cancer Australia (2013) *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: an overview*. (AIHW Catalogue no CAN 75, cancer series no78) Canberra: Australian Institute of Health and Welfare
84. Australian Institute of Health and Welfare (2015) *Australia's hospitals 2013-14 at a glance*. (AIHW Catalogue no HSE 157) Canberra: Australian Institute of Health and Welfare
85. Condon JR, Barnes T, Cunningham J, Armstrong BK (2004) Long-term trends in cancer mortality for Indigenous Australians in the Northern Territory. *Medical Journal of Australia*;180(10):504-511
86. Australian Bureau of Statistics, Australian Institute of Health and Welfare (2008) *The health and welfare of Australia's Aboriginal and Torres Strait Islander Peoples 2008*. (ABS Catalogue no. 4704.0 and AIHW Catalogue no. IHW 21) Canberra: Australian Bureau of Statistics and Australian Institute of Health and Welfare
87. Valery PC, Coory M, Stirling J, Green AC (2006) Cancer diagnosis, treatment, and survival in Indigenous and non-Indigenous Australians: a matched cohort study. *The Lancet*;367(9525):1842-1848
88. Condon JR, Cunningham J, Barnes T, Armstrong BK, Selva-Nayagam S (2006) Cancer diagnosis and treatment in the Northern Territory: assessing health service performance for Indigenous Australians. *Internal Medicine Journal*;36(8):498-505

89. Moore SP, Green AC, Bray F, Garvey G, Coory M, Martin J, Valery PC (2014) *Survival disparities in Australia: an analysis of patterns of care and comorbidities among Indigenous and non-Indigenous cancer patients*. BMC Cancer 14.
90. Cunningham J, Rumbold AR, Zhang X, Condon JR (2008) Incidence, aetiology, and outcomes of cancer in Indigenous peoples in Australia. *The Lancet Oncology*;9(6):585-595
91. Lalor E, Cass A, Chew D, Craig M, Davis W, Grenfell R, Hoy W, McGlynn L, Mathew T, Parker D, Shaw J, Tonkin A, Towler B (2014) *Cardiovascular disease, diabetes and chronic kidney disease: Australian facts - mortality*. (AIHW Catalogue no CDK 1, cardiovascular, diabetes and chronic kidney disease series no 1) Canberra: Australian Institute of Health and Welfare
92. Diabetes Australia (2011) *What is diabetes?* Retrieved September 2011 from <http://www.diabetesaustralia.com.au/Understanding-Diabetes/What-is-Diabetes/>
93. Diabetes Australia (2013) *Diabetes in Australia*. Retrieved 2013 from <http://www.diabetesaustralia.com.au/Understanding-Diabetes/Diabetes-in-Australia/>
94. Australian Institute of Health and Welfare (2010) *Australia's health 2010: the twelfth biennial report of the Australian Institute of Health and Welfare*. (AIHW Catalogue no AUS 122, Australia's health no. 12) Canberra: Australian Institute of Health and Welfare
95. Australian Institute of Health and Welfare (2009) *Insulin-treated diabetes in Australia 2000–2007*. (AIHW Catalogue no. CVD 45) Canberra: Australian Institute of Health and Welfare
96. Australian Institute of Health and Welfare (2010) *Diabetes in pregnancy: its impact on Australian women and their babies*. (AIHW Catalogue no CVD 52, diabetes series no. 14) Canberra: Australian Institute of Health and Welfare
97. Australian Institute of Health and Welfare (2011) *Prevalence of Type 1 diabetes in Australian children, 2008*. (AIHW Catalogue no CVD 54, Diabetes series no.15) Canberra: Australian Institute of Health and Welfare
98. Royal Australian College of General Practitioners (2014) *General practice management of type 2 diabetes: 2014-2015*. Melbourne: Royal Australian College of General Practitioners
99. National Aboriginal Community Controlled Health Organisation (2005) *Evidence base to a preventive health assessment in Aboriginal and Torres Strait Islander peoples*. Melbourne: The Royal Australian College of General Practitioners
100. Australian Institute of Health and Welfare (2011) *Key indicators of progress for chronic disease and associated determinants: data report*. (AIHW Catalogue no PHE 142) Canberra: Australian Institute of Health and Welfare
101. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: biomedical results, 2012-13 - Australia: table 1.3 [data cube]*. Retrieved 10 September 2014 from http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&4727.0.55.003_1.xls&4727.0.55.003&Data%20Cubes&92FBF63F35F71948CA257D4E001700FC&0&2012-13&10.09.2014&Latest
102. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: biomedical results, 2012-13 - Australia: table 3.3 [data cube]*. Retrieved 10 September 2014 from http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&4727.0.55.003_3.xls&4727.0.55.003&Data%20Cubes&FE28D6D39E8ED1FACA257D4E0017027A&0&2012-13&10.09.2014&Latest
103. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: biomedical results, 2012-13 - Australia: table 4.3 [data cube]*. Retrieved 10 September 2014 from http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&4727.0.55.003_4.xls&4727.0.55.003&Data%20Cubes&B80B0E57A2672E00CA257D4E001702AE&0&2012-13&10.09.2014&Latest
104. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: biomedical results, 2012-13 - Australia: table 5.3 [data cube]*. Retrieved 10 September 2014 from http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&4727.0.55.003_5.xls&4727.0.55.003&Data%20Cubes&76FB2FC429853BA3CA257D4E001702E1&0&2012-13&10.09.2014&Latest
105. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: biomedical results, 2012-13 - Australia: table 6.3 [data cube]*. Retrieved 10 September 2014 from http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&4727.0.55.003_6.xls&4727.0.55.003&Data%20Cubes&F653985C855EA253CA257D4E00170316&0&2012-13&10.09.2014&Latest
106. Australian Institute of Health and Welfare (2015) *Prevalence of type 1 diabetes among children aged 0–14 in Australia 2013*. Canberra: Australian Institute of Health and Welfare
107. Australian Institute of Health and Welfare (2014) *Incidence of insulin-treated diabetes in Australia 2000-2011*. (AIHW Catalogue no CVD 66, diabetes series no 22) Canberra: Australian Institute of Health and Welfare

108. Australian Institute of Health and Welfare (2015) *Incidence of type 1 diabetes in Australia 2000-2013*. (AIHW Catalogue no CVD 69, diabetes series no 23) Canberra: Australian Institute of Health and Welfare
109. Zimmet PZ, Magliano DJ, Herman WH, Shaw JE, (2014) Diabetes: a 21st century challenge. *The Lancet Diabetes & Endocrinology*;2(1):56-64
110. Australian Institute of Health and Welfare (2014) *Type 2 diabetes in Australia's children and young people: a working paper*. (AIHW Catalogue no CVD 64, diabetes series no 21) Canberra: Australian Institute of Health and Welfare
111. Australian Institute of Health and Welfare (2008) *Diabetes: Australian facts 2008*. (Diabetes series no. 8. Cat. no. CVD 40) Canberra: Australian Institute of Health and Welfare
112. Australian Institute of Health and Welfare (2014) *Cardiovascular disease, diabetes and chronic kidney disease: Australian facts: morbidity - hospital care*. (AIHW Catalogue no CDK 003, cardiovascular, diabetes and chronic kidney disease series no 3) Canberra: Australian Institute of Health and Welfare
113. International Diabetes Federation (2013) *IDF diabetes atlas*. 6th ed. Brussels, Belgium: International Diabetes Federation
114. Australian Institute of Health and Welfare (2014) *Mortality and life expectancy of Indigenous Australians 2008 to 2012*. (AIHW Catalogue no IHW 140) Canberra: Australian Institute of Health and Welfare
115. Dudgeon P, Walker R, Scrine C, Shepherd C, Calma T, Ring I (2014) *Effective strategies to strengthen the mental health and wellbeing of Aboriginal and Torres Strait Islander people*. (Issues paper no 12) Canberra: Closing the Gap Clearinghouse
116. Australian Health Ministers (2003) *National Mental Health Plan 2003-2008*. Canberra: Australian Government
117. World Health Organization (2009) *Mental health: strengthening mental health promotion*. Retrieved September 2007 from <http://www.who.int/mediacentre/factsheets/fs220/en/index.html>
118. Department of Health and Ageing (2009) *National mental health policy 2008*. Canberra: Commonwealth of Australia
119. Fourth National Mental Health Plan Working Group (2009) *Fourth National Mental Health Plan: an agenda for collaborative government action in mental health 2009-2014*. Canberra: Australian Government Department of Health and Ageing
120. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 7 [data cube]*. Canberra: Australian Bureau of Statistics
121. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: biomedical results, 2012-13 - Australia: table 18 [data cube]*. Retrieved 10 September 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%2018%20family%20stressors%20by%20age,%20remoteness%20and%20sex,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&5319AD44A7925E65CA257CA6000E35AF&0&2012-13&26.03.2014&Latest>
122. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: table 19 [data cube]*. Canberra: Australian Bureau of Statistics
123. Shields MA, Price SM, Wooden M (2009) Life satisfaction and the economic and social characteristics of neighbourhoods. *Journal of Population Economics*;22(2):421-443
124. Australian Bureau of Statistics (2009) *National Aboriginal and Torres Strait Islander social survey, 2008*. Retrieved 11 April 2011 from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4714.0?OpenDocument>
125. Australian Bureau of Statistics (2011) *General social survey: summary results: 2010*. (ABS Catalogue no 4159.0) Canberra: Australian Bureau of Statistics
126. Australian Bureau of Statistics (2010) *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples, Oct 2010: Social and emotional wellbeing [data cube]*. Retrieved 29 October 2010 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&social%20and%20emotional%20wellbeing%20data%20cube.xls&4704.0&Data%20Cubes&F0C653AD3494AB79CA2577CA00138F43&0&Oct%202010&29.10.2010&Previous>
127. Zubrick SR, Silburn SR, Lawrence DM, Mitrou FG, Dalby RB, Blair EM, Griffin J, Milroy H, De Maio JA, Cox A, Li J (2005) *The social and emotional wellbeing of Aboriginal children and young people: vol 2*. (The Western Australian Aboriginal Child Health Survey, v. 2) Perth: Telethon Institute for Child Health Research and Curtin University of Technology
128. Hunter E, Reser J, Baird M, Reser P (2001) *An analysis of suicide in Indigenous communities of North Queensland: the historical, cultural and symbolic landscape*. Cairns: University of Queensland, Department of Social and Preventive Medicine, Gurriny Yealamucka Health Service & the Yarrabah Community Council, James Cook University of North Queensland, School of Psychology and Sociology
129. Measey ML, Li SQ, Parker R, Wang Z (2006) Suicide in the Northern Territory, 1981-2002. *Medical Journal of Australia*;185(6):315-319

130. Tatz C (2001) *Aboriginal suicide is different: a portrait of life and self-destruction [1st ed.]*. Canberra: Aboriginal Studies Press
131. Tatz C (2005) *Aboriginal suicide is different: a portrait of life and self-destruction [2nd ed.]*. 2nd ed. Canberra: Aboriginal Studies Press
132. Kidney Foundation of Canada (2015) *What is kidney disease?* Retrieved 2015 from <http://www.kidney.ca/page.aspx?pid=320>
133. Kidney Health Australia (2015) *Chronic kidney disease (CKD) management in general practice*. 3rd ed. Melbourne: Kidney Health Australia
134. Australian Institute of Health and Welfare (2011) *Chronic kidney disease in Aboriginal and Torres Strait Islander people 2011*. (AIHW Catalogue no PHE 151) Canberra: Australian Institute of Health and Welfare
135. Kidney Health Australia (2010) *The economic impact of end-stage kidney disease in Australia - projections to 2020*. Melbourne: Kidney Health Australia
136. Rix EF, Barclay L, Stirling J, Tong A, Wilson S (2015) The perspectives of Aboriginal patients and their health care providers on improving the quality of hemodialysis services: a qualitative study. *Hemodialysis International*;19(1):80–89
137. Hoy WE, White AV, Tipiloura B, Singh G, Sharma SK, Bloomfield H, Swanson CE, Dowling A, McCredie DA (2015) The multideterminant model of renal disease in a remote Australian Aboriginal population in the context of early life risk factors: lower birth weight, childhood post-streptococcal glomerulonephritis, and current body mass index influence levels of albumin. *Clinical Nephrology*;83(7(Supplement 1)):S75–S81
138. Johnson D (2013) *Risk factors for early chronic kidney disease*. Melbourne: Kidney Health Australia
139. Steering Committee for the Review of Government Service Provision (2011) *Report on government services 2011: Indigenous compendium*. Canberra: Productivity Commission
140. Australia and New Zealand Dialysis and Transplant Registry, ed. (2015) *The thirty seventh annual Australia and New Zealand Dialysis and Transplant Registry Report 2014*. Adelaide: Australia and New Zealand Dialysis and Transplant Registry
141. Australian Bureau of Statistics (2013) *Australian demographic statistics, December quarter 2012*. Retrieved 20 June 2013 from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3101.0Main+Features1Dec%202012?OpenDocument>
142. Australian Bureau of Statistics (2003) *Australian demographic statistics quarterly: September quarter 2002*. (ABS catalogue no. 3101.0) Canberra: Australian Bureau of Statistics
143. Australian and New Zealand Dialysis and Transplant Registry (2015) *End stage renal disease notifications, by Indigenous status, age, jurisdiction and year [2010 to 2014, unpublished]*. Adelaide: Australian and New Zealand Dialysis and Transplant Registry
144. Prout S, Yap M (2010) *Indigenous temporary mobilities and service delivery in regional service centres: a West Kimberley case study*. (Working Paper 66 / 2010) Canberra: Centre for Aboriginal Economic Policy Research
145. Agar JWM, Hawley CM, George CRP, Mathew TH, McDonald SP, Kerr PG (2010) Home haemodialysis in Australia — is the wheel turning full circle? *Medical Journal of Australia*;192(7):403–406
146. Australian Institute of Health and Welfare (2010) *Chronic kidney disease hospitalisations in Australia 2000–01 to 2007–08*. (AIHW Catalogue no PHE 127) Canberra: Australian Institute of Health and Welfare
147. National Public Health Partnership (2005) *The national Aboriginal and Torres Strait Islander safety promotion strategy*. Canberra: National Public Health Partnership
148. National Public Health Partnership (2005) *The national injury prevention and safety promotion plan: 2004–2014*. Canberra: National Public Health Partnership
149. Clapham K, O’Dea K, Chenhall R (2007) Interventions and sustainable programs. In: Carson B, Dunbar T, Chenhall RD, Bailie R, eds. *Social determinants of Indigenous health*. Crows Nest, NSW: Allen and Unwin:271–295
150. World Health Organization (2015) *International Statistical Classification of Diseases*. Retrieved 2015 from <http://apps.who.int/classifications/icd10/browse/2015/en#/XIX/>
151. Moller J (1996) Understanding national injury data regarding Aboriginal and Torres Strait Islander peoples. *Australian Injury Prevention Bulletin*;14(December):1–8
152. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012–13: Table 6 [data cube]*. Retrieved 26 March 2014

153. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 5 [data cube]*. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%205%20long-term%20conditions%20by%20sex%20by%20indigenous%20status,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&5C97CE7DA7059C06CA257C2F00145D5A&0&2012-13&27.11.2013&Latest>
154. Australian Bureau of Statistics (2009) *National Aboriginal and Torres Strait Islander social survey, 2008: law and justice [data cube]*. Retrieved 30 October 2009 from <http://www.abs.gov.au/AUSSTATS/SUBSCRIBER.NSF/log?openagent&law%20and%20justice%20-tables%201-11.xls&4714.0&Data%20Cubes&26DE78465527D0A2CA2577FA0011C50E&0&2008&16.12.2010&Latest>
155. Pointer S (2015) *Trends in hospitalised injury, Australia: 1999-00 to 2012-13*. Canberra: Australian Institute of Health and Welfare
156. Thomson N, Kirov E, Ali M (2003) Respiratory system disorders. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:224-246
157. O'Grady K-AF, Torzillo PJ, Chang AB (2010) Hospitalisation of Indigenous children in the Northern Territory for lower respiratory illness in the first year of life. *Medical Journal of Australia*;192(10):586-590
158. Lim FJ, Lehmann D, McLoughlin A, Harrison C, Willis J, Giele C, Keil AD, Moore HC (2014) Risk factors and comorbidities for invasive pneumococcal disease in Western Australian Aboriginal and non-Aboriginal people. *pneumonia*;4(2014):24-34
159. Australian Institute of Health and Welfare (2010) *Asthma, chronic obstructive pulmonary disease and other respiratory diseases in Australia*. (AIHW Catalogue no ACM 20) Canberra: Australian Institute of Health and Welfare
160. Janu EK, Annabattula BI, Kumariah S, Zajackowska M, Whitehall JS, Edwards MJ, Lujic S, Masters IB (2014) Paediatric hospitalisations for lower respiratory tract infections in Mount Isa. *Medical Journal of Australia*;200(10):591-594
161. Pierce R, Antic R, Chang A, Howard M, James A, Maguire G, Matthiesson A, Musk B, Roseby R, Simpson G, Torzillo P (2010) *Respiratory and sleep health in Indigenous Australians*. Sydney: Thoracic Society of Australia and New Zealand
162. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 2 [data cube]*. Retrieved 26 March 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%202%20selected%20health%20characteristics,%20by%20remoteness%20area%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&9F3D9B7052520B1BCA257CA6000E31B5&0&2012-13&26.03.2014&Latest>
163. Biotext (2008) *Risk factors for eye disease and injury: literature review*. (Final report) Canberra: National Health and Medical Research Council, Australia
164. Australian Health Ministers' Advisory Council (2012) *Aboriginal and Torres Strait Islander health performance framework: 2012 report*. Canberra: Office for Aboriginal and Torres Strait Islander Health, Department of Health and Ageing
165. Access Economics (2004) *Clear Insight: The economic impact and cost of vision loss in Australia*. Access Economics Pty Limited
166. Taylor HR, Boudville A, Anjou M, McNeil R (2011) *The roadmap to close the gap for vision: summary report*. Melbourne: Indigenous Eye Health Unit, the University of Melbourne
167. Vos T, Taylor HR (2013) Contribution of vision loss to the Indigenous health gap. *Clinical & Experimental Ophthalmology*;41(3):309-310
168. Taylor HR, Anjou MD, Boudville AI, McNeil RJ (2012) *The roadmap to close the gap for vision: full report*. Melbourne: Indigenous Eye Health Unit, the University of Melbourne
169. Taylor HR, National Indigenous Eye Health Survey Team (2009) *National Indigenous eye health survey: minum barreng (tracking eyes): summary report*. Melbourne: Indigenous Eye Health Unit, The University of Melbourne
170. Abouzeid M, Anjou MD, Taylor HR (2015) Equity in vision in Australia is in sight. *Medical Journal of Australia*;203(1):21-23
171. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 3 [data cube]*. Retrieved 27 November 2013 from http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%203%20selected%20health%20characteristics,%20by%20state_territory%202012-13-australia.xls&4727.0.55.001&Data%20Cubes&D43DB1D697BED77ECA257C2F00145D04&0&2012-13&27.11.2013&Latest
172. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13*. (ABS Catalogue no. 4727.0.55.001) Canberra: Australian Bureau of Statistics
173. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 25 [data cube]*. Retrieved 26 March 2014 from http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&table%2025%20selected%20health%20characteristics%20by%20aboriginal_torres%20strait%20islander%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&8759176B7100FFF0CA257CA6000E3759&0&2012-13&2

174. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 4 [data cube]*. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%204%20selected%20health%20characteristics,%20by%20sex%202012-13-australia.xls&4727.0.55.001&Data%20Cubes&497BBEB2AFC1B23DC A257C2F00145D2E&0&2012-13&27.11.2013&Latest>
175. The Kirby Institute (2015) *Australian trachoma surveillance report 2014*. Sydney: The Kirby Institute, University of New South Wales
176. Burrow S, Thomson N (2003) Ear disease and hearing loss. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:247-272
177. Darwin Otitis Guidelines Group (2010) *Recommendations for clinical care guidelines on the management of otitis media in Aboriginal and Torres Strait Islander populations*. Darwin: Menzies School of Health Research
178. Couzos S, Metcalf S, Murray R (2008) Ear health. In: Couzos S, Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 3rd ed. South Melbourne: Oxford University Press:308-354
179. Burrow S, Galloway A, Weissfouer N (2009) *Review of educational and other approaches to hearing loss among Indigenous people*. Retrieved from <http://www.healthinonet.ecu.edu.au/other-health-conditions/ear/reviews/our-review-education>
180. O'Neill G (2012) Otitis media: silent epidemic. *Australian Life Scientist*;9(3):42-44
181. Senate Community Affairs References Committee (2010) *Hear us: inquiry into hearing health in Australia*. Canberra: Parliament of Australia: Senate
182. Gunasekera H, Morris PS, Daniels J, Couzos S, Craig JC (2009) Otitis media in Aboriginal children: the discordance between burden of illness and access to services in rural/remote and urban Australia. *Journal of Paediatrics and Child Health*;45(7-8):425-430
183. Morris PS, Leach AJ, Silberberg P, Mellon G, Wilson C, Hamilton E, Beissbarth J (2005) *Otitis media in young Aboriginal children from remote communities in Northern and Central Australia: a cross-sectional survey*. BMC Pediatrics 5.
184. WHO/CIBA (2000) *Prevention of hearing impairment from chronic otitis media*. (WHO/PDH/98.4) Geneva: WHO
185. Kok B, Tong B, Penm R, Watson J (2015) *Hearing health outreach services to Aboriginal and Torres Strait Islander children and young people in the Northern Territory: 2012-13 to 2014-15*. Canberra: Australian Institute of Health and Welfare
186. UK Department of Health (1994) *An oral health strategy for England*. London: Department of Health
187. Australian Institute of Health and Welfare (2014) *Oral health and dental care in Australia: key facts and figures trends 2014*. (AIHW Catalogue no DEN 228) Canberra: Australian Institute of Health and Welfare
188. Northern Territory Department of Health (2011) *Healthy smiles: oral health and fluoride varnish information for health professionals*. Darwin: Northern Territory Department of Health
189. Australian Bureau of Statistics (2006) *National Aboriginal and Torres Strait Islander Health Survey: Australia, 2004-05*. (ABS Catalogue no. 4715.0) Canberra: Australian Bureau of Statistics
190. Harford J, Spencer J, Roberts-Thomson K (2003) Oral health. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:313-338
191. Ha DH, Ellershaw AC (2014) Oral health of Australian Indigenous children compared to non-Indigenous children enrolled in school dental services. *Australian Dental Journal*;59(3):395-400
192. Australian Institute of Health and Welfare (2014) *Stronger Futures in the Northern Territory: Oral Health Program: July 2012 to December 2013*. (AIHW Catalogue no IHW 144) Canberra: Australian Institute of Health and Welfare
193. Slade GD, Spencer AJ, Roberts-Thomson KF (2007) *Australia's dental generations: the national survey of adult oral health 2004-06*. (AIHW Catalogue no. DEN 165) Canberra: Australian Institute of Health and Welfare
194. Jamieson LM, Armfield JM, Roberts-Thomson KF (2007) *Oral health of Aboriginal and Torres Strait Islander children*. (AIHW Catalogue no. DEN 167) Canberra: Australian Research Centre for Population Oral Health (ARCPOH)
195. Ellershaw AC, Spencer AJ (2011) *Dental attendance patterns and oral health status*. (AIHW Catalogue no. DEN 208, Dental statistics and research series no. 57) Canberra: Australian Institute of Health and Welfare
196. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 23 [data cube]*. Retrieved 26 March 2014 from <http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&table%2023%20health-related%20actions%20by%20age,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&276261A1D5915A31CA257CA600E36E1&0&2012-13&26.03.2014&Latest>

197. Footprints in Time (2015) *Footprints in Time: the longitudinal study of Indigenous children: report from Wave 5*. Canberra: Department of Social Services
198. Australian Bureau of Statistics (2013) *Disability, ageing and carers, Australia: summary of findings, 2012*. (ABS Catalogue no 4430.0) Canberra: Australian Bureau of Statistics
199. Australian Institute of Health and Welfare (2014) *Australia's health 2014: the 14th biennial health report of the Australian Institute of Health and Welfare*. (AIHW Catalogue no AUS 181) Canberra: Australian Institute of Health and Welfare
200. World Health Organization (2011) *World report on disability*. Geneva: World Health Organization
201. Australian Bureau of Statistics (2010) *National Aboriginal and Torres Strait Islander social survey: users' guide, 2008*. Retrieved from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4720.0?OpenDocument>
202. Productivity Commission (2011) *Disability care and support: Productivity Commission Inquiry report overview and recommendations*. Canberra: Productivity Commission
203. Australian Bureau of Statistics (2014) *Aboriginal and Torres Strait Islander people with a disability, 2012*. Retrieved 1 December 2014 from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4433.0.55.005?OpenDocument>
204. Council of Australian Governments (2009) *National disability agreement*. Canberra: Council of Australian Governments
205. Council of Australian Governments (2012) *National disability agreement: intergovernmental agreement on federal financial relations*. Canberra: Council of Australian Governments
206. Disability Policy & Research Working Group (2012) *National Indigenous access framework*. Sydney: Disability Policy & Research Working Group
207. Steering Committee for the Review of Government Service Provision (2013) *Report on government services 2013: Indigenous compendium*. Canberra: Productivity Commission
208. Australian Institute of Health and Welfare (2015) *Disability support services: services provided under the National Disability Agreement 2013-14*. (AIHW Catalogue no AUS 192, AIHW bulletin no 130) Canberra: Australian Institute of Health and Welfare
209. Steering Committee for the Review of Government Service Provision (2015) *Report on government services 2015: Indigenous compendium*. Canberra: Productivity Commission
210. Productivity Commission (2011) *Disability care and support: Productivity Commission Inquiry report [vol 1 & 2]*. Canberra: Productivity Commission
211. Burns J, Burrow S, Genovese E, Pumphrey M, Sims E, Thomson N (2003) Other communicable diseases. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:397-441
212. National Health and Medical Research Council (2012) *Staying healthy: preventing infectious diseases in early childhood education and care services (5th edition)*. Canberra: National Health and Medical Research Council
213. Australian Government Department of Health and Ageing (2014) *The Australian immunisation handbook: 10th edition 2013 (updated January 2014)*. 10th ed. Canberra: Australian Government Department of Health and Ageing
214. Australian Institute of Health and Welfare (2012) *Australia's health 2012*. (AIHW Catalogue no AUS 156) Canberra: Australian Institute of Health and Welfare
215. The Kirby Institute (2014) *Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander people: surveillance and evaluation report 2014*. Sydney: University of New South Wales
216. Naidu L, Chiu C, Habig A, Lowbridge C, Jayasinghe S, Wang H, McIntyre P, Menzies R (2013) Vaccine preventable diseases and vaccination coverage in Aboriginal and Torres Strait Islander people, Australia 2006–2010. *Communicable Diseases Intelligence*;37(December 2013 supplement):S1-S92
217. National Institute of Allergy and Infectious Diseases (2009) *Tuberculosis (TB): detailed explanation of TB*. Retrieved 6 March 2009 from <http://www.niaid.nih.gov/topics/tuberculosis/Understanding/WhatIsTB/Pages/detailed.aspx>
218. Krause V (2008) Tuberculosis (TB). In: Couzos S, Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 3rd ed. South Melbourne: Oxford University Press:674-707
219. Narasimhan P, Wood J, Macintyre CR, Mathai D (2013) *Risk factors for tuberculosis*. *Pulmonary Medicine* 2013.
220. Baker M, Das D, Venugopal K, Howden-Chapman P (2008) Tuberculosis associated with household crowding in a developed country. *Journal of Epidemiology and Community Health*;62(8):715-721

221. World Health Organization (2009) *Global tuberculosis control - epidemiology, strategy, financing: WHO report 2009*. Geneva: World Health Organization
222. Barry C, Waring J, Stapledon R, Konstantinos A (2012) Tuberculosis notifications in Australia, 2008 and 2009. *Communicable Diseases Intelligence*;36(1):82-94
223. Bareja C, Waring J, Stapledon R, National Tuberculosis Advisory Committee (2014) Tuberculosis notifications in Australia 2010. *Communicable Diseases Intelligence*;38(1):E36-E48
224. Bareja C, Waring J, Stapledon R, Toms C, Douglas P, National Tuberculosis Advisory Committee (2014) Tuberculosis notifications in Australia, 2011. *Communicable Diseases Intelligence*;38(4):E356-E368
225. Toms C, Stapledon R, Waring J, Douglas P (2015) Tuberculosis notifications in Australia, 2012 and 2013. *Communicable Diseases Intelligence*;Submitted to CDI:E217-E235
226. Australian Bureau of Statistics (2009) *Experimental estimates and projections, Aboriginal and Torres Strait Islander Australians: Projected population, Aboriginal and Torres Strait Islander Australians, Australia, states and territories, 2006-2021 series [data cube]*. Retrieved 8 September 2009 from http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&32380ds002_2006.srd&3238.0&Data%20Cubes&E79A5308D989173FCA25762A001CE1C3&0&1991%20to%202021&08.09.2009&Latest
227. Australian Bureau of Statistics (2011) *Australian demographic statistics, June quarter 2011*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics
228. World Health Organisation (2014) *Hepatitis*. Retrieved 2014 from <http://www.who.int/topics/hepatitis/en/>
229. Australasian Society for HIV Medicine (2010) *Australasian contact tracing manual: a practical handbook for health care providers managing people with HIV, viral hepatitis, STIs and HIV-related tuberculosis*. 4th ed. Sydney: Australasian Society for HIV Medicine
230. Markey P (2010) Nearing elimination of hepatitis A in the Northern Territory following immunisation of Indigenous infants. *Northern Territory Disease Control Bulletin*;17(3):1-6
231. MacIntyre CR, Burgess M, Isaacs D, MacIntyre PB, Menzies R, Hull B (2007) Epidemiology of severe Hepatitis A in Indigenous Australian children. *Journal of Paediatrics and Child Health*;43(5):383-387
232. The Kirby Institute (2012) *HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2012*. Sydney: University of New South Wales
233. The Kirby Institute (2013) *HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2013*. Sydney: University of New South Wales
234. The Kirby Institute (2014) *HIV, viral hepatitis and sexually transmissible infections in Australia annual surveillance report 2014*. Sydney: University of New South Wales
235. McGregor S, McManus H (2015) *Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people: surveillance and evaluation report 2015*. Sydney: The Kirby Institute
236. Australian Bureau of Statistics (2012) *Australian demographic statistics, June quarter 2012*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics
237. Communicable Diseases Section Department of Human Services (2005) *The blue book - guidelines for the control of infectious diseases*. Melbourne: Victorian Government Department of Human Services
238. Hepatitis C Virus Projections Working Group (2006) *Estimates and projections of the hepatitis C virus epidemic in Australia 2006*. Canberra: Ministerial Advisory Committee on AIDS, Sexual Health and Hepatitis C Sub-Committee
239. Wilson H, Hopwood M, Hull P, Lavis Y, Newland J, Bryant J, Treloar C (2010) *Treatment decisions: what makes people decide to have treatment for hepatitis C?* Brisbane: Hepatitis Council of Queensland
240. McGregor S, McManus H, Gray R, Costello J (2015) *HIV, viral hepatitis and sexually transmissible infections in Australia annual surveillance report 2015*. Sydney: The Kirby Institute
241. Horby P, Gilmour R, Wang H, McIntyre P (2003) Progress towards eliminating Hib in Australia: an evaluation of Haemophilus influenzae type b prevention in Australia, 1 July 1993 to 30 June 2000. *Communicable Diseases Intelligence*;27(3):324-341
242. Wang H, Deeks S, Glasswell A, McIntyre P (2008) Trends in invasive Haemophilus influenzae type b disease in Australia, 1995-2005. *Communicable Diseases Intelligence*;32(3):316-325
243. Jacups SP, Morris PS, Leach AJ (2011) Haemophilus influenzae type b carriage in Indigenous children and children attending childcare centers in the Northern Territory, Australia, spanning pre- and post-vaccine eras. *Vaccine*;29(16):3083-3088

244. National Notifiable Diseases Surveillance System Annual Report Writing Group (2015) *Australia's notifiable disease status, 2012: annual report of the National Notifiable Diseases Surveillance System*. Canberra: National Notifiable Diseases Surveillance System
245. NNDSS Annual Report Writing Group (2012) Australia's notifiable diseases status, 2010: annual report of the National Notifiable Diseases Surveillance System. *Communicable Diseases Intelligence*;36(1):1-69
246. National Notifiable Diseases Surveillance System Annual Report Writing Group (2013) *Australia's notifiable disease status, 2011: annual report of the National Notifiable Diseases Surveillance System*. Canberra: National Notifiable Diseases Surveillance System
247. National Notifiable Diseases Surveillance System Annual Report Writing Group (2015) *Australia's notifiable disease status, 2013: annual report of the National Notifiable Diseases Surveillance System*. Canberra: National Notifiable Diseases Surveillance System
248. Immunise Australia Program (2015) *The Australian immunisation handbook: 10th edition 2015 (updated June 2015)*. Canberra: Australian Department of Health
249. Jacups SP, Cheng A (2011) The epidemiology of community acquired bacteremic pneumonia, due to streptococcus pneumoniae, in the top end of the Northern Territory, Australia - over 22 years. *Vaccine*;29(33):5386-5392
250. Toms C, de Kluiver R (2015) Invasive pneumococcal disease in Australia, 2011 and 2012. *Communicable Diseases Intelligence*;Submitted to CDI:1-34
251. de Kluiver R (2014) Invasive pneumococcal disease surveillance Australia, 1 January to 31 March 2014. *Communicable Diseases Intelligence*;38(2):E169-E173
252. Australian Government Department of Health and Ageing (2013) *The Australian immunisation handbook: 10th edition 2013*. 10th ed. Canberra: Australian Government Department of Health and Ageing
253. Lahra MM, Enriquez RP (2012) Annual report of the Australian Meningococcal Surveillance Programme, 2011. *Communicable Diseases Intelligence*;36(3):E251-E262
254. Family Planning Association of WA (2010) *Sexually transmissible infections (STI) and blood-borne viruses (BBV): a guide for health professionals, educators, and general practitioners*. Northbridge, WA: Family Planning Association of WA
255. Australasian Society for HIV Medicine (2009) *Toward a second national sexually transmissible infections strategy 2009 - 2013*. Sydney: Australasian Society for HIV Medicine
256. de Wit J, Mao L, Holt M, Treloar CE (2013) *HIV/AIDS, hepatitis and sexually transmissible infections in Australia: annual report of trends in behaviour 2013*. (Monograph 6/2013) Sydney: Centre for Social Research in Health, The University of New South Wales
257. Bowden FJ, Tabrizi SN, Garland SM, Fairley CK (2002) Sexually transmitted infections: new diagnostic approaches and treatments. *Medical Journal of Australia*;176(11):551-557
258. Australian Department of Health and Ageing (2010) *Second national sexually transmissible infections strategy 2010 - 2013*. Canberra: Department of Health and Ageing, Australia
259. Australian Health Ministers' Advisory Council (2011) *Aboriginal and Torres Strait Islander health performance framework: 2010 report*. Canberra: Office for Aboriginal and Torres Strait Islander Health, Department of Health and Ageing
260. National Centre in HIV Epidemiology & Clinical Research (2010) *Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander people: surveillance and evaluation report 2010*. Sydney, NSW: National Centre in HIV Epidemiology & Clinical Research, University of New South Wales
261. Family Planning Association of WA (2006) *Gonorrhoea*. Perth, WA: FPWA Sexual Health Services
262. Western Australia Communicable Disease Control PH (2009) *Syphilis [fact sheet]*. Perth, WA: Western Australia Department of Health, Public Health
263. Merianos A, Bowden F, Krause V, Savage J, Wallace T (2001) Communicable diseases. In: Condon JR, Warman G, Arnold L, eds. *The health and welfare of Territorians*. Darwin: Territory Health Services:71-86
264. Australian National Council on AIDS Hepatitis C and Related Diseases (2000) *The management of HIV/AIDS: a resource guide for Indigenous primary health care organisations*. Canberra: ANCAHRD, Commonwealth Department of Health and Aged Care
265. Western Australian Department of Health (2008) *HIV model of care*. Perth, WA: Health Networks, Western Australian Department of Health
266. Western Australia Communicable Disease Control (2012) *HIV & AIDS*. Perth, WA: Western Australia Department of Health
267. Australian Department of Health and Ageing (2010) *Sixth national HIV strategy 2010-2013*. Canberra: Department of Health and Ageing, Australia

268. National Centre in HIV Epidemiology & Clinical Research (2010) *HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2010*. Sydney, NSW: National Centre in HIV Epidemiology & Clinical Research, University of New South Wales
269. McDonald E, Bailie R, Brewster D, Morris P (2008) *Are hygiene and public health interventions likely to improve outcomes for Australian Aboriginal children living in remote communities? A systematic review of the literature*. BMC Public Health 8.
270. Currie B, Couzos S (2008) Skin infections. In: Couzos S, Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 3rd ed. South Melbourne: Oxford University Press:410-444
271. Marquardt T (2014) Managing skin infections in Aboriginal and Torres Strait Islander children. *Australian Family Physician*;43(1/2):16-19
272. McMeniman E, Holden L, Kearns T, Clucas DB, Carapetis JR, Currie BJ, Connors C, Andrews RM (2011) Skin disease in the first two years of life in Aboriginal children in East Arnhem Land. *Australasian Journal of Dermatology*;52(4):270-273
273. Hendrickx D, Stephen A, Lehmann D, Silva D, Boelaert M, Carapetis J, Walker R (2015) A systematic review of the evidence that swimming pools improve health and wellbeing in remote Aboriginal communities in Australia. *Australian and New Zealand Journal of Public Health*; Early view (<http://dx.doi.org/10.1111/1753-6405.12433>)
274. Centre for Disease Control (2015) *Healthy Skin Program: guidelines for community control of scabies, skin sores, tinea and crusted scabies in the Northern Territory [3rd ed.]*. Darwin: Northern Territory Department of Health
275. Fischer K, Kemp DJ (2009) Scabies and bacterial skin infections at a molecular level. *Microbiology Australia*;30(5):177-180
276. Clucas DB, Carville KS, Connors C, Currie B, Carapetis J, Andrews R (2008) Disease burden and health-care clinic attendances for young children in remote Aboriginal communities of northern Australia. *Bulletin of the World Health Organization*;86(4):275-281
277. Lokuge B, Kopczynski A, Woltmann A, Alvoen F, Connors C, Guyula T, Mulholland E, Cran S, Foster T, Lokuge K, Burke T, Prince S (2014) Crusted scabies in remote Australia, a new way forward: lessons and outcomes from the East Arnhem Scabies Control Program. *Medical Journal of Australia*;200(11):644-648
278. Valery PC, Wenitong M, Clements V, Sheel M, McMillan D, Stirling J, Sriprakash KS, Batzloff M, vohra R, McCarthy JS (2008) Skin infections among Indigenous Australians in an urban setting in far north Queensland. *Epidemiology and Infection*;136(8):1103-1108
279. Currie BJ, Carapetis JR (2000) Skin infections and infestations in Aboriginal communities in northern Australia. *Australasian Journal of Dermatology*;41(3):139-145
280. McDonald M, Currie BJ, Carapetis JR (2004) Acute rheumatic fever: a chink in the chain that links the heart to the throat? *The Lancet Infectious Diseases*;4(4):240-245
281. Heyes C, Tait C, Toholka R, Gebauer K (2014) Non-infectious skin disease in Indigenous Australians. *Australasian Journal of Dermatology*;55(3):176-184
282. Australian Institute of Health and Welfare (2013) *Australian hospital statistics 2011-12*. (AIHW Catalogue no HSE 134, health services series no 50) Canberra: Australian Institute of Health and Welfare
283. Whitehall J, Kuzulugil D, Sheldrick K, Wood A (2013) Burden of paediatric pyoderma and scabies in North West Queensland. *Journal of Paediatrics and Child Health*;49(2):141-143
284. Hewagama S, Einsiedel L, Spelman T (2012) Staphylococcus aureus bacteraemia at Alice Springs Hospital, Central Australia, 2003-2006. *Internal Medicine Journal*;42(5):505-512
285. Carson B, Dunbar T, Chenhall RD, Bailie R, eds. (2007) *Social determinants of Indigenous health*. Crows Nest, NSW: Allen and Unwin
286. Wilkinson R, Marmot M (2003) *Social determinants of health: the solid facts*. (2nd ed) Denmark: World Health Organization
287. Marmot M (2004) *The status syndrome: how social standing affects our health and longevity*. New York: Holt Paperbacks
288. Gracey MS (2007) Nutrition-related disorders in Indigenous Australians: how things have changed. *Medical Journal of Australia*;186(1):15-17
289. National Health and Medical Research Council (2000) *Nutrition in Aboriginal and Torres Strait Islander peoples: an information paper*. Canberra: National Health and Medical Research Council
290. National Public Health Partnership (2001) *National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan 2000-2010 and first phase activities 2000-2003*. Canberra: National Public Health Partnership
291. National Health and Medical Research Council (2013) *Australian Dietary Guidelines: providing the scientific evidence for healthier Australian diets*. Canberra: National Health and Medical Research Council

292. Australian Bureau of Statistics (2015) *Australian Aboriginal and Torres Strait Islander health survey: nutrition results - food and nutrients, 2012-13: Table 4 [data cube]*. Retrieved 20 March 2015 from http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&4727055005_201213_04.xls&4727.0.55.005&Data%20Cubes&F3E8C224BFBA2FE0CA257E0D000EC970&0&2012-13&20.03.2015&Latest
293. Australian Bureau of Statistics (2015) *Australian Aboriginal and Torres Strait Islander health survey: nutrition results - food and nutrients, 2012-13*. (ABS cat. no. 4727.0.55.005) Canberra: Australian Bureau of Statistics
294. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012-13: table 13 [data cube]*. Retrieved 6 June 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&472705500613.xls&4727.0.55.006&Data%20Cubes&D751183318983C51CA257CEE0010D97D&0&2012%9613&06.06.2014&Latest>
295. Australian Bureau of Statistics (2015) *Australian Aboriginal and Torres Strait Islander health survey: nutrition results - food and nutrients, 2012-13: Table 12.1 [data cube]*. Retrieved 20 March 2015 from http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&4727055005_201213_12.xls&4727.0.55.005&Data%20Cubes&2DC1BC4A0840357FCA257E0D000ECE96&0&2012-13&20.03.2015&Latest
296. Footprints in Time (2012) *Footprints in Time: the longitudinal study of Indigenous children: key summary report from Wave 3*. Canberra: Department of Families, Housing, Community Services and Indigenous Affairs
297. Footprints in Time (2013) *Footprints in Time: the longitudinal study of Indigenous children: report from Wave 4*. Canberra: Department of Families, Housing, Community Services and Indigenous Affairs
298. Australian Bureau of Statistics (2015) *Australian Aboriginal and Torres Strait Islander health survey: nutrition results - food and nutrients, 2012-13: Table 14.1 [data cube]*. Retrieved 20 March 2015 from http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&4727055005_201213_14.xls&4727.0.55.005&Data%20Cubes&2ABA2FFD38663577CA257E0D000ECF19&0&2012-13&20.03.2015&Latest
299. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: physical activity, 2012-13*. (ABS cat. no. 4727.0.55.004) Canberra: Australian Bureau of Statistics
300. Australian Government Department of Health (2014) *Australia's physical activity and sedentary behaviour guidelines*. Canberra: Australian Government Department of Health
301. Australian Government Department of Health (2014) *Australia's physical activity and sedentary behaviour guidelines - guidelines evidence summary*. Canberra: Australian Government Department of Health
302. World Health Organization (2013) *Obesity and overweight: fact sheet no 311*. Retrieved March 2013 from <http://www.who.int/mediacentre/factsheets/fs311/en/>
303. National Health and Medical Research Council (2013) *Eat for Health: Australian dietary guidelines summary*. Canberra: National Health and Medical Research Council
304. World Health Organization (2011) *Waist circumference and waist-hip ratio: report of a WHO expert consultation* Presented Geneva
305. Daniel M, Rowley K, McDermott R, O'Dea K (2002) Diabetes and impaired glucose tolerance in Aboriginal Australians: prevalence and risk. *Diabetes Research and Clinical Practice*;57:23-33
306. Li M, McDermott RA (2010) Using anthropometric indices to predict cardio-metabolic risk factors in Australian Indigenous populations. *Diabetes Research and Clinical Practice*;87(3):401-406
307. Gracey M, Burke V, Martin DD, Johnston RJ, Jones T, Davis EA (2007) Assessment of risks of "lifestyle" diseases including cardiovascular disease and type 2 diabetes by anthropometry in remote Australian Aborigines. *Asia Pacific Journal of Clinical Nutrition*;16(4):688-697
308. Hughes JT, Maple-Brown LJ, Piers LS, Meerkin J, O'Dea K, Ward LC (2014) Development of a single-frequency bioimpedance prediction equation for fat-free mass in an adult Indigenous Australian population. *European Journal of Clinical Nutrition*; Advance online (<http://dx.doi.org/10.1038/ejcn.2014.54>)
309. Australian Institute of Health and Welfare (2011) *Aboriginal and Torres Strait Islander health performance framework 2010: detailed analyses*. (AIHW Catalogue no IHW 53) Canberra: Australian Institute of Health and Welfare
310. Valery PC, Ibiebele T, Harris M, Green AC, Cotterill A, Moloney A, Sinha AK, Garvey G (2012) *Diet, physical activity, and obesity in school-aged Indigenous youths in northern Australia*. *Journal of Obesity* 2012.
311. Hardy LL, O'Hara BJ, Hector D, Engelen L, Eades SJ (2014) Temporal trends in weight and current weight-related behaviour of Australian Aboriginal school-aged children. *Medical Journal of Australia*;200(11):667-671

312. Haupt I, Fisher R, Weber J, Dunn K (2014) *Review of the National Partnership Agreement on Essential Vaccines*. Canberra: Sapere Research Group and Sironis Health
313. Immunise Australia Program (2015) *ACIR - Annual coverage historical data - Aboriginal and Torres Strait Islander children*. Retrieved 11 February 2016 from <http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/acir-ann-hist-data-ATSI-child.htm>
314. World Health Organization (2013) *Exclusive breastfeeding*. Retrieved 2013 from <http://www.who.int/nutrition/topics/exclusive-breastfeeding/en/>
315. Australian Institute of Health and Welfare (2011) *2010 Australian national infant feeding survey: indicator results*. (AIHW Catalogue no PHE 156) Canberra: Australian Institute of Health and Welfare
316. Department of Families Housing Community Services and Indigenous Affairs (2009) *Footprints in time: the longitudinal study of Indigenous children - key summary report from Wave 1*. Canberra: Department of Families, Housing, Community Services and Indigenous Affairs
317. Vos T, Barker B, Stanley L, Lopez A (2007) *The burden of disease and injury in Aboriginal and Torres Strait Islander peoples 2003*. Brisbane: Centre for Burden of Disease and Cost-Effectiveness, University of Queensland
318. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012–13: table 10 smoker status by age, Indigenous status and sex [data cube]*. Retrieved 6 June 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&472705500610.xls&4727.0.55.006&Data%20Cubes&848805EF76A00F55CA257CEE0010D8F0&0&2012%9613&06.06.2014&Latest>
319. Australian Bureau of Statistics (2010) *National Aboriginal and Torres Strait Islander social survey, 2008: Table 10. Indigenous persons aged 15 years and over, by age groups by sex [data cube]*. Retrieved from http://abs.gov.au/AUSSTATS/SUBSCRIBER.NSF/log?openagent&4714.0_aust_010_2008.xls&4714.0&Data%20Cubes&6959208EE47E867DCA25770B0016F56D&0&2008&21.04.2010&Previous
320. Australian Bureau of Statistics (2004) *National Aboriginal and Torres Strait Islander Social Survey, 2002*. (ABS Catalogue no. 4714.0) Canberra: Australian Bureau of Statistics
321. Australian Bureau of Statistics (2010) *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples, Oct 2010*. (ABS Catalogue no 4704.0) Canberra: Australian Bureau of Statistics
322. Australian Bureau of Statistics (2014) *Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012–13: table 11 smoker status by age by remoteness, 2002, 2008 and 2012–13 [data cube]*. Retrieved 6 June 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&472705500611.xls&4727.0.55.006&Data%20Cubes&2DFC3927395AF56DCA257CEE0010D921&0&2012%9613&06.06.2014&Latest>
323. National Health and Medical Research Council (2009) *Australian guidelines to reduce health risks from drinking alcohol*. Canberra: National Health and Medical Research Council
324. Western Australian Department of Health (2010) *Fetal alcohol spectrum disorder model of care*. Perth, WA: Health Networks, Western Australian Department of Health
325. Watkins RE, Elliott EJ, Wilkins A, Mutch RC, Fitzpatrick JP, Payne JM, O'Leary CM, Jones HM, Latimer J, Hayes L, Halliday J, D'Antoine H, Miers S, Russell E, Burns L, McKenzie A, Peadon E, Carter M, Bower C (2013) *Recommendations from a consensus development workshop on the diagnosis of fetal alcohol spectrum disorders in Australia*. BMC Pediatrics 13.
326. Vos T, Barker B, Stanley L, Lopez A (2007) *Burden of disease and injury in Aboriginal and Torres Strait Islander peoples: summary report*. Brisbane: Centre for Burden of Disease and Cost-Effectiveness: School of Population Health, University of Queensland
327. Begg S, Vos T, Barker B, Stevenson C, Stanley L, Lopez A (2007) *The burden of disease and injury in Australia 2003*. (AIHW cat. no. PHE 82) Canberra: Australian Institute of Health and Welfare
328. Australian Institute of Health and Welfare (2011) *2010 National Drug Strategy Household Survey report*. (Drug statistics series no. 25. Cat. no. PHE 145) Canberra: Australian Institute of Health and Welfare
329. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 14 Alcohol consumption - Short-term or Single occasion risk by age, Indigenous status and sex [data cube]*. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%2014%20alcohol%20consumption%20-%20sh-term%20or%20single%20occ%20risk%20-age,%20indigenous%20status,%20sex,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&0E985E680C399BF7CA257C2F>

330. National Health and Medical Research Council (2001) *Australian alcohol guidelines: health risks and benefits*. Canberra: National Health and Medical Research Council
331. Australian Institute of Health and Welfare (2014) *National Drug Strategy Household Survey detailed report: 2013*. (AIHW Catalogue no PHE 183, drug statistics series no 28) Canberra: Australian Institute of Health and Welfare
332. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 13 Alcohol consumption - Long-term or Lifetime risk by age, Indigenous status and sex [data cube]*. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%2013%20alcohol%20consumption%20-%20long-term%20or%20lifetime%20risk%20by%20age,%20indigenous%20status%20and%20sex,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&D5ABABF005F0BEF3C>
333. Steering Committee for the Review of Government Service Provision (2014) *Overcoming Indigenous disadvantage: key indicators 2014: Table 11A.1.2.6 Alcohol induced deaths (rate per 100 000), age standardised, by sex, NSW, Queensland, WA, SA and the NT, 2008–2012*. Canberra: Productivity Commission
334. Degenhardt L, Hall W (2012) Extent of illicit drug use and dependence, and their contribution to the global burden of disease. *The Lancet*;379(9810):55-70
335. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 15 Substance use by age, remoteness and sex [data cube]*. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%2015%20substance%20use%20by%20age,%20remoteness%20and%20sex,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&E6B1092ED1C8DC69CA257C2F00145F58&0&2012-13&27.11.2013&Latest>
336. Australian Institute of Health and Welfare (2015) *Alcohol and other drug treatment services in Australia 2013 - 14*. (AIHW Catalogue no HSE 158, Drug treatment series no. 25) Canberra: Australian Institute of Health and Welfare
337. Australian Institute of Health and Welfare (2011) *Substance use among Aboriginal and Torres Strait Islander people*. (AIHW Catalogue No IHW 40) Canberra: Australian Institute of Health and Welfare
338. Department of the Prime Minister and Cabinet (2016) *Closing the gap Prime Minister's report 2016*. Canberra: Department of the Prime Minister and Cabinet
339. Holland C (2016) *Close the Gap: progress and priorities report 2016*. Canberra: Close the Gap Campaign Steering Committee
340. Holland C (2015) *Close the gap: progress and priorities report 2015*. Sydney: Australian Human Rights Commission

Core funding is
provided by the
Australian Department
of Health

www.healthinonet.ecu.edu.au

