

Overview of Aboriginal and Torres Strait Islander health status 2018



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 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 the Australian Indigenous Health/InfoNet websites (healthinfonet.ecu.edu.au), the Alcohol and Other Drugs Knowledge Centre (aodknowledgecentre.ecu.edu.au) and Tackling Indigenous Smoking (tacklingsmoking.org.au). The research involves analysis and synthesis of data and 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 people 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 spiritualities. 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.

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

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Overview of Aboriginal and Torres Strait Islander health status, 2018

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Preface

The main purpose of the *Overview of Aboriginal and Torres Strait Islander health status* (Overview) is to provide a comprehensive summary of the most recent indicators of the health and current health status of Australia's Aboriginal and Torres Strait Islander people. The Overview 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's 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 it provides a comprehensive review of key indicators across a range of health topics, it is beyond the scope of this Overview to provide detailed information on other aspects, such as the availability and use of services (including barriers to their use) and strategies and policies related to specific health topics. Interested readers should refer to the topic-specific reviews that are available on the HealthInfoNet's website (healthinfo.net.ecu.edu.au/learn/health-facts/reviews-knowledge-exchange-products). Additional, more in depth, information about the topics summarised in this Overview is included in the corresponding sections of the HealthInfoNet's website (healthinfo.net.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.

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 2018*.



Neil Drew, Director on behalf of the HealthInfoNet team

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- the Department of Health and other funding partners 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.

Tell us what you think

We value your opinion, please let us know if you have any suggestions for improving this Overview or future editions.
(See healthinfo.net.ecu.edu.au/contact-us)



Bibdjoöl

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.

Introduction

This *Overview of Aboriginal and Torres Strait Islander health status* (Overview) provides a comprehensive summary of the most recent indicators of the health of Aboriginal and Torres Strait Islander people¹ in Australia. Where possible, information is detailed for individual states and territories: 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). The Overview 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). We continue our strong commitment to developing strengths based approaches to assessing and reporting the health of Aboriginal and Torres Strait Islander people and communities.

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 a series of special reports that bring together key information about Aboriginal and Torres Strait Islander 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.
- *Reports on government services*, produced by the SCRGSP and published annually by the Productivity Commission since 2003.

This Overview also 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 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.

¹ Very little information is available separately for Aboriginal people and Torres Strait Islander people.

Key facts

Population

- In 2018, the estimated Australian Aboriginal and Torres Strait Islander population was 778,064.
- In 2018, NSW had the highest number of Aboriginal and Torres Strait Islander people (the estimated population was 239,587 people, 31% of the total Aboriginal and Torres Strait Islander population).
- In 2018, NT had the highest proportion of Aboriginal and Torres Strait Islander people in its population, with 31% of the NT population identifying as Aboriginal and/or Torres Strait Islander.
- In 2016, around 37% of Aboriginal and Torres Strait Islander people lived in major cities.
- The Aboriginal and Torres Strait Islander population is much younger than the non-Indigenous population.

Births and pregnancy outcomes

- In 2017, there were 20,400 births registered in Australia with one or both parents identified as Aboriginal and/or Torres Strait Islander (6.6% of all births registered).
- In 2017, Aboriginal and Torres Strait Islander mothers were generally younger than non-Indigenous mothers; the median age was 25.6 years for Aboriginal and Torres Strait Islander mothers and 31.3 years for all mothers.
- In 2017, total fertility rates were 2,329 births per 1,000 for Aboriginal and Torres Strait Islander women and 1,741 per 1,000 for all women.
- In 2016, the average birthweight of babies born to Aboriginal and Torres Strait Islander mothers was 3,216 grams compared with 3,342 grams for babies born to non-Indigenous mothers.
- In 2016, the proportion of low birthweight babies (LBW) born to Aboriginal and Torres Strait Islander women was twice that of non-Indigenous women (12% compared with 6.3%).
- For 2006 to 2016 there was a slight decrease in the proportion of LBW babies born to Aboriginal and Torres Strait Islander mothers.

Mortality

- For 2017, the age-standardised death rate for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT was 9.8 per 1,000, 1.8 times the rate for non-Indigenous people.
- Between 1998 and 2015, there was a 15% reduction in the death rates for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT.
- For Aboriginal and Torres Strait Islander people born 2015-2017, life expectancy was estimated to be 71.6 years for males and 75.6 years for females, around 8-9 years less than the estimates for non-Indigenous males and females.
- For 2015-2017, age-specific death rates were higher for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT than for non-Indigenous people across all age-groups, and were much higher in the young and middle-adult years.
- For 2015-2017, the infant mortality rate was twice as high for Aboriginal and Torres Strait Islander infants than for non-Indigenous infants living in NSW, Qld, WA, SA and the NT; in 2015-2017, the rate for Aboriginal and Torres Strait Islander infants was highest in the NT.
- In 2017, the leading causes of death among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT were coronary heart disease, diabetes, chronic lower respiratory diseases and lung and related cancers.
- For 2012-2016, the maternal mortality ratio for Aboriginal and Torres Strait Islander women was 31.6 deaths per 100,000 women who gave birth, 4.6 times higher than the ratio for non-Indigenous women.
- For 1998-2015, in NSW, Qld, WA, SA and the NT there was a 32% decline in the death rate from avoidable causes for Aboriginal and Torres Strait Islander people aged 0-74 years.

Hospitalisation

- In 2016-17, 4.7% of all hospital separations were for Aboriginal and Torres Strait Islander people.
- In 2016-17, the age-adjusted separation rate for Aboriginal and Torres Strait Islander people was 2.6 times higher than for non-Indigenous people.

- In 2016-17, the main cause of hospitalisation for Aboriginal and Torres Strait Islander people was for 'factors influencing health status and contact with health services' (mostly for care involving dialysis), responsible for 49% of all Aboriginal and Torres Strait Islander separations.
- In 2016-17, the rate of overall potentially preventable hospitalisations was 2.9 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Selected health conditions

Cardiovascular health

- 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 reported as being 1.2 times more common for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2016-17, after age-adjustment, Aboriginal and Torres Strait Islander people were hospitalised for cardiovascular disease (CVD) at 1.7 times the rate of non-Indigenous people.
- In 2017, ischaemic heart disease (CHD) was the leading cause of death of Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT; the age-adjusted death rate due to CHD for Aboriginal and Torres Strait Islander people was 1.8 times the rate for non-Indigenous people.
- For 1998 to 2015, the gap in CVD mortality rates between Aboriginal and Torres Strait Islander and non-Indigenous people narrowed.
- In 2011, CVD was the third largest contributor (12%) to total disease burden among Aboriginal and Torres Strait Islander people.

Cancer

- For 2009-2013, age-adjusted cancer incidence rates were 1.1 times higher for Aboriginal and Torres Strait Islander people living in NSW, Vic, Qld, WA and the NT than for non-Indigenous people.
- For 2009-2013, the most common cancers diagnosed among Aboriginal and Torres Strait Islander people living in NSW, Vic, Qld, WA and the NT were lung cancer and breast (females) cancer.
- Survival rates indicate that of the Aboriginal and Torres Strait Islander people living in NSW, Vic, Qld, WA, and the NT who were diagnosed with cancer between 2007 and 2014, 50% had a chance of surviving five years after diagnosis. This compared with a relative survival rate of 65% for non-Indigenous people.
- In 2016-17, age-adjusted hospitalisation rates for cancer were lower for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- For 2011-2015, the age-adjusted death rate for cancer for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT was 1.4 times higher than for non-Indigenous people.
- In 2011, cancer and other neoplasms (cancerous and non-cancerous tumours) were responsible for 9.4% of the total burden of disease among Aboriginal and Torres Strait Islander people.

Diabetes

- In 2012-2013, 13% of Aboriginal and Torres Strait Islander people reported having diabetes; after age-adjustment, Aboriginal and Torres Strait Islander people were 3.5 times more likely to report having some form of diabetes than non-Indigenous people.
- In 2015-16, Aboriginal and Torres Strait Islander people were more likely to have diabetes recorded as the principal cause of hospital admission compared with non-Indigenous people.
- Diabetes was the second leading cause of death for Aboriginal and Torres Strait Islander people in 2017.
- In 2011, diabetes accounted for 4% of the burden of disease among Aboriginal and Torres Strait Islander people.

Social and emotional wellbeing

- In 2012-2013, 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 2014-2015, 68% of Aboriginal and Torres Strait Islander people aged 15 years and over and 67% of children aged 4-14 years experienced at least one significant stressor in the previous 12 months.
- In 2012-2013, 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 2014-2015, more than half of Aboriginal and Torres Strait Islander people aged 15 years and over reported an overall life satisfaction rating of at least 8 out of 10.
- In 2016-17, there were 21,167 hospital separations with a principal diagnosis of International Classification of Diseases (ICD) 'mental and behavioural disorders' identified as Aboriginal and/or Torres Strait Islander.
- In 2017, 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 twice the rate reported for non-Indigenous people.

Kidney health

- For 2011-2015, after age-adjustment, the notification rate of end-stage renal disease was 6.8 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2015-16, 'care involving dialysis' was the most common reason for hospitalisation among Aboriginal and Torres Strait Islander people.
- For 2012-2016, the age-adjusted death rate from kidney disease was 2.6 times higher for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and NT than for non-Indigenous people.
- In 2011, kidney and urinary diseases accounted for 2.5% of the total burden of disease among Aboriginal and Torres Strait Islander people.

Injury, including family violence

- In 2012-2013, 2.5% of Aboriginal and Torres Strait Islander people reported having a long-term condition caused by injury; after age-adjustment the level of injury was 1.2 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2016-17, after age-adjustment, Aboriginal and Torres Strait Islander people were hospitalised for injury at almost twice the rate for non-Indigenous people.
- In 2016-17, 21% of injury-related hospitalisations among Aboriginal and Torres Strait Islander people were for falls and 19% for assaults.
- In 2017, age-adjusted death rates from intentional self-harm were 2.0 times as high for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT than for non-Indigenous people, land transport accidents 2.4 times higher and accidental poisoning 2.8 times higher.
- In 2011, injury was responsible for 15% of the total burden of disease among Aboriginal and Torres Strait Islander people

Respiratory health

- In 2012-2013, 31% of Aboriginal and Torres Strait Islander people reported having a long-term respiratory condition. After age-adjustment, the level of respiratory disease was 1.2 times higher for Aboriginal and Torres Strait Islander than for non-Indigenous people.
- In 2012-2013, 18% of Aboriginal and Torres Strait Islander people reported having asthma.
- In 2014-15, age-adjusted hospitalisation rates for Aboriginal and Torres Strait Islander people were 5.0 times higher for chronic obstructive pulmonary disease, 3.1 times higher for influenza and pneumonia, 2.1 times higher for whooping cough and 1.8 times higher for asthma and acute upper respiratory infections, than for non-Indigenous people.
- In 2017, chronic lower respiratory disease was the third highest cause of death overall for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT.
- For 1998 to 2015, age-adjusted death rates for respiratory disease in NSW, Qld, WA, SA and NT significantly declined for Aboriginal and Torres Strait Islander people.
- In 2011, respiratory diseases were responsible for 7.9% of the total burden of disease among Aboriginal and Torres Strait Islander people.

Eye health

- In 2015-2016, after age-adjustment, vision impairment and blindness among Indigenous adults were both three times higher than in non-Indigenous adults.
- In 2014-2015, 13% of Aboriginal and Torres Strait Islander children, aged 4-14 years, were reported to have eye or sight problems.
- In 2012-2013, eye and sight problems were reported by 33% of Aboriginal people and 34% of Torres Strait Islander people.

- In 2012-2013, myopia, hyperopia, cataracts and blindness for Aboriginal and Torres Strait Islander people were reported at 0.8, 1.1, 1.4 and 7.4 times the proportions for non-Indigenous people.
- In 2017, 91 cases of trachoma were detected among Aboriginal and Torres Strait Islander children aged 5-9 years living in at-risk communities in WA (47), SA (15) and the NT (29).
- For 2014-2016, 61% of hospitalisations for diseases of the eye among Aboriginal and Torres Strait Islander people were for disorders of the lens (mainly cataracts).

Ear health and hearing

- In 2014-2015, ear and hearing problems were reported for 8.4% of Aboriginal and Torres Strait Islander children aged 0-14 years.
- In 2012-2013, ear and hearing problems were reported by 12% of Aboriginal and Torres Strait Islander people.
- In 2016-17, the hospitalisation rate for middle ear and mastoid conditions for Aboriginal and Torres Strait Islander people was 1.4 times higher than the rate for non-Indigenous people.
- In 2011, hearing and vision disorders were responsible for 1.2% of the total burden of disease among Aboriginal and Torres Strait Islander people, with hearing disorders comprising 79% of this burden.

Oral health

- In 2014-2015, the proportion of Aboriginal and Torres Strait Islander children aged 4-14 years with reported tooth or gum problems was 34%, a decrease from 39% in 2008.
- In 2012-2014, 61% of Aboriginal and Torres Strait Islander children aged 5-10 years had experienced tooth decay in their baby teeth compared with 41% of non-Indigenous children, and 36% of Aboriginal and Torres Strait Islander children aged 6-14 years had experienced tooth decay in their permanent teeth compared with 23% of non-Indigenous children.
- In 2012-2013, around 49% of adults reported no tooth loss; around 47% had lost one or more teeth; and around 5% reported complete tooth loss.
- In 2014-15, age-adjusted national potentially preventable hospitalisation rates for dental conditions were 1.3 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Disability

- In 2016, 6.7% of Aboriginal and Torres Strait Islander people with a profound or severe disability reported a need for assistance.
- In 2015, 24% of Aboriginal and Torres Strait Islander people living in non-remote areas reported living with a disability, compared with 18% of non-Indigenous people; after age-adjustment, the rate of disability for Aboriginal and Torres Strait Islander was 1.8 times the rate for non-Indigenous people.
- In 2016-17, 6.1% of disability service users were Aboriginal and Torres Strait Islander people, with most aged under 50 years (85%).
- In 2016-17, 1,583 Aboriginal and Torres Strait Islander National Disability Agreement service users transitioned to the National Disability Insurance Scheme

Communicable diseases

- In 2017, Aboriginal and Torres Strait Islander people had higher crude notification rates for chlamydia, gonorrhoea and syphilis than non-Indigenous people.
- In 2017, there were 31 cases of newly diagnosed human immunodeficiency virus (HIV) infection among Aboriginal and Torres Strait Islander people in Australia. Age-adjusted notification rates of HIV diagnosis were 1.6 times higher for Aboriginal and Torres Strait Islander people than non-Indigenous people.
- In 2017, there were 1,201 Aboriginal and Torres Strait Islander people diagnosed with hepatitis C (HCV) in Australia. The age-adjusted notification rate for HCV was 4.4 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2017, there were 151 Aboriginal and Torres Strait Islander people diagnosed with hepatitis B (HBV) in Australia. The age-adjusted notification rate for HBV was 2.3 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- For 2013-2015, there were 594 Aboriginal and Torres Strait Islander people diagnosed with invasive pneumococcal disease (IPD). The age-standardised notification rate of IPD for Aboriginal and Torres Strait Islander people was 6.4 times higher compared with non-Indigenous people.

- In 2014, there were with 21 cases of invasive meningococcal disease identified as Aboriginal in Australia. For 2006-2015, the incidence rate of meningococcal serogroup B was 3.8 times higher among Aboriginal and Torres Strait Islander people compared with non-Indigenous people.
- For 2010-2014, there were 172 notifications of TB identified as Indigenous in Australia. The age-adjusted notification rate for tuberculosis was 9.0 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- For 2012-2014, there were nine Aboriginal and Torres Strait Islander people diagnosed with invasive *Haemophilus influenzae* type b (Hib) in Australia. The average notification rate for Hib among Aboriginal and Torres Strait Islander people was 5.3 times the rate in the total population.
- For 2009-2012, in remote NT communities, scabies was detected in almost 17% of Aboriginal and Torres Strait Islander children who had impetigo (skin sores, pyoderma).

Factors contributing to Aboriginal and Torres Strait Islander health

Environmental health

- In 2016, 18% of Aboriginal and Torres Islander people were reported living in overcrowded households.
- In 2016, 72% of Aboriginal and Torres Strait Islander households reported living in houses of an acceptable standard.
- In 2014-2015, 26% of Aboriginal and Torres Strait Islander households reported structural issues within their dwelling, a reduction from 2012-2013 when the reported level was 35%.
- In 2014-2015, over 90% of Aboriginal and Torres Strait Islander households reported that they had access to working facilities for: washing people, clothes and bedding; preparing food; and sewerage facilities.
- In 2014-15, after age adjustment, Aboriginal and Torres Strait Islander people were hospitalised for diseases related to environmental health at 2.3 times the rate of non-Indigenous people.
- For 2010-2014, Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT died as a result of diseases associated with poor environmental health at 1.7 times the rate of non-Indigenous people.

Nutrition and breastfeeding

- In 2012-2013, 54% of Aboriginal and Torres Strait Islander people reported eating an adequate amount of fruit per day but only 8% reported eating an adequate amount of vegetables per day.
- In 2012-2013, on average, Aboriginal and Torres Strait Islander people consumed 41% of their total daily energy in the form of discretionary foods (i.e. confectionary, snack foods, soft drinks and alcohol).
- In 2012-2013, 83% of Aboriginal and Torres Strait Islander people reported consuming dairy foods daily.
- In 2012-2013, on average, Aboriginal and Torres Strait Islander people reported consuming 111 grams of sugar daily.
- In 2012-2013, the average daily sodium intake was similar for Aboriginal and Torres Strait Islander people and non-Indigenous people, approximately one teaspoon of salt.
- In 2012-2013, 22% of Aboriginal and Torres Strait Islander people reported running out of food or unable to buy food.
- In 2011, the joint effect of all dietary risks combined (13 identified) contributed 9.7% to the burden of disease for Aboriginal and Torres Strait Islander people.
- In 2014-2015, 80% of Aboriginal and Torres Strait Islander children aged 0-3 years had been breastfed.
- Aboriginal Family Birthing program services have a positive impact on rates of breastfeeding of Aboriginal and Torres Strait Islander infants.

Physical activity

- In 2012-2013, 47% of Aboriginal and Torres Strait Islander adults in non-remote areas, and 55% in remote areas, met the target of 30 minutes of moderate intensity physical activity on most days.
- In 2012-2013, 48% of Aboriginal and Torres Strait children in non-remote areas, aged 5-17 years, met the recommended amount of physical activity compared with 35% of non-Indigenous children.

Bodyweight

- In 2012-2013, 69% 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.
- In 2012-2013, around 30% of Aboriginal and Torres Strait Islander children aged 2-14 years were overweight or obese; after age-adjustment, the level of obesity/overweight was 1.2 times higher for Aboriginal and Torres Strait Islander children than for non-Indigenous children.

Immunisation

- In September 2018, 97% of Aboriginal and Torres Strait Islander 5 year old children were fully immunised against the recommended vaccine-preventable diseases, compared with 95% non-Indigenous 5 year old children.

Tobacco use

- In 2014-2015, 39% of Aboriginal and Torres Strait Islander people aged 15 years and over reported they were current smokers; after age-adjustment, this proportion was 2.8 times higher than the proportion among non-Indigenous people.
- In 2016, 43% of Aboriginal and Torres Strait Islander mothers reported smoking during pregnancy, down from 50% in 2009.
- Between 2008 and 2014-2015, the highest reduction in daily smoking was in younger age groups 15-24 years (39% to 31%) and 25-34 years (53% to 45%).
- In 2011, tobacco use was the leading cause of the burden of disease among Aboriginal and Torres Strait Islander people, responsible for 12% of the total burden of disease.

Alcohol use

- In 2014-2015, 38% of Aboriginal and Torres Strait Islander adults reported abstaining from alcohol.
- For 2010 to 2016, there was a decline (32% to 20%) in the proportion of Aboriginal and Torres Strait Islander people aged 12 years and over who exceeded the 2009 guidelines for lifetime risk (two standard drink/day).
- There was a reported 50% reduction of mothers of Aboriginal and Torres Strait Islander children who drank through pregnancy, from 20% in 2008 to 9.8% in 2014-2015.
- For 2014-15, after age-adjustment, for a principal diagnosis related to alcohol use, Aboriginal and Torres Strait Islander males were hospitalised at 4.0 times and females at 3.4 times the rates of non-Indigenous males and females.
- For 2013-2017, the age-adjusted death rates for alcohol-related deaths for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT was five times higher than for non-Indigenous people.
- In 2011, alcohol use was responsible for 8.3% of the total burden of disease among Aboriginal and Torres Strait Islander people.

Illicit drug use

- In 2014-2015, 69% of Aboriginal and Torres Strait Islander people aged 15 years and older and in 2016, 73% aged 14 years and older reported they had never used illicit substances in the last 12 months.
- In 2014-2015, 30% of Aboriginal and Torres Strait Islander people aged 15 years and over and in 2016, 27% aged 14 years and older reported that they had used an illicit substance in the previous 12 months.
- In 2014-2015, hospitalisation for mental/behavioural disorders from use of amphetamines had the highest rate of separations due to drug use and was 3.7 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2010-2014, the rate of drug-induced deaths was 1.9 times higher for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT than for non-Indigenous people.
- In 2011, illicit substance use was responsible for 3.7% of the total burden of disease for Aboriginal and Torres Strait Islander people.

Volatile substance use

- In 2014-15, hospitalisation rates for poisoning and accidental poisoning from the toxic effects of organic solvents (e.g. petrol) were between 3.9 and 5.1 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Social and cultural concepts

Aboriginal people have occupied their traditional lands throughout Australia for the past 50,000 to 120,000 years and their continuity, history and cultural traditions are unrivalled in the world [1]. Torres Strait Islander people have occupied 270 islands in the Torres Strait for at least 9,000 years and now live permanently in 20 communities across mainland Australia and the Torres Strait; including two mainland communities in Far North Queensland.

Aboriginal people enjoyed a semi-nomadic lifestyle in family and community groups, moving across a defined area following seasonal changes [1]. Torres Strait Islander people had a communal village lifestyle revolving around fishing, trading and gardening. Land was and still is today a central part of Aboriginal and Torres Strait Islander customs, culture and law and is an important aspect to Aboriginal and Torres Strait Islander people's beliefs about mental, social and emotional wellbeing [2].

There are distinctive ethnic and cultural differences between Aboriginal societies, and between Aboriginal and Torres Strait Islander societies, each having their own languages and traditions [3]. Despite their differences, Aboriginal and Torres Strait Islander people have had many similar experiences relating to colonisation that have led to negative outcomes on their quality of life and their health [1, 4]. Racism, discrimination, the forced removal of children and loss of identity, language, culture and land, are some of the negative impacts that Aboriginal and Torres Strait Islander people have faced and continue to face [5].

There have been a number of positive changes towards Aboriginal and Torres Strait Islander self-determination and sovereignty. With representation in parliament, Aboriginal and/or Torres Strait Islander people now have a political voice [6]. In addition, there has been the development of a shift away from the deficit narratives that have infused (and confused) much of the debate about the health and wellbeing of Aboriginal and Torres Strait Islander people towards a strengths based approach [5]. This has come about after decades of leadership from Aboriginal and Torres Strait Islander Community Controlled Health Organisations (ACCHOs). Megan Davis, Professor of Law, University of NSW, said of ACCHOs, 'It is apparent when we look to the Aboriginal community health services sector, we can see that for decades and decades they have been leading the way already in the realisation of the most fundamental aspect of the right to self-determination: making decisions about one's health. Community control is intuitive to communities' [7].

There is now clear evidence to show that the social and cultural determinants of health add to an individual's ill health [8]. This includes such factors as their early life experiences, social and economic position in society, exposure to stress, educational attainment and exclusion from participation in society, which all have a powerful influence on their health throughout their life. Aboriginal and Torres Strait Islanders view health as a whole-of-life view that contributes to the total wellbeing of their community and not just the individual. This view also includes the concept of life-death-life.

The National Aboriginal and Torres Strait Islander Community Controlled Health Organisation (NACCHO) has adopted the World Health Organization's view to '... put people at the centre of health care and that comprehensive primary health care is central to achieving real outcomes and health benefits for Aboriginal and Torres Strait Islander people rather than a disease focused approach' [9].

Social indicators

Key national measures linked to the social determinants of health for Aboriginal and Torres Strait Islander people include education, employment and income.

Education

The 2016 Australian Census [10] indicated that the number of Aboriginal and Torres Strait Islander people completing year 12 has increased with 47% of those aged 20 to 24 years reporting that they had completed year 12, compared with 32% in 2006.

In addition for 20-24 year-olds in the 2016 Census:

- Aboriginal and Torres Strait women were more likely to have completed year 12 than men (51% compared with 43%)
- Aboriginal and Torres Strait Islander people living in urban areas were more likely to have completed year 12 compared with those living in rural areas (50% compared with 34%)
- the highest proportions of Aboriginal and Torres Strait Islander people completing year 12 were in the ACT (66%) and Qld (55%). The NT had the lowest proportion (25%).

In 2016, 37% of Aboriginal and Torres Strait Islander people aged 15 years and over had completed vocational or tertiary studies (a non-school qualification) [10]. The highest proportions of Aboriginal and Torres Strait Islander people with vocational or tertiary qualifications were in the ACT (52%), Vic (45%), NSW (40%) and Tas (40%). The NT had the lowest proportion (22%).

The number of Aboriginal and Torres Strait Islander people studying at university has increased [10]. A total of 15,395 Aboriginal and Torres Strait Islander students were attending university in 2016 compared with 7,000 students in 2006.

An ABS school report [11] showed that in 2017:

- There were 215,453 school students who identified as Aboriginal and/or Torres Strait Islander, an increase of 3.7 % from 2016.
- The retention rate for Aboriginal and Torres Strait Islander students who started secondary school in year 7 and continued through to year 12, rose from 60% in 2016 to 62% in 2017. Over the past 10 years the retention rate for Aboriginal and Torres Strait Islander secondary students increased from 47% in 2008 to 62% in 2017.

A national report on schooling in Australia [12] showed that in 2017:

- 82% of year 3 Aboriginal and Torres Strait Islander students and 76% of year 5 Aboriginal and Torres Strait Islander 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
- 83% of year 3 Aboriginal and Torres Strait Islander students and 69% of year 5 Aboriginal and Torres Strait Islander students were at or above the national minimum standard for writing, compared with 96% of year 3 non-Indigenous students and 93% of year 5 non-Indigenous students
- 77% of year 3 Aboriginal and Torres Strait Islander students and 78% of year 5 Aboriginal and Torres Strait Islander students were at or above the national minimum standard for spelling, compared with 95% of year 3 non-Indigenous students and 95% of year 5 non-Indigenous students
- 78% of year 3 Aboriginal and Torres Strait Islander students and 70% of year 5 Aboriginal and Torres Strait Islander 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
- 82% of year 3 Aboriginal and Torres Strait Islander students and 80% of year 5 Aboriginal and Torres Strait Islander 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.

Employment

According to the 2016 Australian *Census* [13]:

- almost half (47%) of Aboriginal and Torres Strait Islander people between the ages of 15 years and 64 years were employed
- 70% of Aboriginal and Torres Strait Islander people aged 15 to 24 years were either fully or partly engaged in employment, education and training
- the top three industries in which Aboriginal and Torres Strait Islander people worked were; health care and social assistance (15%), followed by public administration and safety (12%) and education and training (10%). Aboriginal and Torres Strait Islander men were most likely to be employed in construction (17%) and women were most likely to be employed in health care and social assistance (24%).

Income

In the 2016 *Census* [13]:

- 20% of Aboriginal and Torres Strait Islander people reported an equivalised² weekly income of \$1,000 or more compared to 13% in 2011 [10, 13].
- Over half (53%) of Aboriginal and Torres Strait Islander people reported an equivalised weekly household income of between \$150 and \$799. In comparison, 51% of non-Indigenous people reported an equivalised weekly household income of between \$400 and \$1,249 [10].

² Equivalised household income adjusts the actual incomes of households to make households of different sizes and compositions comparable [10].

Aboriginal and Torres Strait Islander population

The ABS has estimated³ the Aboriginal and Torres Strait Islander population at 778,064 people in 2018 (Table 1) [15]. The Aboriginal and Torres Strait Islander population accounted for 3.1% of Australia's total population of nearly 25 million [Derived from [15, 16]]. The Aboriginal and Torres Strait Islander population is highest in NSW (239,587 people), followed by Qld (223,883). The NT has the highest proportion of Aboriginal and Torres Strait Islander people among its population (31%) and Vic the lowest (0.9%).

Table 1. Estimated Aboriginal and Torres Strait Islander (Indigenous) population, by jurisdiction, Australia, 2018

Jurisdiction	Indigenous population (number)	Proportion of Australian Indigenous population (%)	Proportion of jurisdiction population (%)
NSW	239,587	31	3.0
Vic	56,528	7.3	0.9
Qld	223,883	29	4.5
WA	101,753	13	3.9
SA	43,317	5.6	2.5
Tas	28,328	3.6	5.4
ACT	7,525	1.0	1.8
NT	76,845	9.9	31
Australia	778,064	100	3.1

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

Source: Derived from ABS, 2014 [15], ABS, 2018 [16]

In 2016, more than one-third (37%) of Aboriginal and Torres Strait Islander people lived in major cities; 19% lived in remote or very remote areas [17]. In terms of specific geographical areas, more than one-half (59%) of all Aboriginal and Torres Strait Islander people counted in the 2016 Census lived in 10 of the 58 Indigenous regions⁴ [18]. The largest populations were in three regions in eastern Australia (Brisbane, NSW Central and North Coast, and Sydney-Wollongong), which accounted for 32% of the total Aboriginal and Torres Strait Islander population.

According to estimates from the 2016 Census, 91% of Indigenous people were identified as Aboriginal, 5% as Torres Strait Islanders and 4% as of both Aboriginal and Torres Strait Islander descent [17]. Around 64% of Torres Strait Islander people⁵ lived in Qld; NSW had the second largest number of Torres Strait Islander people.

The Aboriginal and Torres Strait Islander population is much younger overall than the non-Indigenous population (Figure 1) (Derived from [15, 16]). According to ABS estimates, about one third (33%) of Aboriginal and Torres Strait Islander people were aged less than 15 years, compared with 18% of non-Indigenous people. About 4.5% of Aboriginal and Torres Strait Islander people were aged 65 years or over, compared with 15% of non-Indigenous people.

Figure 1. Population pyramid of Aboriginal and Torres Strait Islander and non-Indigenous populations, 30 June 2018



Note: Excludes 90 years and older age-group.

Source: Derived from ABS, 2014 [19], ABS, 2013 [20]

³ Population estimates are released regularly by the ABS and provide a more accurate measure of the actual size of a population [14]. They are assessments of what would happen to the population if components of population change (births, deaths and migration were to hold in the future).

⁴ Indigenous regions are large geographical units loosely based on the former Aboriginal and Torres Strait Islander Commission boundaries.

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

Births and pregnancy outcomes

There have been some improvements in birth and pregnancy outcomes for Aboriginal and Torres Strait Islander mothers and babies in recent years, with an increase in the proportion of mothers attending antenatal care in the first trimester, a decrease in the rate of mothers smoking during pregnancy, and a slight decrease in the proportion of low birthweight (LBW) babies [19]. However, significant gaps remain between outcomes for Indigenous and non-Indigenous mothers and babies.

In 2017, there were 20,400 births registered in Australia with one or both parents identified as Aboriginal and/or Torres Strait Islander (6.6% of all births registered) [20]. This probably underestimates the true number as Indigenous status is not always identified, and there may be a lag in birth registrations. See Appendix 1 for a discussion of data limitations. For births registered as Indigenous: 27% recorded both parents as Aboriginal and/or Torres Strait Islander; 43% recorded only the mother as Aboriginal and/or Torres Strait Islander (including births where paternity was not acknowledged and those where the father's Indigenous status was unknown); and in 30% of registrations only the father was recorded as Aboriginal and/or Torres Strait Islander (including births where the mother's Indigenous status was unknown) [20].

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.⁶ These rates are the annual number of live births per 1,000 women in five-year age-groups from 15 to 49 years (the relatively small numbers of births to women aged less than 15 years are included in the 15-19 years age-group, similarly births to women aged over 49 are included in the 45 to 49 years age-group). The summary measure of fertility is the total fertility rate, which is the sum of age-specific fertility rates multiplied by five (since five-year age-groups are involved). It estimates the number of children that would be born to 1,000 women if each woman experienced current age-specific fertility rates at each age of her reproductive life.

Age of mothers

In 2017, Aboriginal and Torres Strait Islander women had more babies and had them at younger ages than non-Indigenous women; teenagers had 13% of the babies born to Aboriginal and Torres Strait Islander women, compared with 2.4% of those born to all mothers [20]. The median age of Aboriginal and Torres Strait Islander mothers was 25.6 years, compared with 31.3 years for all mothers. The highest fertility rate among Aboriginal and Torres Strait Islander women was among the 20-24 years age-group. In comparison, the fertility rate for all women was highest in the 30-34 years age-group (Table 2). The fertility rate of teenage Aboriginal and Torres Strait Islander women (53 babies per 1,000 women) was more than five times that of all teenage women (10 babies per 1,000).

Table 2. Age-specific fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2017

Age-group of mother (years)	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Aboriginal and Torres Strait Islander mothers							
15-19	44	43	60	76	50	54	53
20-24	116	109	148	140	119	113	126
25-29	133	129	146	140	120	94	130
30-34	91	103	106	85	73	76	92
35-39	52	63	58	55	40	40	52
40-44	11	19	14	10	9.2	6.7	12
All mothers							
15-19	9.1	6.4	15	13	8.8	32	10
20-24	41	32	56	50	41	80	43
25-29	86	84	97	97	93	93	90
30-34	117	125	113	120	116	104	119
35-39	72	80	61	71	65	61	72
40-44	16	18	13	14	13	12	15

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

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

Source: ABS, 2018 [20]

⁶ 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.

Total fertility rates

In 2017, total fertility rates were 2,329 births per 1,000 Aboriginal and Torres Strait Islander women and 1,741 per 1,000 for all women (Table 3) [20]. The highest total fertility rate for Aboriginal and Torres Strait Islander women was in Qld (2,669 babies per 1,000 women), followed by WA (2,527 per 1,000) and Vic (2,328 per 1,000).

Table 3. Total fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2017

Status of mother	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Aboriginal and Torres Strait Islander mothers	2,231	2,328	2,669	2,527	2,051	1,925	2,329
All mothers	1,708	1,724	1,772	1,825	1,684	1,909	1,741

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, 2018 [20]

Antenatal care

Antenatal care from health professionals helps pregnant women by monitoring their health, screening and providing information and support [21]. It can help with the early identification of potentially preventable risk factors that adversely affect maternal and child health outcomes, especially when care is provided during the first trimester of pregnancy [22, 23].

In 2016, pregnant Aboriginal and Torres Strait Islander women attended an average of nine antenatal visits [19].⁷ (The Department of Health recommends 10 visits for first-time pregnancy without complications and seven visits for subsequent uncomplicated pregnancies [21]). Of these women 62% attended the first antenatal visit during the first trimester of pregnancy [19]. The proportion of expectant Aboriginal and Torres Strait Islander mothers attending antenatal care in the first trimester increased from 41% in 2010 to 60% in 2016.

Birthweight

The average birthweight of babies born to Aboriginal and Torres Strait Islander mothers in 2016 was 3,216 grams, 125 grams less than the average for babies born to non-Indigenous mothers (3,342 grams) [19]. Around 12% of babies born to Aboriginal and Torres Strait Islander mothers were of LBW, compared with 6.3% of babies of non-Indigenous mothers (Table 4). LBW, defined as a birthweight of less than 2,500 grams, increases the risk of health problems and death in infancy [24]. There has been a slight decrease in the proportion of LBW babies born to Aboriginal and Torres Strait Islander mothers between 2006 and 2016 (12.4% to 11.6%).

Table 4. Proportion (%) of low birthweight babies, by sub-categories and Indigenous status, Australia, 2016

	Babies born to Aboriginal and Torres Strait Islander mothers	Babies born to non-Indigenous mothers
Low birthweight (1,500-2,499 grams)	9.5	5.4
Very low birthweight (less than 1,500 grams)	2.1	0.9
Extremely low birthweight (less than 1,000 grams)	2.1	0.8

Source: AIHW, 2018 [19]

In 2016, LBW for babies of Aboriginal and Torres Strait Islander mothers varied by remoteness from 11% of babies born in major cities to 15% in very remote areas [19].

Factors impacting on LBW include pre-term birth, socioeconomic disadvantage, the age of the mother and antenatal care [24]. A mother's nutritional status and use of tobacco during pregnancy also impact on the birthweight of her baby. Tobacco, in particular, has a major impact on birthweight. After age-adjustment, 43% of Aboriginal and Torres Strait Islander mothers and 12% of non-Indigenous mothers reported smoking during pregnancy in 2016 [19]. The proportion of Aboriginal and Torres Strait Islander mothers who smoked during pregnancy has decreased from 50% in 2009 to 43% in 2016.

The impact of tobacco smoking during pregnancy can be seen in the proportions of LBW babies [25]. For 2012-2014, excluding pre-term and multiple births, 51% of LBW births to Aboriginal and Torres Strait Islander mothers were attributable to smoking during pregnancy, compared with 16% for other mothers. 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 40%.

⁷ This excludes very pre-term births.

Mortality

There were 3,250 deaths in Australia in 2017 where the deceased person was identified as Aboriginal and/or Torres Strait Islander [26] (Table 5). See Appendix 1 for discussion of data limitations.

Table 5. Numbers and proportions (%) of Aboriginal and Torres Strait Islander deaths, Australia, 2017

Jurisdiction	Number of deaths	Proportion of deaths in jurisdiction %
NSW	857	1.6
Vic	186	0.5
Qld	897	2.8
WA	508	3.5
SA	222	1.6
Tas	52	1.1
NT	504	46
ACT	22	0.9
Australia	3,250	2.0

Source: ABS, 2018 [26]

In 2017, there were 971 deaths for which no Indigenous status was reported, representing 0.6% of registered deaths; it is very likely that some of these deaths were among Aboriginal and Torres Strait Islander people [26]. The number of deaths with no Indigenous status reported has decreased over time [27].

Age-standardised death rates

Age-standardised death rates for Aboriginal and Torres Strait Islander people are generally calculated only for NSW, Qld, WA, SA and the NT as they are the jurisdictions with adequate data quality [26]. In 2017, the age-standardised death rate for Aboriginal and Torres Strait Islander people (9.8 per 1,000) was 1.7 times the rate for non-Indigenous people (5.7 per 1,000) (Table 6). Rates for Aboriginal and Torres Strait Islander people varied by jurisdiction, with the highest rate occurring in the NT (13 per 1,000) and the lowest in NSW (7.8 per 1,000).

Table 6. Age-standardised death rates, by Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2017

Jurisdiction	Indigenous rate	Non-Indigenous rate	Rate ratio
NSW	7.8	5.7	1.4
Qld	11	5.7	1.8
WA	12	5.4	2.1
SA	9.2	6.0	1.5
NT	13	5.6	2.4
Selected jurisdictions	9.8	5.7	1.7

Notes: 1 Rates are per 1,000 population.

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

3 Due to the incomplete identification of Indigenous status, these figures probably underestimate the true difference between Indigenous and non-Indigenous rates.

4 Rates are based on three year averages; for Aboriginal and Torres Strait Islander data, rates are calculated for each calendar year and then averaged to reduce variability in annual rates.

5 Rounding may result in inconsistencies in calculated ratios

Source: ABS, 2018 [26]

For 2015-2017 in NSW, Qld, WA, SA and the NT, the age-standardised death rate for Aboriginal and Torres Strait Islander people was 9.8 per 1,000 population compared with 9.9 per 1,000 population in 2005-2007 [26]. Between 2005-2007 and 2015-2017, age-standardised death rates decreased for Aboriginal and Torres Strait Islander males (from 11.3 to 10.8 per 1,000), while the rate increased for females (from 8.7 to 8.9 per 1,000).

Between 1998 and 2015, there was a 15% reduction in the age-standardised death rates for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT; there was, however, no significant change in the gap in death rates between Aboriginal and Torres Strait Islander and non-Indigenous people [25].

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 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 Aboriginal and Torres Strait Islander deaths, including sex and age, to a 'standard' population [28]. In Australia, currently 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) [28]. 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.

Expectation of life

In 2018 the ABS published revised estimates for expectation of life at birth for Aboriginal and Torres Strait Islander people [29]. According to these estimates, Aboriginal and Torres Strait Islander males born in Australia in 2015-2017 could expect to live to 71.6 years, 8.6 years less than the 80.2 years expected for non-Indigenous males. The expectation of life at birth of 75.6 years for Aboriginal and Torres Strait Islander females was 7.8 years less than the expectation of 83.4 years for non-Indigenous females. Revised estimates were also published for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT (Table 7).

Table 7. Expectation of life at birth in years, by Indigenous status and sex, selected jurisdictions, Australia, 2015-2017

Jurisdiction	Indigenous status/sex		
	Indigenous	Non-Indigenous	Difference
Males			
NSW	70.9	80.2	9.4
Qld	72.0	79.8	7.8
WA	66.9	80.3	13.4
NT	66.6	78.1	11.5
Australia (headline)	71.6	80.2	8.6
Females			
NSW	75.9	83.5	7.6
Qld	76.4	83.2	6.7
WA	71.8	83.8	12.0
NT	69.9	82.7	12.8
Australia (headline)	75.6	83.4	7.8

Notes: 1 These estimates are based on the average number of Aboriginal and Torres Strait Islander deaths registered in 2015-2017 adjusted for under-identification and over-identification of Indigenous status in registrations. Final Aboriginal and Torres Strait Islander population estimates are based on the 2016 Census.

2 Australian estimates are based on deaths in all states and territories.

3 Differences are based on unrounded estimates

Source: ABS, 2018 [29]

Life expectancy for Aboriginal and Torres Strait Islander people varied considerably by remoteness of residence [29]. Aboriginal and Torres Strait Islander males living in major cities had a life expectancy of 72.1 years in 2015-2017, compared with 65.9 years for those living in remote and very remote areas. For women, the figures were 76.5 years for major cities and 69.6 years for remote and very remote areas (Table 8).

Table 8. Expectation of life at birth in years, by Indigenous status and remoteness, Australia, 2015-2017

Remoteness	Aboriginal and Torres Strait Islander		Non-Indigenous		Difference	
	Females	Males	Females	Males	Males	Females
Major cities	72.1	76.5	80.7	83.7	8.6	7.2
Inner and outer regional	70.0	74.8	79.1	82.8	9.1	8.0
Remote and very remote	65.9	69.6	79.7	83.6	13.8	14.0

Notes: 1 These estimates are based on the average number of Aboriginal and Torres Strait Islander deaths registered in 2015-2017 adjusted for under-identification and over-identification of Indigenous status in registrations. Aboriginal and Torres Strait Islander population estimates are based on the 2016 Census.

2 Differences are based on unrounded estimates.

Source: ABS, 2018 [29]

Since 2010-2012, life expectancy for Aboriginal and Torres Strait Islander people has increased (2.5 years for males and 1.9 years for females) [29]. There was also a slight narrowing in the life expectancy gap between Aboriginal and Torres Strait Islander and non-Indigenous people (2.0 years for males and 1.7 years for females) over the same period.

Age at death

In 2015-2017, the median age at death⁸ for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT was 59.3 years; this was an increase from 54.8 years in 2005-2007 [26]. Since 2005-2007, the median age at death has increased for Aboriginal and Torres Strait Islander males (from 51.8 to 56.7 years in 2015-2017) and females (58.7 years to 62.3 years) (Table 9).

Table 9. Median age at death, by Indigenous status and sex, NSW, Qld, WA, SA and the NT, 2015-2017

Jurisdiction	Indigenous			Non-Indigenous		
	Males	Females	Persons	Males	Females	Persons
NSW	59.2	66.0	61.9	79.5	85.5	82.5
Qld	58.2	64.0	61.0	77.9	84.3	80.9
WA	53.5	58.2	55.8	78.4	84.8	81.4
SA	54.4	62.9	57.8	80.1	86.0	83.2
NT	54.4	59.2	56.8	68.9	72.9	70.1
Selected jurisdictions	56.7	62.3	59.3	78.9	85.2	82.0

Notes: 1 Information is not available for the other jurisdictions because of the relatively small numbers of deaths recorded.

2 Median age of death is the age below which 50% of deaths occur.

Source: ABS, 2018 [26]

In 2015-2017 in NSW, Qld, WA, SA, and the NT, age-specific death rates were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people across all age-groups [26]. The rate ratios were highest in the young and middle-adult years.

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 2015-2017, the Aboriginal and Torres Strait Islander IMR was 6.2 per 1,000; this was twice as high as the non-Indigenous IMR (3.1 per 1,000) [26]. In 2015-2017, the IMR for Aboriginal and Torres Strait Islander infants was highest in the NT (14 per 1,000) (Table 10).

Table 10. Infant mortality rates, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2015-2017

Jurisdiction	Indigenous			Non-Indigenous			Rate ratio		
	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
NSW	4.7	4.0	4.3	3.1	2.6	2.8	1.5	1.5	1.5
Qld	6.6	6.6	6.6	4.2	3.6	3.9	1.6	1.8	1.7
WA	7.2	5.5	6.3	2.6	1.9	2.2	2.8	2.9	2.9
SA	5.8	2.7	4.7	3.2	2.8	3.0	1.8	1.0	1.6
NT	13	15	14	3.6	4.3	4.3	3.6	3.4	3.2
Selected jurisdictions	6.4	6.0	6.2	3.3	2.8	3.1	1.9	2.1	2.0

Notes: 1 Infant mortality rate is the number of infant deaths per 1,000 live births.

2 Rates are based on three year averages; for Aboriginal and Torres Strait Islander data, rates are calculated for each calendar year and then averaged to reduce variability in annual rates.

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

4 The Indigenous rates are likely to be underestimated, due to the incomplete identification of Indigenous status on births and deaths records.

5 Due to the small number of deaths registered in Vic, Tas and the ACT, these jurisdictions have been excluded.

Source: ABS, 2018 [26]

Between 1998 and 2015, the Aboriginal and Torres Strait Islander IMR has more than halved (from 13.5 to 6.3 per 1,000) [25]. The gap between Aboriginal and Torres Strait Islander and non-Indigenous IMR has narrowed significantly (by 84%).

In the five-year period 2011-2015, 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 fetal growth, and complications from pregnancy, labour and delivery, and respiratory and cardiovascular disorders specific to the perinatal period [25]. This accounted for half (51%) of all Aboriginal and Torres Strait Islander infant deaths. The second major cause was ICD 'Symptoms, signs and ill-defined conditions, which included sudden infant death syndrome (SIDS), and accounted for 21% of Aboriginal and Torres Strait Islander infant deaths.

⁸ 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.

Causes of death

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 2017 [30]. For Aboriginal and Torres Strait Islander people, the mortality rate for CHD was 1.8 times the rate for non-Indigenous people. The other leading specific causes of death of Aboriginal and Torres Strait Islander people were diabetes (rate ratio: 5.2), chronic lower respiratory disease (rate ratio: 2.9) and lung and related cancers (rate ratio: 2.2). For non-Indigenous people, the leading cause of death was CHD, followed by dementia, cerebrovascular diseases and lung and related cancers.

In 2017, the leading cause of death for both Aboriginal and Torres Strait Islander males and females living in NSW, Qld, WA, SA and the NT was CHD [30]. The next leading causes of death for males were suicide and lung and related cancers; for females they were diabetes and chronic lower respiratory disease.

For 2011-2015, cardiovascular disease was the leading cause of death of Aboriginal and Torres Strait Islander people, being responsible for 24% of the deaths of those living in NSW, Qld, WA, SA and the NT [25]. The next most common causes of death were ICD 'Neoplasms' (mainly cancers) which were responsible for 21% of deaths, followed by ICD 'External causes' (injury) (15%) (Table 11).

Table 11. Proportions 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, 2011-2015

Cause of death	Proportions	Rate	Rate ratio
Cardiovascular diseases	24	271	1.6
Neoplasms	21	232	1.4
External causes	15	81	2.1
Endocrine, metabolic and nutritional disorders	8.8	101	4.5
<i>Diabetes</i>	7.6	87	5.6
Respiratory diseases	8.3	101	2.0
Digestive disorders	5.5	46	2.3
Nervous system diseases	2.5	26	0.9
Infectious and parasitic diseases	2.5	21	2.0
Kidney diseases	2.0	24	2.6
Conditions in the perinatal period	2.0	4.7	2.0

Notes: 1 Rates are deaths per 100,000.

2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate (not shown).

Source: Australian Health Ministers' Advisory Council, 2017 [25]

Between 1998 and 2015, mortality rates for Aboriginal and Torres Strait Islander people have declined for cardiovascular diseases and respiratory diseases; there was also a decline in the mortality rate for kidney disease between 2006 and 2015 [25].

Maternal mortality

Maternal deaths refer to deaths of women during pregnancy or up to 42 days after delivery [31]. Direct maternal deaths refer to those resulting from obstetric complications (including in pregnancy, labour, and in the 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 who reached at least 20 weeks gestation; this result is then multiplied by 100,000 [31].

In Australia between 2012-2016, 12 of the 96 maternal deaths reported were of Aboriginal and Torres Strait Islander women (Indigenous status was not reported in seven of the deaths) [31]. Of these, 12 Aboriginal and Torres Strait Islander maternal deaths, six were direct and six were indirect (Table 12). The MMR for Aboriginal and Torres Strait Islander women was 31.6 deaths per 100,000 women who gave birth, 4.6 times higher than the ratio of 6.9 per 100,000 for non-Indigenous women.

Between 2000-2014, the leading causes of Aboriginal and Torres Strait Islander women MMRs were cardiovascular conditions (MMR of 3.9 per 100,000), suicide (3.2 per 100,000), hypertensive disorders and sepsis (both 2.6 per 100,000) [32].

Expectation of life

In 2018 the ABS published revised estimates for expectation of life at birth for Aboriginal and Torres Strait Islander people [29]. According to these estimates, Aboriginal and Torres Strait Islander males born in Australia in 2015-2017 could expect to live to 71.6 years, 8.6 years less than the 80.2 years expected for non-Indigenous males. The expectation of life at birth of 75.6 years for Aboriginal and Torres Strait Islander females was 7.8 years less than the expectation of 83.4 years for non-Indigenous females. Revised estimates were also published for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT (Table 7).

Table 12. Numbers of women who gave birth and maternal deaths, and maternal mortality ratios, by Indigenous status, Australia, 2012-2016

Indigenous status	Number of women who gave birth	Maternal deaths	Maternal mortality ratio
Aboriginal and Torres Strait Islander	52,823	12	31.6
Direct maternal deaths		6	15.6
Indirect maternal deaths		6	16.0
Non-Indigenous	1,298,836	77	6.9
Direct maternal deaths		40	3.3
Indirect maternal deaths		37	3.6

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 the small number of deaths and some uncertainty about the numbers of Indigenous deaths and confinements, some caution must be exercised in the interpretation of the ratios.

3 Data not available for WA for all years and for the NT for 2015-2016.

4 Directly age standardised to the Australian female population aged 15-44 at 30 June 2001.

Source: AIHW, 2018 [31]

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) [25].

In the five-year period 2011-2015, there were 6,427 deaths from avoidable causes among Aboriginal and Torres Strait Islander people aged 0-74 years living in NSW, Qld, WA, SA and the NT [25]. Age-adjusted rates for avoidable deaths were highest in the NT (629 per 100,000) and lowest in NSW (244 per 100,000). Aboriginal and Torres Strait Islander people died from avoidable causes at 3.3 times the rate of non-Indigenous people.

In 2011-2015, 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 (22%), diabetes (12%), suicide (11%), and chronic obstructive pulmonary disease (COPD) (7.3%) [25]. After age-adjustment, the conditions most responsible for the avoidable mortality gap between Aboriginal and Torres Strait Islander and non-Indigenous people were CHD (26% of the gap), diabetes (19% of the gap) and COPD (11% of the gap).

Between 1998 and 2015, there was a 32% 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 [25].

Hospitalisation

Statistics on hospitalisation provide some insights into ill health in the population [33]. 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. 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 (See Appendix 1).

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 [33]. Multiple admissions by a relatively small number of patients - as occurs for kidney 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.

Separation rates

Of the more than 11 million hospital separations in Australia⁹ during 2016-17, there were 521,936 (4.7%) identified as Aboriginal and Torres Strait Islander (Table 12) [34]. Around 93% of these hospital separations were for Aboriginal people, 3.8% were for Torres Strait Islander people, and 3.7% were for people who identified as being of both Aboriginal and Torres Strait Islander descent.

In 2016-17, the overall age-standardised separation rate of 1,047 separations per 1,000 population for Aboriginal and Torres Strait Islander people was 2.6 times that for non-Indigenous people (Table 13) [34]. The vast majority (80%) of the difference in hospitalisation rates between these two populations is due to the markedly higher separation rates for dialysis among Aboriginal and Torres Strait Islander people. The highest age-standardised separation rate was for Aboriginal and Torres Strait Islander people living in the NT (2,222 per 1,000), 5.6 times the rate for non-Indigenous people.

⁹ 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 Aboriginal and Torres Strait Islander: non-Indigenous rate ratios, 2016-17

Jurisdiction	Aboriginal and Torres Strait Islander		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	106,990	651	3,117,278	374	1.7
Vic	26,739	746	2,790,359	422	1.8
Qld	128,914	921	2,368,316	471	2.0
WA	110,924	1,816	1,048,824	403	4.5
SA	26,253	910	730,612	377	2.4
NT	110,615	2,222	48,196	398	5.6
Australia	521,936	1,047	10,491,879	409	2.6

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 separately for public hospitals in Tas or the ACT, but included in totals where applicable.
5 The incomplete identification of Indigenous status means that these figures probably underestimate the true difference between Indigenous and non-Indigenous rates.

Source: Burgess, Gilbert, McIntyre, and Mole, 2018 [34]

Age-specific separation rates

In 2013-15 after age-adjustment, hospital separation rates (excluding dialysis) were higher for Aboriginal and Torres Strait Islander people than those for non-Indigenous people in all age-groups except for the 65 years and over age-group (Table 14) [25].

Table 14. Age-specific hospital separation rates (excluding dialysis), by sex and Indigenous status, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, Australia, 2013-15

Age-group (years)	Males			Females		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0-4	343	268	1.3	269	204	1.3
5-14	105	97	1.1	95	81	1.2
15-24	140	130	1.1	356	228	1.6
25-34	222	138	1.6	486	360	1.3
35-44	357	195	1.8	460	339	1.4
45-54	478	285	1.7	492	339	1.4
55-64	578	477	1.2	599	461	1.3
65+	852	1,002	0.9	832	864	1.0

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

Source: Australian Health Ministers' Advisory Council, 2017 [25]

The Council of Australian Governments (COAG) has set targets to improve wellbeing and reduce disadvantage among Aboriginal and Torres Strait Islander people; one strategic area for action is early childhood development, which uses early childhood hospitalisations as an indicator [5]. In 2014-15, Aboriginal and Torres Strait Islander children aged 0-4 years were hospitalised at a rate of 310 per 1,000, 1.3 times higher than the non-Indigenous rate. Hospitalisation rates for Aboriginal and Torres Strait children 0-4 years were similar in major cities and regional areas (271 and 276 per 1,000 respectively) but were almost twice as high in remote areas (468 per 1,000). In comparison, rates for non-Indigenous children decreased slightly as remoteness increased (from 240 per 1,000 to 208 per 1,000).

Causes of hospitalisation

In 2016-17, the most common reason for the hospitalisation of Aboriginal and Torres Strait Islander people in Australia was for ICD 'Factors influencing health status and contact with health services' (mostly for care involving dialysis), being responsible for 49% of Aboriginal and Torres Strait Islander separations (255,903 separations) [34]. Many of these separations involved repeat admissions for the same people. 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 Aboriginal and Torres Strait Islander people, responsible for 35,649 separations (6.8% of all separations). After ICD 'Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified', the next leading cause of hospitalisation for Aboriginal and Torres Strait Islander people were respiratory conditions (responsible for 27,567 separations) (Table 15).

Table 15. Numbers, proportions (%), and age-standardised hospitalisation rates for leading causes of hospital separations among Aboriginal and Torres Strait Islander people, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, Australia, 2016-17

Principal diagnosis (ICD)	Number of separations	Proportion of separations (%)	Age-standardised separation rate	Rate ratio
Injury, poisoning and certain other consequences of external causes	35,649	6.8	55	1.9
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	27,813	5.3	51	1.5
Diseases of the respiratory system	27,567	5.3	46	2.5
Pregnancy, childbirth and the puerperium	26,253	5.0	31	1.5
Diseases of the digestive system	24,996	4.8	44	1.1
Mental and behavioural disorders	21,167	4.1	34	1.9
Diseases of the circulatory system	14,789	2.8	35	1.7
Diseases of the genitourinary system	13,493	2.6	25	1.3
Diseases of the musculoskeletal system and connective tissue	11,713	2.2	24	0.8
Diseases of the skin and subcutaneous tissue	11,167	2.1	17	2.5
Endocrine, nutritional and metabolic diseases	8,874	1.7	17	2.5
Certain infectious and parasitic diseases	8,795	1.7	14	1.9
Neoplasms	7,931	1.5	19	0.8
Diseases of the nervous system	7,564	1.4	13	1.0
Factors including health status and contact with health services	255,903	49	590	6.7
All causes	521,936	100	1,044	2.6

Notes: 1 Hospitalisation data for the NT include only public hospitals.
2 Some principal diagnoses have been excluded.
3 Non-Indigenous includes separations for which Indigenous status was not stated.
4 Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate.

Source: Burgess, Gilbert, McIntyre, and Mole, 2018 [34]

Potentially preventable hospitalisations

Potentially preventable hospitalisations are admissions which ‘could have been avoided with access to quality primary care and preventive care’ [35]. 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 [34].

In 2016-17, the age-standardised rate of overall potentially preventable hospitalisations for Aboriginal and Torres Strait Islander people was 76 per 1,000, 2.9 higher than that for non-Indigenous people (Table 16) [34]. The highest rates for potentially preventable hospitalisations of Aboriginal and Torres Strait Islander people were for chronic conditions (37 per 1,000). The rate for vaccine-preventable conditions was 5.1 times higher for Aboriginal and Torres Strait Islander people (10 per 1,000) than for non-Indigenous people (2.0 per 1,000).

Table 16. Age-standardised separation rates for potentially preventable hospitalisations, by Indigenous status, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, Australia, 2016-17

	Aboriginal and Torres Strait Islander rate	Non-Indigenous rate	Rate ratio
Vaccine-preventable conditions	10	2.0	5.1
Acute conditions	31	13	2.5
Total chronic conditions	37	12	3.1
<i>Diabetes complications</i>	6.8	1.7	4.0
<i>Chronic conditions (excluding diabetes)</i>	30	10	2.9
Total	76	26	2.9

Note: 1 Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate.
2 Rounding may result in inconsistencies in calculated ratios.

Source: Burgess, Gilbert, McIntyre, and Mole, 2018 [34]

In 2014-15, the national rate of hospitalisation of Aboriginal and Torres Strait Islander children aged 0-4 years for potentially preventable diseases and injuries was 161 per 1,000, 1.6 times higher than the rate for non-Indigenous children [5]. The rate of hospitalisation of Aboriginal and Torres Strait Islander children was 2.5 times as high in remote areas (306 per 1,000) as it was in major cities (124 per 1,000).

Selected health conditions

Cardiovascular health

Cardiovascular disease (CVD) is the term for all diseases and conditions that affect the heart and blood vessels [36]. Specific types of CVD include CHD (or ischaemic heart disease), cerebrovascular disease (including stroke), hypertension (high blood pressure), and rheumatic heart disease (RHD) [37]. CVD presents a significant burden for Aboriginal and Torres Strait Islander people in terms of prevalence, hospitalisation, and mortality [38].

Most types of CVD (excluding RHD) are subject to the same set of modifiable or non-modifiable risk factors [39]. Modifiable behavioural factors for CVD include tobacco use, physical inactivity, poor dietary behaviour and excessive alcohol consumption [39, 40]. Modifiable biomedical factors include hypertension, high blood cholesterol, overweight and obesity. Certain related health conditions, particularly diabetes and chronic kidney disease, can also increase the risk of developing CVD [40]. Non-modifiable risk factors that can influence the risk of CVD include age, sex, family history of CVD, and ethnicity [39]. Researchers are currently considering additional risk factors for CVD for Aboriginal and Torres Strait Islander people, including sleep quality and the presence of particular types of blood fats (lipids) [41].

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 [42, 43]. ARF, which is rare among non-Indigenous Australians, is caused by an untreated bacterial (group A streptococci or GAS) infection of the throat, and possibly of the skin. 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 [42-44].

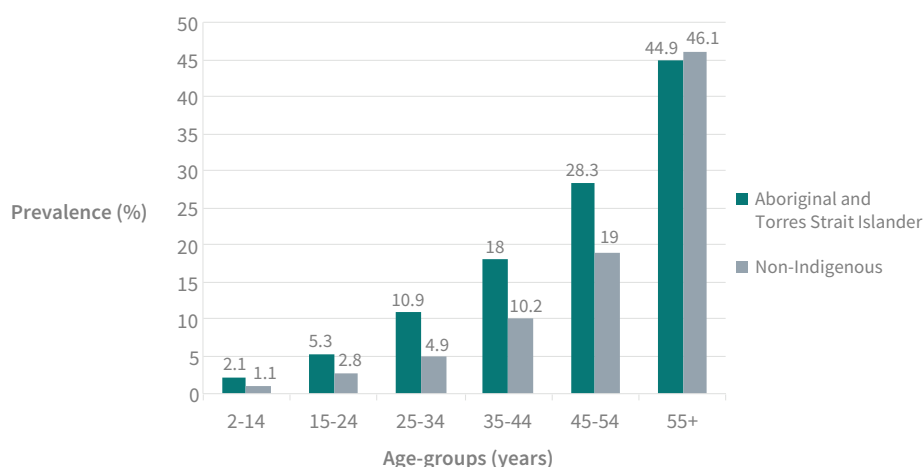
Extent of cardiovascular disease among Aboriginal and Torres Strait Islander people

Prevalence of cardiovascular disease

It was reported in the 2012-13 Aboriginal and Torres Strait Islander Health Survey (AATSIHS) that around 13% of Aboriginal and Torres Strait Islander people aged 2 years and over had CVD¹⁰ [52]. The levels of CVD for Aboriginal people¹¹ and for Torres Strait Islander people¹² were similar (13% and 12% respectively) [53].

CVD was reported more frequently by Aboriginal and Torres Strait Islander females (14%) than by Aboriginal and Torres Strait Islander males (11%) [47]. 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) [48]. 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) [49].

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



Note: Prevalence expressed as percentages

Source: ABS, 2014 [48]

¹⁰ 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.

¹¹ People of Aboriginal origin only.

¹² 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 [47]. 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'¹³ (age-adjusted rate ratios of 1.5 for males and 1.7 for females).

Table 17. Prevalence (%) of cardiovascular disease among Aboriginal and Torres Strait Islander people, by sex and disease type, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, Australia, 2012-2013

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	1.2	14	1.3

Note: 1 Prevalence expressed as percentages.

2 Rate ratios are age-standardised, and are the rates for Indigenous people divided by the rates for non-Indigenous people.

Source: ABS, 2014 [47]

Around 4% of Aboriginal and Torres Strait Islander people reported that they had 'Heart, stroke and/or vascular diseases' in 2012-2013 [45]. Heart disease, stroke and/or vascular diseases were reported in similar proportions by Aboriginal and Torres Strait Islander males and females (4.0% and 3.8% respectively) [47]. 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 [48].

Around 6% of Aboriginal and Torres Strait Islander people (5.8% of Aboriginal people and 5.3% of Torres Strait Islander people) reported that they had hypertensive heart disease [46]. 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) [47]. Hypertensive disease became prevalent from about 25 years of age onwards; 12% of Aboriginal and Torres Strait Islander people aged 25 years and over reported hypertensive heart disease with proportions ranging from 4.1% of those aged 25-34 years to 25% of those aged 55 years and over [45, 48].

The 2012-13 AATSIHS also provided data for selected risk factors for CVD [45]. 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 [50]. The self-reported information [45] and biomedical results [50] show that some CVD risk factors are more prevalent among Aboriginal and Torres Strait Islander people than among non-Indigenous people. These include: daily smoking (rate ratio: 2.6¹⁴); obesity (rate ratio: 1.6¹⁴); inadequate daily fruit and vegetable intake (rate ratios: 0.9¹⁴ and 0.8¹⁴ respectively for meeting the *Australian Dietary guidelines*); high clinically-measured blood pressure (rate ratio: 1.2¹⁵); abnormal high density lipoprotein (HDL) cholesterol (rate ratio 1.8¹⁵); high triglycerides (rate ratio: 1.9¹⁵); and dyslipidaemia¹⁶ (rate ratio: 1.1¹⁵).

Information on strokes as self-reported by non-Indigenous and Indigenous people is available from the 2016 National Eye Health Survey (NEHS)¹⁷ [51, 52]. It was found that the crude prevalence of stroke among Indigenous people aged 40 years and over was 8.8%. After age-adjustment, the prevalence was 13%, indicating Indigenous people were three times more likely to have reported stroke than non-Indigenous people [52].

Prevalence of RHD and incidence of ARF

Jurisdictional data for the prevalence of RHD and the incidence of ARF are currently only available from RHD registers for Qld, WA, SA and the NT [53]. It is not possible to directly compare data from these registers¹⁸ 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.

There were 397 cases of ARF reported in Qld, WA, SA and the NT combined in 2016 (Derived from [54]). Of these, 94% were reported for Aboriginal and Torres Strait Islander people (Derived from [54]). The crude rate of ARF for Aboriginal and Torres Strait Islander people was 87 per 100,000 population and the crude rate for other Australians was 0.3 per 100,000 population [54]. Rates were highest among Aboriginal and Torres Strait Islander children aged 0-14 years, and fell with age, being lowest among those aged over 45. Between 2013 and 2016, the rate of ARF among Aboriginal and Torres Strait Islander people rose from 53 to 87 per 100,000 population, probably reflecting an improvement in reporting and registration.

There were 3,392 people recorded as having RHD in Qld, WA, SA and the NT combined as at 31 December 2015 (derived from [55]), of which 3,129 (92%) identified as being Aboriginal and Torres Strait Islander [55]. The rate of RHD for Aboriginal and Torres Strait Islander

¹³ Which include ischaemic heart disease, stroke and other cerebrovascular disease, odema, heart failure, and disease of the arteries, arterioles and capillaries.

¹⁴ For Aboriginal and Torres Strait Islander people aged 15 years and over.

¹⁵ For Aboriginal and Torres Strait Islander people aged 18 years and over.

¹⁶ A number of different lipid disorders that may contribute to hardening or narrowing of the arteries taking blood to the heart.

¹⁷ The NEHS was a cross-sectional population-based study that included a representative sample of Indigenous people aged 40 years and older (n = 1,738 Indigenous people).

¹⁸ It is not possible to directly compare data from Qld, WA, SA and the NT as the registers are at different stages of establishment and coverage. The National Health and Medical Research Council (NHMRC)-funded End Rheumatic Heart Disease Centre of Research Excellence is currently working on a comprehensive data linkage strategy to establish a replicable overview of national ARF and RHD burden.

people was 7.4 per 1,000 population. Of Aboriginal and Torres Strait Islander people with RHD in Qld and the NT, about two-thirds were female. Of Aboriginal and Torres Strait Islander people with RHD in Qld, WA and the NT, rates were lowest for those aged 0-14 years (2.4 per 1,000 population), and highest for those aged 35-44 and 25-34 years (13 per 1,000 population).

In NSW, ARF in people of any age and RHD in people aged less than 35 years were added to the list of notifiable conditions in 2015, and a register for people with ARF/RHD established [56]. Preliminary data show that, while ARF and RHD still disproportionately affect Aboriginal and Torres Strait Islander people, a high proportion of cases in NSW are also for non-Aboriginal and non-Torres Strait Islander people [57].

A population-based survey that aimed to compare regional differences in the prevalence of RHD detected by echocardiographic screening in high-risk Aboriginal and Torres Strait Islander children (n=3,946) was conducted in four regions of northern and central Australia [58]. It found that the prevalence of definite RHD among Aboriginal and Torres Strait Islander children aged 5-15 years differed between regions, from 4.7 per 1,000 in Far North Qld to 15 per 1,000 in the Top End of the NT. The study uncovered a substantial level of previously undetected disease.

A recent surveillance¹⁹ study aimed to identify the prevalence of RHD in pregnancy in Australia [59]. It found that the rate of RHD in pregnancy in Australia was 4.3 per 10,000 women giving birth. Rates among Aboriginal and Torres Strait Islander women ranged from 7.0 per 10,000 women giving birth in NSW to 222 per 10,000 in the NT²⁰.

Hospitalisation

There were 14,789 hospital separations for CVD among Aboriginal and Torres Strait Islander people in 2016-17 [34], representing 5.6% of all Aboriginal and Torres Strait Islander hospital separations (excluding dialysis) (Derived from [34]). After age-adjustment, Aboriginal and Torres Strait Islander people were 1.7 times more likely to be hospitalised with a primary diagnosis of CVD than non-Indigenous people (at rates of 35 per 1,000 and 20 per 1,000 population respectively) [34]. In 2013-15, the gap was highest in the 35-44 years and 45-54 years age-groups, with Aboriginal and Torres Strait Islander people hospitalised at over three times the rate of non-Indigenous people after age-standardisation [55].

Age-adjusted rates of heart-related hospitalisations at the regional level²¹ are available for 2012-2016, and show that Aboriginal and Torres Strait Islander people are hospitalised at much higher rates than non-Indigenous people in some parts of Australia [60]. The gap in heart-related hospitalisations was highest in the Wheatbelt and Outback (North) regions of WA (rate ratios of 4.5 and 4.2 respectively), and lowest in Sydney's Outer West and Blue Mountains region (rate ratio 1.2). At the state and territory level, the gap was highest in WA and the NT (rate ratios of 3.5 and 3.2 respectively).

Hospitalisation rates for CVD for Aboriginal and Torres Strait Islander people in 2014-15 were highest in remote and very remote areas (27 per 1,000 population); 2.2 times higher than in major cities (12 per 1,000 population) (Derived from [5]).

In 2013-15, of specific CVDs, CHD was responsible for the highest number of hospitalisations of Aboriginal and Torres Strait Islander people (39% of CVD hospitalisations), followed by pulmonary 'and other forms of heart disease' (33%) and cerebrovascular disease (7.7%) [55]. Although ARF/RHD accounted for only 4.4% of CVD hospitalisations, it was responsible for the biggest disparity in hospitalisation rates between Aboriginal and Torres Strait Islander and non-Indigenous people of all specific CVD diagnoses (rate ratio: 7.2).

Mortality

Of all specific causes of death, CHD was the leading cause of both Aboriginal and Torres Strait Islander and non-Indigenous deaths in 2017 [30]. After age-adjustment, the death rate due to CHD for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT was 1.8 times the rate for non-Indigenous people (115 per 100,000 and 64 per 100,000 population respectively). In 2012-2016, the gap in the age-adjusted death rate due to CHD was highest in WA (rate ratio 2.7) and lowest in SA (rate ratio 1.5) of all states and territories [60].

In 2017, the death rate due to cerebrovascular diseases for Aboriginal and Torres Strait Islander people was 1.2 times the rate for non-Indigenous people (43 per 100,000 and 36 per 100,000 population respectively) [30].

In 2011-2015, about a quarter (24%) of all deaths of Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT combined were caused by CVD, making this the leading cause of death [55]. After age-adjustment, the death rate due to CVD for Aboriginal and Torres Strait Islander people was 1.6 times the rate for non-Indigenous people (271 per 100,000 and 173 per 100,000 population respectively). Of all specific CVDs, RHD accounted for the biggest difference in death rates between Aboriginal and Torres Strait Islander and non-Indigenous people (rate ratio: 4.7), while CHD caused the most deaths (55% of deaths of Aboriginal and Torres Strait Islander people from CVD) (Table 18). CHD caused the death of nearly twice as many Aboriginal and Torres Strait Islander men as women (1,135 and 607 deaths respectively).

¹⁹ Conducted under the umbrella of the Australasian Maternity Outcomes Surveillance System (AMOSS).

²⁰ The authors outlined reasons why the true prevalence of RHD is higher than documented in the study.

²¹ Heart-related hospitalisations' are the total number of hospitalisations for the diagnostic groups ST-Elevation Myocardial Infarction (STEMI), Non-ST-elevation myocardial infarction (NSTEMI), Unstable Angina and Heart Failure [60]. 'Regions' are based on the Australian Statistical Geography Standard (ASGS) according to Statistical Area Level 3 (for the ACT) and Statistical Area Level 4 (for all other states and Territories).

Table 18. Deaths from CVD, by Indigenous status and sex, NSW, Qld, WA, SA and NT, 2011-2015

CVD type	Indigenous		Non-Indigenous	Rate ratio
	% of total CVD deaths	Age-standardised rate (per 100,000)	Age-standardised rate (per 100,000)	
Ischaemic heart disease	55	138	79	1.8
Acute myocardial infarction	22	58	35	1.6
Cerebrovascular disease	17	58	43	1.3
Stroke	14	46	33	1.4
Other heart disease (I26-I52)	17	45	34	1.3
Rheumatic heart disease	3.4	6.4	1.4	4.7
Hypertension disease	4.6	15	8.1	1.8
Other diseases of the circulatory system (I70-I99)	3.3	9.3	8.4	1.1
Total CVD	100.0	271	173	1.6

Notes: 1. Directly age-standardised using the 2001 standard population.
2. Data presented for acute myocardial infarction are a subset of data presented for all ischaemic heart disease, and data presented for stroke are a subset of data presented for all cerebrovascular disease.
3. Rate ratio is the mortality rate for Indigenous people divided by the mortality rate for non-Indigenous people.
4. Rounding may result in inconsistencies in calculated ratios.

Source: AIHW, 2017 [55]

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 2013-2017 in NSW, Qld, WA, SA and the NT, the death rate for CHD was 13.3 times higher for Aboriginal and Torres Strait Islander men and women in the 25-35 years age-group, and 9.9 times higher for Aboriginal and Torres Strait Islander people in the 35-44 years age-group than for non-Indigenous people of the same ages [30].

Between 1998 and 2015, there was a 43% decrease in the mortality rate for CVD for Aboriginal and Torres Strait Islander people, and a narrowing of the gap between Indigenous and non-Indigenous Australians for this indicator [25].

Burden of disease

‘Burden of disease’ analysis quantifies the impact of a disease or injury on a population, using the disability-adjusted life years (DALY) measure. In 2011, CVD was the third biggest contributor to total disease burden among Aboriginal and Torres Strait Islander people, causing 12% of total burden [38]. CHD contributed the highest total burden of all specific diseases (7% of total burden). Based on age-standardised DALY rate differences, CVD contributed most to the gap in total burden between Aboriginal and Torres Strait Islander and non-Indigenous people (19% of the gap). Aboriginal and Torres Strait Islander people experienced total rates of burden due to CVD at 2.8 times the rate for non-Indigenous people. Although RHD contributed only 5% of DALY for the CVD group overall, it represented the largest relative difference in DALY rates for CVD between Aboriginal and Torres Strait Islander and non-Indigenous people, with a rate ratio of 6.6. Between 2003 and 2011, there was a significant reduction in the age-standardised rate of total burden due to CVD for Aboriginal and Torres Strait Islander people (from 91 to 72 DALY per 1,000 people), driven by a decrease in fatal burden from CHD and stroke.

Cancer

Cancer is the term given to a number of related diseases [61]. It is a genetic disease, arising from changes to the genes (DNA) that control the way cells behave. In all cancers, some of the cells of the body divide in an uncontrolled manner (cells normally grow and divide as the body needs them). When cancer cells spread into surrounding tissues, or to different parts of the body (metastasis) they are known as malignant [62]. Cancer can start almost anywhere in the body [61].

There is limited evidence or data available on cancer to inform initiatives to improve outcomes for Aboriginal and Torres Strait Islander people [63]. Inconsistent Indigenous identification in cancer notifications in several jurisdictions is an issue [64]. The National Aboriginal and Torres Strait Islander Cancer Framework highlights the need for improved Indigenous identification, including on pathology requests and reports [63]. It also expresses a need for routine national data collection, access and linkage to allow national monitoring and reporting, and inform strategies to improve cancer care and outcomes.

Extent of cancer among Aboriginal and Torres Strait Islander people

Incidence

For 2009-2013, there were 6,397 new cases of cancer diagnosed in Aboriginal and Torres Strait Islander people living in NSW, Vic, Qld, WA and the NT (an average of 1,279 new cases per year) [65]. Aboriginal and Torres Strait Islander people were 1.1 times more likely to be diagnosed with cancer as non-Indigenous people. After age-adjustment, the cancer incidence rate for all cancers combined was higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (501 per 100,000 and 439 per 100,000 respectively) [65]. Age-adjusted cancer incidence rates were higher for Aboriginal and Torres Strait Islander people than non-Indigenous people for: liver

cancer (rate ratio: 2.4); lung cancer (rate ratio: 2.1); cancers of unknown primary site (rate ratio: 2.1); head and neck cancer (rate ratio 1.9); cancer of the uterus (rate ratio: 1.8), and pancreatic cancer (rate ratio 1.6) (Table 19). Cancer incidence rates were the same or lower for: colorectal (bowel) cancer (rate ratio: 1.0); breast cancer (rate ratio: 0.9); non-Hodgkin lymphoma (rate ratio: 0.9); and prostate cancer (rate ratio: 0.7).

Table 19. Age-standardised incidence rates for the 10 most common cancers, by Indigenous status, and Indigenous: non-Indigenous rate ratios, NSW, Vic, Qld, WA and the NT, 2009-2013

Primary site	Aboriginal and Torres Strait Islander age-standardised rates	Non-Indigenous age-standardised rates	Rate ratio
Lung	85	41	2.1
Breast (females)	99	112	0.9
Colorectal (bowel)	53	56	1.0
Prostate (males)	108	151	0.7
Head and neck	28	15	1.9
Uterus (females)	30	17	1.8
Liver	16	6.4	2.4
Unknown primary site	19	9.1	2.1
Pancreatic cancer	17	11	1.6
non-Hodgkin lymphoma	15	17	0.9
All cancers	501	439	1.1

Notes: 1 Rates per 100,000 population, age-standardised to the Australian population at 30 June 2001.
 2 Cancers are ordered by numbers among Aboriginal and Torres Strait Islander people (not shown in table).
 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 underestimate the true difference between Aboriginal and Torres Strait Islander and non-Indigenous rates.
 5 Rounding may result in inconsistencies in calculated ratios.

Source: AIHW, 2017 [65]

For 2009-2013, detailed information²² is available for the incidence of cervical and breast cancers for Aboriginal and Torres Strait Islander females. After age-adjustment, the rate for cervical cancer for Aboriginal and Torres Strait Islander females aged 20-69 living in NSW, Vic, Qld, WA and NT was 2.2 times higher than for non-Indigenous females of the same age (19 per 100,000 and 8.5 per 100,000 respectively) [66]. For breast cancer, the age-adjusted rate was lower than for non-Indigenous females aged 50-74 living in NSW, Vic, Qld, WA and NT (251 per 100,000 and 285 per 100,000 respectively) [67].

For 2009-2013, detailed information for cancer incidence is available for Aboriginal and Torres Strait Islander males and females living in NSW, Vic, Qld, WA and the NT. For all cancers combined, the number of new cases were higher for females (3,300 new cases) than for males (3,097 new cases) [65]. After age-adjustment, the rates for both Aboriginal and Torres Strait Islander males and females were higher than those for non-Indigenous males and females; males: 561 per 100,000 and 520 per 100,000 respectively, and females: 460 per 100,000 and 371 per 100,000 respectively.

Survival

Information on survival from cancer for Aboriginal and Torres Strait Islander people is based on crude survival rates (observed survival) and is provided for states and territories where the data are considered of sufficient completeness for reporting [65]. Survival rates indicate that of the Aboriginal and Torres Strait Islander people living in NSW, Vic, Qld, WA, and the NT who were diagnosed with cancer between 2007 and 2014, 50% had a chance of surviving five years after diagnosis. This compared with a relative survival rate of 65% for non-Indigenous people. The five year relative survival rates for Aboriginal and Torres Strait Islander males and females were considerably lower compared with non-Indigenous males and females (males: 46% compared with 64%, and females: 54% compared with 67% respectively). The five-year survival for all cancers combined was highest for Aboriginal and Torres Strait Islander people 0-14 years and for non-Indigenous people 15-24 years and decreased with age for both populations (Table 20).

Table 20. Five year relative survival for all cancers combined by Indigenous status and age, NSW, Vic, Qld, WA and the NT, 2007-2014

Age-group (years)	Aboriginal and Torres Strait Islander	Non-Indigenous rate
0-14	82	84
15-24	78	87
25-44	66	84
45-64	50	74
65+	40	56

Source: AIHW, 2018 [65]

²² This information is from the national screening programs for cervical and breast cancer and presents data for specific age groups.

Hospitalisation

In 2016-17, there were 7,931 hospital separations for neoplasms²³ for Aboriginal and Torres Strait Islander people in Australia, representing 3.0% of all separations (excluding dialysis) among Aboriginal and Torres Strait Islander people (Derived from [34]). After age-adjustment, Aboriginal and Torres Strait Islander people were less likely to be hospitalised for neoplasms than non-Indigenous people (19 per 1,000 and 25 per 1,000 respectively).

For specific cancers where details are available in 2014-15, the age-standardised hospitalisation rates for lung and cervical cancers for Aboriginal and Torres Strait Islander people were 2.0 and 3.0 times higher respectively than for non-Indigenous people [5]. Hospitalisation rates for lung cancer were slightly higher for Aboriginal and Torres Strait Islander males than females (1.4 per 1,000 and 1.3 per 1,000 respectively), and also higher for non-Indigenous males than females (0.8 per 1,000 and 0.5 per 1,000 respectively).

Mortality

In 2017, cancers of the trachea, bronchus and lung combined were the fourth leading cause of death for Aboriginal and Torres Strait Islander people (184 deaths: 101 males and 83 females) living in NSW, Qld, WA, SA and the NT, with the overall age-adjusted death rate 2.2 times higher than for non-Indigenous people [30].

For 2011-2015, cancer was responsible for the deaths of 2,754 Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT (an average of 551 deaths per year) [65]. Lung cancer was the leading cause of cancer death for Aboriginal and Torres Strait Islander people and non-Indigenous people. After age-adjustment, the mortality rate for all cancers combined for Aboriginal and Torres Strait Islander people was 1.4 times higher than for non-Indigenous people (230 per 100,000 and 166 deaths per 100,000 respectively). The mortality rates were higher for Aboriginal and Torres Strait Islander people than non-Indigenous people for cancers of the head and neck (rate ratio: 3.4); liver cancer (rate ratio: 2.4); cancer of the oesophagus (rate ratio: 1.9); cancer of the unknown primary site (rate ratio: 1.9); cancer of the lung (rate ratio: 1.8); stomach (rate ratio: 1.8); pancreas (rate ratio: 1.2) and breast (rate ratio: 1.2) (Table 21). Rates were lower for prostate cancer (rate ratio: 0.9) and bowel cancer (rate ratio: 0.9).

Table 21. Age-standardised death rates for the 10 most common cancers, by Indigenous status, and Indigenous: non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2011-2015

Primary cancer	Aboriginal and Torres Strait Islander age-standardised rates	Non-Indigenous standardised rates	Rate ratio
Lung	57	31	1.8
Liver	15	6.1	2.4
Head and neck	13	4.0	3.4
Unknown primary site	18	9.8	1.9
Breast (females)	24	20	1.2
Bowel (colorectal)	14	15	0.9
Pancreas	12	9.6	1.2
Oesophagus	8.6	4.6	1.9
Stomach	7.4	4.1	1.8
Prostate (males)	25	27	0.9
All cancers	230	166	1.4

Notes: 1 Rates per 100,000 population, age-standardised to the Australian population at 30 June 2001.
2 Cancers are ordered by numbers among Aboriginal and Torres Strait Islander people (not shown in table).
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 underestimate the true difference between Aboriginal and Torres Strait Islander and non-Indigenous rates.
5 Rounding may result in inconsistencies in calculated ratios.
6 Rate ratios less than one indicate that non-Indigenous people experience higher rates of the disease.

Source: AIHW, 2018 [65]

For 2011-2015, the age-standardised Aboriginal and Torres Strait Islander cancer mortality rates: non-Indigenous cancer mortality rates were 1.5 times higher for females (202 per 100,000 and 132 per 100,000 respectively) and 1.3 higher for males (269 per 100,000 and 209 per 100,000 respectively) [65].

For 2011-2015, the age-specific cancer mortality rates were higher for Aboriginal and Torres Strait Islander people in all age-groups 20-29 years and 35-74 years to 85 and older, compared with non-Indigenous people [65]. The biggest disparity in the mortality rates between the populations occurred in the 50-54 years age-group (rate ratio: 2.0). Aboriginal and Torres Strait Islander children and adolescents 0-19 years (excluding 10-14 years) had age-specific mortality rates the same or lower than those for non-Indigenous people with rate ratios ranging from 0.7 (15-19 and 5-9 years) to 1.0 (0-4 years).

The patterns of Aboriginal and Torres Strait Islander cancer incidence and mortality can be partly explained by the higher level of risk factors, most notably tobacco use [68]. High rates of smoking are the likely cause of a high incidence of cancer of the lung. High incidence rates of liver cancer are consistent with risky levels of alcohol consumption and a higher prevalence of hepatitis B infection.

²³ Neoplasms C00-D48 also includes benign neoplasms D10-D36 ICD-10-AM.

Other contributing factors include:

- Aboriginal and Torres Strait Islander people being more likely to have cancers that have a poor prognosis
- being diagnosed with cancer at a later stage
- being more likely to present with co-morbidities (that may lead to poorer outcomes)
- being less likely to receive any treatment or adequate treatment [69-71].

Burden of disease

Cancer and other neoplasms²⁴ were responsible for 9.4% of the total burden of disease among Aboriginal and Torres Strait Islander people in 2011, comprising 17% of all fatal burden and 0.5% of all non-fatal burden [38]. Cancer burden was almost entirely due to premature death. It was the fourth leading disease group causing burden for Aboriginal and Torres Strait Islander people (cancer was the leading disease for the total population) [72]. Lung (24%), bowel (8%), liver (7%), breast (7%) and mouth and pharyngeal (throat) (6%) cancers contributed to over half (51%) of this cancer burden [38].

Diabetes

Diabetes is a chronic disease marked by high levels of glucose in the blood and is caused by the pancreas not producing enough insulin²⁵ or not being able to use the insulin effectively, or both [73].

There are several types of diabetes, of which the most frequently occurring are type 1, type 2 and gestational diabetes mellitus (GDM) [73]. Type 1 diabetes is usually diagnosed in children and young people but can occur at any age [74]. Type 2 diabetes is the most common form [75] and is largely preventable by maintaining a healthy lifestyle. GDM develops in some women during pregnancy [75] and is more common among Aboriginal and Torres Strait Islander women than among non-Indigenous women [76].

Diabetes is recognised as one of the most important health problems currently facing Aboriginal and Torres Strait Islander people and can lead to life-threatening health complications [74]. The most common form is type 2 diabetes which occurs at earlier ages for Aboriginal and Torres Strait Islander people and is often undetected and untreated. Complications from diabetes may occur within months of diagnosis while others may develop over several years [77]. Aboriginal and Torres Strait Islander people with diabetes tend to have higher levels of risk factors such as smoking [74] and may show signs of other chronic conditions, including chronic kidney disease, cardiovascular disease, liver disease and anaemia [78].

Extent of diabetes among Aboriginal and Torres Strait Islander people

Incidence and prevalence

Results from the 2012-13 National Aboriginal and Torres Strait Islander Health Measures Survey (NATSIHMS) indicated that 13% (46,200 people) of Aboriginal and Torres Strait Islander adults had diabetes, based on self-reported information and measured results [74]. About 2% of these adults did not self-report that they had diabetes, which may indicate that they were unaware they had the condition. Of those with diabetes, there was a larger proportion of females (56%) than males (44%). Overall, Aboriginal and Torres Strait Islander adults were 3.5 times more likely to have diabetes than non-Indigenous adults. There was an increase with age for the prevalence of diabetes among Aboriginal and Torres Strait Islander adults, from 2% aged 18-34 years to 46% aged 65 years and over. Aboriginal and Torres Strait Islander adults living in remote areas were twice as likely to have diabetes compared with those living in non-remote areas (28% and 15% respectively). 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).

For type 2 diabetes, in the initial stages, known as pre-diabetes, blood glucose levels are higher than normal but not high enough to be diagnosed as diabetes [74]. Impaired glucose regulation can be measured by impaired fasting glycemia (IFG) testing. In 2011-2013, an estimated 5.3% of Aboriginal and Torres Strait Islander adults had IFG compared with 2.9% of non-Indigenous adults. Aboriginal and Torres Strait Islander adults in the 18-44 years age-group had a significantly higher prevalence of IFG (4.2%) compared with non-Indigenous adults in the same age-group (1%).

In 2016, according to the National (insulin treated) Diabetes Register (NDR), the incidence rate of type 1 diabetes was lower for Aboriginal and Torres Strait Islander people than for non-Indigenous people (9.3 per 100,000 compared with 11 per 100,000 after age-adjustment) [79].

In 2016 for insulin treated type 2 diabetes, after age-adjustment, the incidence rate was 103 cases per 100,000 for Aboriginal and Torres Strait Islander people, 2.6 times higher than for non-Indigenous people (39 cases per 100,000) [79].

The most recent national estimates of the prevalence of GDM are for 2005-2007 when almost 6.6% of Aboriginal and Torres Strait Islander women who gave birth in NSW, Vic, Qld, WA, SA and the NT had diabetes during pregnancy: 1.5% had pre-existing diabetes and 5.1% had GDM [76]. Aboriginal and Torres Strait Islander women who gave birth were 3.2 times more likely than their non-Indigenous counterparts to have pre-existing diabetes and 1.6 times more likely to have GDM.

²⁴ Cancer and other neoplasms include malignant neoplasms (cancer) and benign and uncertain neoplasms [45].

²⁵ Insulin is necessary to convert glucose to energy [73].

General practice attendances and hospitalisation

Survey results from April 2010 - March 2015 found that, among Aboriginal and Torres Strait Islander patients, diabetes accounted for 5.5% of all problems managed by general practitioners (GPs) [80]. Type 2 diabetes accounted for 92% of all diabetes problems managed for Aboriginal and Torres Strait Islander patients [25]. After age-adjustment, diabetes was managed around 2.9 times more frequently among Aboriginal and Torres Strait Islander patients than among other patients.

Hospital services are typically required to treat the advanced stages of complications of diabetes or acute episodes of poor glycaemic control [74]. In 2015-16, the rate of hospitalisations where the principal or additional diagnosis was diabetes was highest among Aboriginal and Torres Strait Islander people than all Australians²⁶ in all age groups except those aged 0-4 years [81].

In 2015-16, there were around 2,300 hospitalisations with a principal diagnosis of type 2 diabetes among Aboriginal and Torres Strait Islander people [81]. The hospitalisation rate was similar among males and females (576 and 514 per 100,000 population respectively).

Rates of hospitalisations for type 2 diabetes as a principal diagnosis increased with age for Aboriginal and Torres Strait Islander people ranging from 15 per 100,000 population in the 0-25 years age-group to 1,638 per 100,000 in the 65 and older age-group [81]. Hospitalisation rates for type 2 diabetes among Aboriginal and Torres Strait Islander people living in remote and very remote areas were 2.1 times as high as for those living in major cities (855 per 100,000 and 417 per 100,000 respectively).

In 2015-16 there were around 860 hospitalisations with a principal diagnosis of type 1 diabetes among, Aboriginal and Torres Strait Islander people [81]. The hospitalisation rate was higher among females than males (133 and 96 hospitalisations per 100,000 population respectively).

Rates of hospitalisations for type 1 diabetes as a principal diagnosis were highest in the 15-54 years age-groups and lowest in the 0-4 years age-group [81]. Hospitalisation rates for type 1 diabetes among Aboriginal and Torres Strait Islander people living in major cities were 1.9 times as high as those living in remote and very remote areas (119 per 100,000 and 62 per 100,000 respectively).

Hospitalisations for various chronic conditions, including complications of diabetes, are considered potentially preventable [5]. In 2014-15, diabetes complications accounted for 19% of potentially preventable hospitalisations for Aboriginal and Torres Strait Islander people, with an age-adjusted rate four times greater than the rate for non-Indigenous people.

In 2015-16, there were almost 500 hospitalisations with a principal diagnosis of diabetes during pregnancy among Aboriginal and Torres Strait Islander women, including pre-existing and gestational diabetes [81]. The hospitalisation rates were highest among women aged 25-34 years. Hospitalisation rates increased with remoteness; the rate was more than 12 times as high for those living in remote or very remote areas than those living in major cities (739 and 60 per 100,000 population respectively).

Mortality

Diabetes was the second leading cause of death among Aboriginal and Torres Strait Islander people in 2017, at an age-adjusted rate 5.2 times higher compared with non-Indigenous people (ranked seventh) [30]. Over the period 2013-2017, the age-standardised death rate for diabetes (as an underlying cause of death) was 1.8 times as high for Aboriginal and Torres Strait Islander people than for non-Indigenous people²⁷. Deaths among Aboriginal and Torres Strait Islander males were 1.4 times as high as non-Indigenous males and deaths among Aboriginal and Torres Strait Islander females were 2.2 times as high as non-Indigenous females. The death rate for diabetes increased with age for both populations and was higher for Aboriginal and Torres Strait Islander in every age group.

The rate ratio (Aboriginal and Torres Strait Islander: non-Indigenous) for diabetes mortality was greatest in WA (rate ratio 9.7) followed by NT (rate ratio 7.1), Qld (rate ratio 6.1), SA (rate ratio 3.9) and lowest in NSW (rate ratio 2.8) [30].

National key performance indicators

Improvements to national key performance indicators (nKPIs) have been made in six of the eight chronic disease management indicators relating to diabetes in 2017 [23]. The data can be used to manage programs to improve Aboriginal and Torres Strait Islander health as well as inform government policy.

Burden of disease

Diabetes accounted for 4% of the total burden of disease among Aboriginal and Torres Strait Islander people in 2011 [38]. Diabetes was among the top five specific diseases which included CHD (ranked highest), suicide/self-inflicted injuries, anxiety disorders and alcohol use disorders.

²⁶ Non-Indigenous comparisons could not be obtained from the available ABS national health survey data for this measurement. As a result, all results based on ABS survey data compare Indigenous Australians with all Australians and results should be interpreted with this in mind.

²⁷ Includes data from NSW, Qld, WA, SA and NT only.

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 [4, 82]. While the term SEWB has been used interchangeably with 'mental health' and 'mental illness', it has been proposed that these latter terms be positioned 'within' a broader understanding of SEWB rather than 'equated with SEWB' [4]. 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' [4]. Colonisation has had a systematically profound impact on Aboriginal and Torres Strait Islander peoples' traditional cultural practices and by implication on their SEWB [2, 83]. 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 [2]. Factors that enhance SEWB have also been identified, including 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 wellbeing in which individuals can cope with the normal stresses of life, realise their potential, work productively and contribute to their community [84]. Like SEWB, mental health is influenced by an individual's character traits, the social circumstances in which they find themselves and the environment they live in [85].

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 [86]. Mental illness is a psychological disorder that significantly interferes with an individual's cognitive, emotional or social abilities [86], and is generally determined according to the classification system of the *Diagnostic and statistical manual of mental disorders* (DSM) or the ICD [87]. Severe mental illness, while evident in the anthropological or ethnographic records, was relatively rare in traditional Aboriginal societies [88].

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 [88].

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

Prevalence

The 2012-13 AATSIHS found that 30% of Aboriginal and Torres Strait Islander respondents aged 18 years and over reported high or very high levels of psychological distress in the four weeks prior to the interview [45, 89]. After age-adjustment, the proportion of Aboriginal and Torres Strait Islander people reporting high or very high distress levels was 2.7 times that of non-Indigenous people²⁸.

The National Aboriginal and Torres Strait Islander Social Survey, 2014-15 (NATSISS) found a relationship between education level and employment status and the level of psychological distress [25]. The proportion of 37% of Aboriginal and Torres Strait Islander people who were educated to year 10 level experienced high/very high levels of psychological distress, whereas for those who were educated to year 12, the figure was 26%. Similarly, 40% of unemployed Aboriginal and Torres Strait Islander people experienced high/very high levels of psychological distress, compared with 24% of those employed.

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 life stressors in the previous 12 months [90]. According to the 2014-15 NATSISS, 68% of Aboriginal and Torres Strait Islander people aged 15 years and over experienced one or more selected personal stressors in the 12 months prior to the survey. The most prevalent stressors were death of a family member or close friend (28% of people surveyed), followed by; unable to get a job (19%); serious illness (12%); other work-related stressors (11%) and mental illness (10%). Commonly reported personal stressors were fairly consistent for males and females; however a greater proportion of females than males reported experiencing one or more specific stressors (70% and 66% respectively). Aboriginal and Torres Strait Islander people with a mental health condition were more likely to experience personal stressors (84%) than those with no long-term health condition (60%) [91].

Another indicator of a person's state of SEWB is the degree to which they experience positive feelings. In the 2012-13 AATSIHS, 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 [92].

The 2014-15 NATSISS found that more than half of Aboriginal and Torres Strait Islander people aged 15 years and over reported an overall life satisfaction rating of at least 8 out of 10 (54% of males and 53% of females), where 0 is completely unsatisfied and 10 is completely satisfied. (Derived from [93]). Of those that experienced low range (0-4 out of 10) satisfaction ratings, a clear association was

²⁸ Data for non-Indigenous people are for 2011-2012, from the Australian Health Survey 2011-13 [89].

found with relative disadvantage, in particular unemployment and not finishing year 12.

In 2014-2015, 29% of Aboriginal and Torres Strait Islander people reported having a clinically diagnosed mental health condition (25% of males and 34% of females) [94]. Mental health conditions were more likely to be reported by Aboriginal and Torres Strait Islander people living in non-remote areas (33%) compared with remote areas (16%).

In 2014-2015, 23% of Aboriginal and Torres Strait Islander people with a mental health condition reported excellent or very good self-assessed health, this compared with 58% of those with no long-term health condition. Those with a mental health condition were 2.6 times more likely to have experienced high or very high levels of psychological distress (60%) as those with no long-term health condition (23%) [91, 94].

SEWB is influenced by the support a person receives from their social networks, either in the form of emotional, physical or financial assistance [94]. Information collected in the 2014-15 NATSISS showed that 92% of Aboriginal and Torres Strait Islander people aged 15 years and over were able to obtain help from someone else, not in their household, during a time of crisis [91, 94]. For the general population, people experience similar levels of social support: in the 2014 General Social Survey (GSS) it was found that 95% were able to access support at a time of crisis [95].

Removal from one's natural family also has implications for a person's mental health. The 2014-15 NATSISS found that Aboriginal and Torres Strait Islander people with a mental health condition were more likely to have been removed, or had relatives removed, from their natural family (50%) than those with no long-term health condition (34%) [91].

According to the 2014-15 NATSISS, 67% of Aboriginal and Torres Strait Islander children aged 4-14 years experienced one or more selected personal stressors in the 12 months prior to the survey. The most prevalent stressors were death of a family member or close friend (25% of children surveyed), followed by; problems keeping up at school and being scared or upset by an argument or someone's behaviour (23%) [94].

Hospitalisation

Reflecting the continuing high levels of distress experienced by many Aboriginal and Torres Strait Islander people, 21,167 of the hospital separations in 2016-17 with a principal diagnosis of ICD 'Mental and behavioural disorders' were identified as Aboriginal and Torres Strait Islander [34].²⁹ These separations accounted for 8.0% of all hospital separations (excluding dialysis) (Derived from [34]) for Aboriginal and Torres Strait Islander people; and occurred at 1.9 times higher the rate than for non-Indigenous people (34 per 1,000 and 18 per 1,000 respectively) [34].

For 2013-15, hospitalisation rates for each sub-category within the ICD 'Mental and behavioural disorders' were generally higher for Aboriginal and Torres Strait Islander people than for other Australians [55]. For this period, the age-adjusted separation rates for mental and behavioural disorders due to ICD 'Psychoactive substance use disorders' were 3.6 times higher for Aboriginal and Torres Strait Islander people than those for non-Indigenous people. Similarly, the rate for Aboriginal and Torres Strait Islander 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 diagnosis³⁰, was responsible for 3,008 (0.6%) of all hospital separations for Aboriginal and Torres Strait Islander people in 2016-17 (Derived from [34]). For the period 2013-15 there were 4,365 hospitalisations for Aboriginal and Torres Strait Islander people for intentional self-harm [55]. Rates were higher for females (3.8 per 1,000) compared with males (2.5 per 1,000) and higher in remote areas (3.9 per 1,000) followed by major cities (3.3 per 1,000), with the lowest rate being for very remote areas (2.8 per 1,000). Aboriginal and Torres Strait Islander people were 2.7 times more likely to be admitted for intentional self-harm than non-Indigenous people. After age-adjustment, separation rates for self-harm were 3.1 and 2.5 times higher for Aboriginal and Torres Strait Islander males and females respectively, than those for non-Indigenous males and females.

Mortality

The most recent detailed information indicates that mental health conditions accounted for 385 deaths among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT in 2011-2015 [55]. Of these 385 deaths, 167 were among males and 218 among females (Table 22) [55]³¹. After age-adjustment, death rates were 1.2 and 1.1 times higher for Aboriginal and Torres Strait Islander males and females respectively, than for non-Indigenous males and females.

²⁹ 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'.

³⁰ Intentional self-harm as a principal diagnosis for external causes of injury and poisoning for Aboriginal and Torres Strait Islander people [34].

³¹ Under the ICD, intentional self-harm is classified under 'External causes of morbidity and mortality' (codes X60-X84); details are provided separately.

Table 22. Numbers and rates of deaths from mental health related conditions (excluding intentional self-harm), by sex and cause of death, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, NSW, Qld, WA, SA, and the NT, 2011-2015

Cause of death	Males			Females		
	Number	Rate	Rate ratio	Number	Rate	Rate ratio
Mental disorders due to substance use	70	9.4	5.0	19	n.p.	n.p.
Organic mental disorders	86	32	1.3	160	44	1.2
Other mental disorders	11	n.p.	n.p.	39	10	0.6
All mental disorders	167	44	1.2	218	56	1.1

Notes: 1 Rates are deaths per 100,000, rounded to the nearest whole number, standardised using the 2001 Australian standard population.
2 Details of death from intentional self-harm are not included in this table; see Tables 23 and 24.
3 '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.
4 n.p.: not published.
5 Rounding may result in inconsistencies in calculated ratios.

Source: AIHW, 2017 [55]

In 2017, the death rate for ICD 'Intentional self-harm (suicide)' for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA, and the NT was 2.0 times the rate reported for non-Indigenous people (26 and 13 per 100,000 population respectively) [30]. It was the fifth leading specific cause of death among Aboriginal and Torres Strait Islander people compared with a ranking of 13th for non-Indigenous people.

For 2013-2017, age-standardised death rates from intentional self-harm were 2.1 times higher for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT (25 per 100,000) than for non-Indigenous people (12 per 100,000) [30]. Age-standardised death rates for Aboriginal and Torres Strait Islander people by jurisdiction ranged from 18 per 100,000 in NSW to 39 per 100,000 in WA. Death rates were higher for Aboriginal and Torres Strait Islander males than females (in those jurisdictions for which details were available) (Table 23).

Table 23. Age-standardised death rates for intentional self-harm among 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, 2013-2017

Jurisdiction	Aboriginal and Torres Strait Islander people			Rate ratios		
	Persons	Males	Females	Persons	Males	Females
NSW	18	30	n.p.	1.8	1.9	n.p.
Qld	25	42	9.3	1.8	1.9	1.4
WA	39	54	23	3.0	2.8	3.4
SA	25	29	21	2.0	1.5	3.3
NT	26	32	21	1.8	1.4	2.9

Notes: 1 Rate per 100,000 population, rounded to the nearest whole number, standardised to the 2011 Census based population estimates and 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 underestimate the differences between Aboriginal and Torres Strait Islander and non-Indigenous people due to the incomplete identification of Indigenous status.
5 Rounding may result in inconsistencies in calculated ratios.

Source: ABS, 2018 [30]

Aboriginal and Torres Strait Islander people die from suicide at much younger ages than non-Indigenous people [30]. Combined data for NSW, Qld, WA, SA and the NT in 2013-2017 show that for Aboriginal and Torres Strait Islander people in the 15-24 years, 25-34 years and 35-44 years age-groups, intentional self-harm was the leading cause of death; with death rates as high as 41 per 100,000, 49 per 100,000 and 42 per 100,000 respectively (Table 24). The burden of death by intentional self-harm was highest among Aboriginal and Torres Strait Islander males aged 25-34 years and 35-44 years (rates of 75 per 100,000 and 65 per 100,000 respectively), but was also very high among young Aboriginal and Torres Strait Islander females in the 15-24 year age-group at a rate of 28 per 100,000.

Table 24. Age-standardised death rates for intentional self-harm among 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, 2013-2017

Age-group (years)	Aboriginal and Torres Strait Islander people			Rate ratios		
	Persons	Males	Females	Persons	Males	Females
1-14	2.3	2.7	1.8	5.7	6.7	4.6
15-24	41	54	28	3.7	3.3	4.7
25-34	49	75	22	3.3	3.4	3.2
35-44	42	65	19	2.3	2.4	2.4
45+	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.
All ages	25	35	n.p.	2.0	1.9	n.p.

Notes: 1 Rate per 100,000 population, rounded to the nearest whole number, standardised to the 2011 Census based population estimates and 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 underestimate the true differences between Aboriginal and Torres Strait Islander and non-Indigenous people.

5 Rounding may result in inconsistencies in calculated ratios.

Source: ABS, 2018 [30]

In 2017, among 5-17 year-olds, suicide was the leading cause of death for both the Aboriginal and Torres Strait Islander population and the non-Indigenous population, accounting for 40% of deaths among Aboriginal and Torres Strait Islander children and young people [30]. For 2013-2017, of all suicide deaths in this age group, more than one-quarter (26%) were Aboriginal and Torres Strait Islander children and young people, with a rate of 10 per 100,000 being 5.1 times the rate for non-Indigenous children and young people, 2.0 per 100,000.

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 (nephrons) of the kidneys which affect the kidneys' ability to eliminate wastes and excess fluids [96]. 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 [97]. CKD is inclusive of different conditions, including diabetic nephropathy, hypertensive renal disease, glomerular disease, chronic renal failure, and end-stage renal disease (ESRD) [98]. If CKD is 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 survive [99]. ESRD, where the kidneys are operating at less than 15% of capacity and dialysis or transplant are required [96], is expensive to treat [100] 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 [101, 102].

Risk factors associated with kidney disease, include obesity, hypertension, diabetes mellitus, tobacco use, established cardiovascular disease, age, family history, socioeconomic disadvantage [103] and LBW [104, 105]. These factors are particularly common among Aboriginal and Torres Strait Islander people and contribute to high rates of CKD [38, 99].

Extent of kidney disease among Aboriginal and Torres Strait Islander people

Prevalence/incidence

Around 1.8% of Aboriginal and Torres Strait Islander people reported kidney disease as a long-term health condition in the 2012-13 AATSIHS [45]. After age-adjustment, the prevalence of kidney disease 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 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 people aged 45-54 years and 7.7% for people 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. 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 [98]. Rates fluctuate from year to year but in recent years Aboriginal and Torres Strait Islander rates have stabilised.

Data from the ANZDATA for the five-year period 2011-2015 reveal that the age-standardised notification rate of ESRD for Aboriginal and Torres Strait Islander people was 629 per 1,000,000 population, 6.8 times the rate for non-Indigenous people (Derived from [15, 106-108]).

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 (1,828 per 1,000,000), WA (1,090 per 1,000,000), and SA (588 per 1,000,000) (Table 25) (Derived from [15, 106-108]).

Table 25. Numbers of notifications and age-standardised notification rates for ESRD, by Indigenous status, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, selected jurisdictions, Australia, 2011-2015

Jurisdiction	Aboriginal and Torres Strait Islander		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	186	293	3,755	92	3.2
Vic	51	368	3,139	100	3.7
Qld	293	503	2,112	88	5.7
WA	311	1,090	1,075	86	12.7
SA	70	588	834	87	6.8
NT	433	1,828	75	98	18.6
Australia	1,354	629	11,512	93	6.8

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, ACT and the NT 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 ABS, 2014 [15], ABS, 2003 [106], ABS, 2014 [107], ANZDATA, 2017, [108]

Of people newly registered with the ANZDATA in 2011-2015, 58% of Aboriginal and Torres Strait Islander people were aged less than 55 years, compared with 30% 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) and the rate ratio was particularly high for the 45-54 age-group (12.2) (Table 26) (Derived from [15, 106-108]).

Table 26. Numbers of notifications and notification rates of ESRD, by Indigenous status and age-group, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, Australia, 2011-2015

Age-group (years)	Aboriginal and Torres Strait Islander		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-14	6	4.9	168	8.1	0.6
15-24	27	38	259	18	2.2
25-34	88	180	532	32	5.6
35-44	231	566	905	58	9.8
45-54	437	1,310	1,612	107	12.2
55-64	393	1,912	2,506	193	9.9
65-74	147	1,604	2,965	321	5.0
75+	25	700	2,565	350	2.0
All ages	1,354	629	11,512	93	6.8

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 ABS, 2014 [15], ABS, 2003, [106], ABS, 2014 [107], ANZDATA, 2017 [108]

Hospitalisation, dialysis and transplantation

In 2016-17, there were 1,047 per 1,000 hospital separations³² for Aboriginal and Torres Strait Islander people, 2.6 times the rate for non-Indigenous people (409 per 1,000) [34]. However, around 80% of the difference between these rates was due to higher separations for Aboriginal and Torres Strait Islander people admitted for dialysis.

Detailed information from ANZDATA is available for 2016 when a total of 292 Aboriginal and Torres Strait Islander people commenced dialysis, an increase from 2015 (282 people) [98]. In 2016, there were 34 new transplant operations for Aboriginal and Torres Strait Islander recipients, compared with 1,057 performed for non-Indigenous recipients. At 31 December 2016, 32 (3.4%) of the 948³³ patients on the waiting list for a transplantation were Aboriginal and/or Torres Strait Islander.

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 [98, 99, 109]. In 2016, HD accounted for the majority of treatment; 92%, with only 7.8% of Aboriginal and Torres Strait Islander dialysis patients receiving peritoneal dialysis (PD) (Derived from [98]). The majority (79%) of non-Indigenous dialysis patients also received HD, but 21% of non-Indigenous dialysis patients received PD. In 2016, there were 1,727 prevalent dialysis patients in Australia (PD and HD treatments) identified as Aboriginal and Torres Strait Islander.

For 2015-16, hospitalisation rates for CKD³⁴ (excluding dialysis) were 5.0 times higher after age-adjustment among Aboriginal and Torres Strait Islander people (56 per 1,000) than non-Indigenous people (11 per 1,000) [110]. For Aboriginal and Torres Strait Islander males,

³² Only includes public hospital data for Tas, ACT and NT.

³³ Included 19 patients with an unreported Indigenous status.

³⁴ CKD as a principal and/or additional diagnosis.

rates were 3.7 times higher than for non-Indigenous males (49 per 1,000 and 13 per 1,000 respectively). For Aboriginal and Torres Strait Islander females, rates were 6.7 times higher than for non-Indigenous females (63 per 1,000 and 9.4 per 1,000 respectively).

In 2014-15 (for the latest data available) there were 207,605 hospital separations for ESRD among Aboriginal and Torres Strait Islander people [5]. After age-adjustment, the hospitalisation rate for ESRD was 11.2 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, 17.4 times that of other females; Aboriginal and Torres Strait Islander males were hospitalised for ESRD at 7.3 times the rate of other males.³⁵

In 2014-15 after age-adjustment, hospitalisation rates for ESRD for Aboriginal and Torres Strait Islander people increased with remoteness [5]. In remote and very remote areas the hospitalisation rate for Aboriginal and Torres Strait Islander people was almost 70 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 2.9 times the rate of Aboriginal and Torres Strait Islander people living in major cities.

In 2015-16, hospitalisation rates for regular dialysis as the principal diagnosis were 12.4 times higher for Aboriginal and Torres Strait Islander people (531 per 1,000) than for non-Indigenous people (43 per 1,000) [110]. For Aboriginal and Torres Strait Islander males, hospitalisation rates were 8.2 times higher than for non-Indigenous males (456 and 56 per 1,000 respectively). For females, hospitalisation rates were 19.4 times higher than for non-Indigenous females (598 per 1,000 and 31 per 1,000 respectively).

Mortality

There were 52 deaths from disease of the urinary system among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT in 2017 [30].³⁶ After age-adjustment, the death rate for Aboriginal and Torres Strait Islander people was 1.6 times that for non-Indigenous people.

For 2012-2016, after age-adjustment, the death rate for kidney disease for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and NT (23 per 100,000) was 2.6 times the rate for non-Indigenous people (8.8 per 100,000) [111].

More detailed information is available for people living in NSW, Qld, WA, SA and the NT for 2013-2015. After age-adjustment, the death rate for CKD as an underlying or associated cause of death for Aboriginal and Torres Strait Islander people was 3.8 times higher than the rate for non-Indigenous people (209 and 55 per 100,000 respectively) [110]. The Aboriginal and Torres Strait Islander: non-Indigenous rate ratios were higher for females (5.0) than for males (2.8).

Burden of disease

Kidney and urinary diseases accounted for 2.5% of the total burden of disease among Aboriginal and Torres Strait Islander people in 2011 [38]. CKD (79%) and other kidney and urinary diseases (20%) were the largest contributors to this total burden.

Injury, including family violence

Injury includes both physical harm to a person's body and non-physical harm, including grief, loss and suffering [112], but in public health practice attention is almost entirely confined to physical harm [113]. Even restricted to physical harm, assessing the total impact of injury is difficult because many injuries do not result in hospitalisation or death and there are few systematic data [114].

The classification of injury has generally followed the WHO's ICD, which includes particular attention to the external cause of the injury [37].³⁷ When looking at injury in Aboriginal and Torres Strait Islander contexts, there are a number of factors which must be taken into consideration. These include low socioeconomic contexts (which have a higher risk of injury because of unsafe environments) [114, 116], alcohol and other drug use, intimate partner violence [117], disruption to culture [112], as well as less access to prevention efforts and high-quality treatment and rehabilitation services.

Extent of injury among Aboriginal and Torres Strait Islander people

Prevalence

The 2012-13 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 years and 45-54 years age-groups [118]. 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 and over age-group. 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) [119].

In relation to violence, in the 2014-15 NATSISS, 22% of Aboriginal and Torres Strait Islander people aged 15 years and over had experienced physical or threatened violence in the last 12 months [94]. For males, victimisation was highest in the 15-24 years age-group (27%), while for females, it was highest in the 25-34 years age-group (27%). Males experienced physical or threatened violence

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.

³⁷ This system is followed in this section, but it has its limitations (for more details, see [115]).

at a slightly higher rate than females (23% and 22% respectively). In terms of remoteness, victimisation levels were slightly higher in remote areas (23%) than they were in non-remote areas (22%).

According to the 2014-15 NATSISS, 69% of Aboriginal and Torres Strait Islander people aged 15 years or over reported awareness of problems in their neighbourhood or community, with 25% reporting awareness of family violence and 21% reporting awareness of assault [94]. For remote areas, 47% of Aboriginal and Torres Strait Islander people reported awareness of family violence, compared with 19% for non-remote areas. The figures are similar for assault, with 45% of Aboriginal and Torres Strait Islander people in remote areas reporting awareness of assault, compared with 14% in non-remote areas.

Hospitalisation

There were 35,649 hospital separations for injuries for Aboriginal and Torres Strait Islander people in 2016-17, representing 13% of all Aboriginal and Torres Strait Islander separations (excluding those for dialysis) (Derived from [34]). The leading external causes of injury-related hospitalisations were falls (21%), assault (19%), exposure to mechanical forces (16%) and complications of medical and surgical care (14%). After age-adjustment, the separation rate for injury was almost twice as high for Aboriginal and Torres Strait Islander people than for other Australians (55 per 1,000 and 30 per 1,000 respectively).

More detailed information for 2013-15 shows that in terms of age, the greatest disparity between Aboriginal and Torres Strait Islander and non-Indigenous people was in the 35-44 years age-group, where the rate of hospitalised injury was three times higher for Aboriginal and Torres Strait Islander people [55]. The rate of Aboriginal and Torres Strait Islander males hospitalised for injury was highest in the 35-44 years age-group (64 per 1,000), however the rate of Aboriginal and Torres Strait Islander females hospitalised for injury was the highest in the 65 and older age-group (58 per 1,000). Rates of hospitalised injury are consistently higher for Aboriginal and Torres Strait Islander people than non-Indigenous people in the middle years, however from about 65 years of age, the rates are high for both populations.

In terms of remoteness, hospitalisation rates for injury for Aboriginal and Torres Strait Islander people increased with remoteness in 2014-15 [5]. The rate increased from 38 per 1,000 in major cities to 74 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, notably so for assaults, where the rate ratio for remote and very remote areas (19.0) was more than twice that of major cities (7.6).

Assaults account for a higher proportion of injury-related hospitalisations among Aboriginal and Torres Strait Islander people than among non-Indigenous people; in 2016-17, 19% of injury-related hospitalisations among Aboriginal and Torres Strait Islander people were for assaults compared with 2% among non-Indigenous people [34].

More detailed information about rates of hospitalisations due to family violence-related assaults among Aboriginal and Torres Strait Islander people is available for 2014-15 [5]. After age-adjustment, Aboriginal and Torres Strait Islander people were hospitalised for assaults relating to family violence at 29 times the rate of non-Indigenous people. The hospitalisation rates for family violence-related assaults for Aboriginal and Torres Strait Islander females were highest for those aged 25-34 years (13 per 1,000). For Aboriginal and Torres Strait Islander males, rates were highest for those aged 35-44 years (4.3 per 1,000). The hospitalisation rates from family violence-related assaults for Aboriginal and Torres Strait Islander people increased with remoteness, from 4.0 per 1,000 in major cities to 15 per 1,000 in remote and very remote areas (rate ratios: 13.8 and 41.7 respectively when compared with the age-standardised rates for non-Indigenous people).

Mortality

Important specific causes of injury deaths for NSW, Qld, SA, WA and the NT in 2017 were:

- intentional self-harm (165 deaths, 5.5% of all Aboriginal and Torres Strait Islander deaths)
- land transport accidents (77 deaths, 2.7% of all Aboriginal and Torres Strait Islander deaths)
- accidental poisoning (78 deaths, 2.6% of all Aboriginal and Torres Strait Islander deaths) [30].

After age-adjustment, deaths from intentional self-harm were 2.0 times as common for Aboriginal and Torres Strait Islander people than for non-Indigenous people, those from land transport accidents 2.4 times as common, and deaths from accidental poisoning 2.8 times as common [30].

More detailed information for death from injury is available for 2011-2015. In this period, there were 1,995 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 [55]. After age-adjustment, Aboriginal and Torres Strait Islander people died from injury at 2.1 times the rate of non-Indigenous people. Death rates for injury were particularly high among Aboriginal and Torres Strait Islander people aged 25-34 years (104 per 100,000), 35-44 years (111 per 100,000) and 75 years and above (205 per 100,000 respectively).

Leading causes of injury-related death of Aboriginal and Torres Strait Islander people for 2011-2015 in NSW, Qld, WA, SA and the NT, as a percentage of total deaths were intentional self-harm (6.8% for males and 3.4% for females), land transport accidents (4.1% for males and 2.4% for females), accidental poisoning by and exposure to noxious substances (2.3% for males and 1.8% for females) and assault (1.6% for males and 1.4% for females) [55].

Burden of disease

In 2011, injury was the second highest contributor to the total burden of disease for Aboriginal and Torres Strait Islander people, responsible for 15% of this burden [38]. The burden of disease for injury was higher in Aboriginal and Torres Strait Islander males (19%) compared with females (10%). Looking specifically at the injury burden, suicide accounted for 30% of this burden, with transport accidents accounting for 17%, and homicide and violence accounting for 12%.

Respiratory health

Respiratory health can be compromised by a number of conditions that affect the airways and other structures of the lung [120] and impair the process of breathing and oxygen delivery [121]. These conditions range from acute respiratory infections to chronic respiratory conditions [38].

Respiratory disease is associated with a number of contributing factors, including: risky behaviours (particularly tobacco use); environmental conditions; occupational exposures and hazards [38, 122]; family history and other health conditions (obesity, infectious diseases) [122]. Infants and children are particularly susceptible to developing respiratory diseases due to risk factors including: exposure to tobacco smoke; poor living conditions; poor nutrition; and limited access to medical care [123, 124].

Extent of respiratory disease among Aboriginal and Torres Strait Islander people

Prevalence

Long-term diseases of the respiratory system³⁸ were reported by 31% of Aboriginal and Torres Strait Islander people who participated in the 2012-13 AATSIHS³⁹ [119]. 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. Respiratory diseases were more frequently reported by Aboriginal and Torres Strait Islander females (34%) than males (28%). The proportion of Aboriginal and Torres Strait Islander people reporting respiratory diseases increased with age, from 21% in the 0-14 year age-group to 43% in the 45-54 years age-group, before decreasing to 41% for the 55 years and over age-group.

Asthma was reported by 18% of Aboriginal and Torres Strait Islander people in the 2012-13 AATSIHS; it was the most commonly reported long-term respiratory disease and the second most commonly reported long-term disease overall [119]. After age-adjustment, the level of asthma was 1.9 times higher among Aboriginal and Torres Strait Islander people than non-Indigenous people. Asthma was reported more commonly by females (20%) than by males (15%) [119] and by people living in non-remote areas (20%) than those in remote areas (10%) [125].

Other long-term respiratory diseases reported by Aboriginal and Torres Strait Islander people in the 2012-13 AATSIHS were chronic sinusitis (8.3%) and COPD⁴⁰ (4.1%) [119].

Hospitalisation

There were 27,567 hospital separations with a principal diagnosis of respiratory disease among Aboriginal and Torres Strait Islander people in 2016-17 [34], representing 10% of all separations (excluding dialysis) identified as Aboriginal and Torres Strait Islander (Derived from [34]). After age-adjustment, the hospitalisation rate for respiratory disease was 2.5 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people [34].

In 2014-15, age-standardised hospitalisation rates for selected respiratory diseases were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people, particularly in the middle adult years (Table 27) [5].

Table 27. Indigenous:non-Indigenous hospitalisation rate ratios, by selected condition and age-group, all jurisdictions, 2014-15

	Age-group (years)					
	0-14	15-24	25-44	45-64	65+	All ages
COPD	n/a	n/a	n/a	n/a	n/a	5.0
Influenza and pneumonia	1.9	2.7	5.4	5.7	2.0	3.1
Whooping cough	1.3	n/a	n/a	n/a	3.8	2.1
Asthma	1.0	1.6	3.2	3.4	2.9	1.8
Acute upper respiratory infections	1.6	1.3	2.4	3.1	1.8	1.8

Source: Derived from Steering Committee for the Review of Government Service Provision, 2016 [5]

In 2014-15, hospitalisation rates for COPD, influenza and pneumonia, acute upper respiratory infections, and asthma all increased with remoteness [5]. The rate for influenza and pneumonia was particularly high for Aboriginal and Torres Strait Islander people living in remote/very remote areas (22 per 1,000) compared with the rate for those living in major cities areas (6.8 per 1,000).

³⁸ Individuals who reported a current respiratory condition that had lasted, or was expected to last, for six months or more [119].

³⁹ The 2014-15 NATSISS provides the most current information on the prevalence of long-term diseases of the respiratory system, however the ABS proposes wherever possible the 2012-2013 AATSIHS should be used for more detailed reporting of this data [94].

⁴⁰ Chronic obstructive pulmonary disease (COPD) relates to a progressive lung disease for which the symptoms are not fully reversible, and includes chronic bronchitis and emphysema [126].

Mortality

In 2017, chronic lower respiratory disease (which includes asthma, bronchitis, bronchiectasis, emphysema, and other COPD) was the third highest cause of death overall for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT (responsible for 202 deaths) [30]. After age-adjustment, the death rate for chronic lower respiratory disease among Aboriginal and Torres Strait Islander people was 2.9 times higher than among non-Indigenous people. Influenza and pneumonia were responsible for 53 Aboriginal and Torres Strait Islander deaths, with an age-adjusted death rate 2.8 times higher than for non-Indigenous people.

For the period 2011–2015, more detailed information is available for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT [55]. The overall age-standardised proportion of total deaths from respiratory diseases was higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (Table 28).

Table 28. Underlying causes of death, by Indigenous status, respiratory diseases, NSW, Qld, WA, SA and NT, 2011–2015

Respiratory disease type	Indigenous		Non-Indigenous	
	Deaths	Age-standardised % of total deaths	Deaths	Age-standardised % of total deaths
Chronic lower respiratory diseases	757	7.2	24,531	4.7
<i>COPD</i>	648	6.5	21,993	4.2
<i>Asthma</i>	42	0.3	1,341	0.3
Pneumonia and influenza	187	1.5	8,796	1.7
Other respiratory diseases	148	1.4	12,060	2.3
Total respiratory diseases	1,092	10	45,387	8.7

Notes: 1 Directly age-standardised using the 2001 standard population.
2 Data presented for COPD and asthma are a subset of data presented for all chronic lower respiratory diseases.

Source: AIHW, 2017 [55]

Age-specific information is available for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT for the period 2013–2017 [30]. The highest Aboriginal and Torres Strait Islander: non-Indigenous rate ratio for deaths from chronic lower respiratory diseases (as an underlying cause of death) was in the 45–54 years age-group where the death rate was 8.8 times higher for Aboriginal and Torres Strait people (38 per 100,000) than for non-Indigenous people. ‘Pneumonia and influenza’ was a leading cause of respiratory related deaths for Aboriginal and Torres Strait Islander infants under one year of age (0.1 per 100,000) at a rate 4.5 times higher than for non-Indigenous infants.

While death rates from respiratory disease continue to be higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people, the disparity has closed over recent decades because of a decrease in rates among Aboriginal and Torres Strait Islander people [25]. Age-standardised death rates for respiratory disease for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and NT have significantly declined over the 1998–2015 period.

Burden of disease

Respiratory diseases⁴¹ were responsible for 7.9% of the total burden of disease among Aboriginal and Torres Strait Islander people in 2011 [38]. Most of the burden from respiratory disease was attributed to asthma (41%), (particularly affecting people aged 10–24 years) and COPD (38%), (peaking in the 60–64 years age-group).

Eye health

Eye health can be affected by a number of factors, including genetics, ageing, premature birth, diseases (such as diabetes), infections, injuries, ultraviolet (UV) exposure, nutrition and tobacco use [94, 127, 128]. 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 [55, 129, 130]. Even partial loss of vision can reduce an individual’s ability to live independently and increase the risk of mortality [25, 131, 132].

A range of factors heighten the risk of certain eye conditions among Aboriginal and Torres Strait Islander people [51]. There is however, evidence that Aboriginal and Torres Strait Islander children, especially those living in remote areas, generally experience better vision than non-Indigenous children [5, 133]. Recent survey data suggests there has been some improvement in the eye health of Aboriginal and Torres Strait Islander adults. It is estimated that 90% of vision impairment (VI) and blindness⁴² among both Indigenous and non-Indigenous people is preventable or treatable [51].

⁴¹ Include chronic conditions such as COPD, upper respiratory diseases and bronchiectasis.

⁴² This calculation is based on figures for age-related macular degeneration, cataract, diabetic retinopathy, glaucoma and uncorrected refractive error [51].

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

Estimates of the prevalence of eye health problems among Aboriginal and Torres Strait Islander people have been obtained from surveys⁴³ and surveillance activities that rely on eye examinations or self-report⁴⁴.

Prevalence estimates of eye health problems based on data from eye examinations

The NEHS was conducted between March 2015 and April 2016 [51]. It provides the latest evidence about the prevalence, causes and treatment of VI⁴⁵ and blindness⁴⁶ among Indigenous adults in Australia. The NEHS examined the eyes of 1,738 Indigenous people (aged 40-92 years) and 3,098 non-Indigenous people (aged 50-98 years) living in 30 randomly selected urban, rural and remote sites across Australia. According to the NEHS, bilateral VI and bilateral blindness occurred among 11% and 0.3% of Indigenous Australians respectively. After age-adjustment, the NEHS found that the prevalence of bilateral VI and bilateral blindness were both three times higher among Indigenous participants than among non-Indigenous participants. Of note, is the apparent reduction in the prevalence of blindness in Indigenous adults, from six times higher than that experienced by non-Indigenous adults in 2008 [133] to three times higher in 2016⁴⁷ [51].

VI increased with age among Indigenous adults participating in the NEHS, ranging from 5.7% for those in the 40-49 years age-group to 46% for those aged 80 years and over [51]. There was no significant difference in the prevalence of VI or blindness between Indigenous males and females. The prevalence of VI among Indigenous adults in outer regional and very remote areas (17% and 15% respectively) was up to double that in other areas (8.2% in major cities, 8.4% in inner regional areas and 8.3% in remote areas). In 2016, it was estimated that up to 18,300 Indigenous people aged 40 years or older were living with VI or blindness.

According to the NEHS, the main causes of VI in Indigenous and non-Indigenous adults were uncorrected refractive error⁴⁸ (63% and 62% respectively) and cataract (20% and 14% respectively) [51]. Diabetic retinopathy (DR) was the third most common cause of VI in Indigenous adults, but it contributed to a smaller proportion of cases among non-Indigenous adults (5.5% and 1.5% respectively). Among those participants with self-reported diabetes, a greater proportion of Indigenous adults had DR and vision-threatening DR (39% and 9.5% respectively) than non-Indigenous adults (29% and 4.5% respectively) [137]. While not among the main causes of VI, the prevalence of vision loss due to ocular trauma (eye injury) was also higher among Indigenous adults (0.8%) than among non-Indigenous adults (0.2%) [138]. Participants who were male or living in a very remote area were also more likely to have vision loss from ocular trauma.

The NEHS identified five Indigenous participants with bilateral blindness, the main causes of which were cataract (two people), DR (one person), optic atrophy (one person) and a combination of mechanisms (one person) [51]. In comparison, the main cause of bilateral blindness in non-Indigenous people was age-related macular degeneration (5 out of 7 people).

Prevalence estimates of eye health problems based on self-reported data

Although self-report is considered an unreliable population-based research tool for identifying eye disease in those with vision loss [139], self-reported information is the only recent data available for some aspects of eye health. The most recent self-reported information on eye health problems for children comes from the 2014-15 NATSISS [25, 94]. In 2014-2015, 13% of Aboriginal and Torres Strait Islander children aged 4-14 years were reported to have eye or sight problems (including treated/corrected eye or sight problems) [94]. Eye problems were less likely to be reported for children in remote areas (6.3%) than for those in non-remote areas (14%). For Aboriginal and Torres Strait Islander children aged 0-14 years, 9.7% had a long-term eye problem, with long sightedness (4.7%) and short sightedness (2.8%) being among the most common problems reported [5]. In comparison, 12% of non-Indigenous children had a long-term eye problem.

Eye and sight problems⁴⁹ were reported in the 2012-13 AATSIHS by one-third (33%) of Aboriginal and Torres Strait Islander people (33% of Aboriginal people and 34% of Torres Strait Islander people), making it the most commonly reported long-term health condition [140]. Eye and sight problems were reported by 29% of males and by 38% of females [119]. The proportion of Aboriginal and Torres Strait Islander people reporting eye or sight problems was similar in non-remote areas⁵⁰ and remote areas (both 35%), but lower among those living in very remote areas (25%) [125]. The most common eye conditions reported by Aboriginal and Torres Strait Islander people in the 2012-13 AATSIHS were: hyperopia (long sightedness: 19%), myopia (short sightedness: 13%), other diseases of the eye and adnexa⁵¹ (5.6%), blindness (3.0%), and cataract (1.1%) [119].

43 Survey findings may not be directly comparable due to differing ways of defining and assessing vision loss [149].

44 Self-reported survey data may underestimate the prevalence of health conditions because participants: may not have been diagnosed yet, may not be willing to disclose a diagnosis, may have forgotten the diagnosis or misinterpreted the survey question [1].

45 The NEHS defines vision impairment as 'presenting distance visual acuity <6/12 in the better eye' [51].

46 The NEHS defines blindness as 'presenting distance visual acuity <6/60 in the better eye' [51].

47 It has been noted however, that the observed reduction is based on small numbers of people with bilateral blindness [136].

48 A condition in which light that passes through the front of the eye fails to focus precisely on the retina, causing long or short sightedness and difficulties changing focus.

49 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 [140]. Unlike the 2016 NEHS data, measures of myopia and hyperopia have been reported separately and include both corrected and uncorrected cases.

50 Non-remote areas include major cities and inner and outer regional areas [125].

51 Other diseases of the eye and adnexa include: glaucoma, macular degeneration, astigmatism and presbyopia [119].

After age-adjustment, Aboriginal and Torres Strait Islander people were less likely to report eye and sight problems than non-Indigenous people (ratios of 0.9 for: males; females; and total persons). They 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).

Prevalence estimates of trachoma and trichiasis based on surveillance

The National Trachoma Surveillance and Reporting Unit provides prevalence data for trachoma which shows there have been substantial improvements in trachoma control in Indigenous communities in Australia [141]. The estimated prevalence of active trachoma among Indigenous children aged 5-9 years in selected remote communities has decreased from 14% in 2009 [142] to 3.8% in 2017 [141], however persistently high levels of trachoma continue to be found in some regions [141]. In 2017, screening was undertaken in at-risk communities in Qld, WA, SA, and the NT. Among the 2,872 children screened, 91 cases were detected: 47 were in WA, 15 in SA, and 29 in the NT, with no children with active trachoma detected in Qld [141]. No trachoma was reported in children aged 5-9 years in 39% of at-risk communities.

If left untreated, trachoma can cause scarring of the eyelid and in-turned eyelashes that lead to blindness (trichiasis) [133, 141, 142]. In 2016, screening in at risk communities in WA, SA and the NT detected trichiasis in 0.3% of Indigenous adults aged 15 years and over and 0.5% of those aged 40 years and over. A total of 50 cases of trichiasis were detected (3 in WA, 8 in SA, and 39 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 2010 to March 2015 were related to eye health [151]. After age-adjustment, eye health problems among Indigenous patients were managed by GPs at a similar rate as 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 2015-16, there were 3,994 hospital separations for diseases of the eye and adnexa among Aboriginal and Torres Strait Islander people in Australia, accounting for 1.6% of separations (excluding dialysis) (derived from [41]). A more detailed analysis of hospitalisation data is available for the period July 2013 to June 2015 [61]. In this period, there were 6,523 hospitalisations for diseases of the eye and adnexa among Aboriginal and Torres Strait Islander people, the majority of which (60%) were for cataracts. There were more hospitalisations for females (55%) than males (45%).

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 non-Indigenous males and females (rate ratios of 0.8 for both) [61]. Aboriginal and Torres Strait Islander people in remote and very remote areas were more likely to be hospitalised than those in non-remote areas (rate ratios: 1.5 and 1.6 respectively). When compared with non-Indigenous people Indigenous people were less likely to be hospitalised for eye conditions in non-remote areas (rate ratio: 0.7), but they were more likely to be hospitalised for them in remote and very remote areas (rate ratios: 1.1 and 1.3 respectively).

Between July 2013 and June 2015, there were also 1,658 hospitalisations for eye injury among Aboriginal and Torres Strait Islander people in Australia [61]. After age-adjustment, hospitalisation rates for eye injury were higher among Aboriginal and Torres Strait Islander men than women, but Aboriginal and Torres Strait Islander: non-Indigenous rate ratios were higher among women (4.2) than men (2.7). Overall, Aboriginal and Torres Strait Islander people were 3.2 times more likely to be hospitalised for eye injury than non-Indigenous people.

Burden of disease

In 2011, hearing and vision disorders together contributed to 1.2% of the total burden of disease experienced by Aboriginal and Torres Strait Islander people [45]. The burden of vision loss⁵² was estimated to be three times greater for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Ear health and hearing

Otitis media (OM) is the medical term for all forms of inflammation and infection of the middle ear [144]. OM can be caused by viruses or bacteria or both, and often occurs as a result of another illness, such as a cold [145]. The main cause of hearing loss in Aboriginal and Torres Strait Islander children is OM and its complications, including otitis media with effusion (glue ear) and chronic suppurative otitis media (CSOM) (persistent discharge through a hole in the eardrum) [144, 146].

The hearing loss associated with OM can cause speech, language and psychosocial delays, and impact on education and employment outcomes [145, 147-149]. 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 [150].

As with many other areas of Aboriginal and Torres Strait Islander health, high rates of recurring ear infections are associated with social disadvantage, crowded housing conditions, inadequate access to clean water and functional sewerage systems, nutritional problems and poor access to health care [5]. A reduced risk of OM has been found for children who were breastfed [5, 151].

⁵² Vision loss refers specifically to loss due to refractive error, cataract, glaucoma and age-related macular degeneration [45]. It does not include vision loss due to trachoma or diabetes.

Extent of ear disease among Aboriginal and Torres Strait Islander people

Prevalence

High levels of ear disease and hearing loss have been reported for many years in Aboriginal and Torres Strait Islander communities [145]. The levels of chronic otitis media 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' [152, p.2].

Multiple surveys undertaken between 2001 and 2013 showed that 90% of children under three years of age living in remote communities in the Top End region of Australia had some form of OM [153-155]; however, changes in vaccination schedules in the NT have been associated with a sustained improvement in the severity of OM seen in these children [155].

Ear or hearing problems were reported for 8.4% of Aboriginal and Torres Strait Islander children aged 0-14 who participated in the 2014-15 NATSISS [94]. Ear or hearing problems were 2.9 times more prevalent among Aboriginal and Torres Strait Islander children aged 0-14 than non-Indigenous children [55].

Ear problems were reported for 21% of children aged 5 ½ to 7 years who participated in the Longitudinal Study of Indigenous Children (LSIC) in 2013⁵³ [156]. The prevalence of ear problems was highest among children in areas with moderate remoteness (25%), and lowest among children in areas with low remoteness (20%).

Ear 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 2012-13 AATSIHS [157]. 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 12% of females. After age-adjustment, the rate for ear/hearing problems for Aboriginal and Torres Strait Islander people was 1.3 times higher than for non-Indigenous people (1.2 times higher for males and 1.5 times higher for females).

The proportion of Aboriginal and Torres Strait Islander people with ear/hearing problems in the 2012-13 AATSIHS increased with age, ranging from 7.1% of children aged 0-14 years, to 29% of those aged 55 years and over [157]. Just under 3% of Aboriginal and Torres Strait Islander children aged 0-14 years were reported to have OM and just over 3% were reported to have hearing loss. Hearing loss in adults ranged from 7.0% of Aboriginal and Torres Strait Islander people aged 15-24 years to 26% of those aged 55 years and over.

Information about the ear health and hearing status of young Aboriginal and Torres Strait Islander people in the NT is collected from an outreach ear program funded by the Australian Government⁵⁴ [158]. Of the 1,879 Aboriginal and Torres Strait Islander people aged 0-20 years who received a service through the program in 2017, 61% were diagnosed with at least one type of ear condition at their latest visit. The prevalence of ear conditions ranged from 49% among those aged 11-15 years to 71% among those aged 0-2 years. Among children and young people who had an ear condition, the most common diagnosis was otitis media with effusion (OME) (23%), followed by eustachian tube dysfunction⁵⁵ (15%), CSOM without discharge (15%) and CSOM with discharge (12%). Of the children who received an audiology service through the program, 45% were found to have some hearing loss in one or both ears.

GP attendances and hospitalisation

According to the Bettering the Evaluation of Care and Health (BEACH) survey data, the rates of GP attendance for the period from April 2010 to March 2015 were about the same for Aboriginal and Torres Strait Islander and non-Indigenous children aged 0-14 years for OM (67 per 1,000 encounters compared with 64 per 1,000 encounters), and similar for total diseases of the ear (105 per 1,000 encounters compared with 98 per 1,000 encounters) [25, 55].

There were 3,455 hospital separations with a principal diagnosis of diseases of the ear and mastoid process among Aboriginal and Torres Strait people in 2016-17 [34], representing 1.3% of all separations (excluding dialysis) among Aboriginal and Torres Strait Islander people (Derived from [34]). After age-adjustment, the hospitalisation rate for middle ear and mastoid conditions was 1.4 times higher for Aboriginal and Torres Strait Islander people than that for non-Indigenous people.

In 2014-15, the hospitalisation rate for middle ear and mastoid conditions as the principal diagnosis for Aboriginal and Torres Strait Islander children aged 0-3 years (9.5 per 1,000) was 0.7 times the rate for non-Indigenous children (13 per 1,000) [5]. Rates for Aboriginal and Torres Strait Islander children aged 4-14 years (6.8 per 1,000) were 1.4 times higher than for non-Indigenous children (4.9 per 1,000).

In major cities, the hospitalisation rate for Aboriginal and Torres Strait Islander children aged 0-14 years (6.3 per 1,000) was lower than for non-Indigenous children (7.2 per 1,000) whereas in remote/very remote areas it was 2.2 times as high (14 per 1,000 and 6.2 per 1,000 respectively) [5].

Burden of hearing disorders

Hearing and vision disorders (which include all possible conditions leading to long-term hearing loss, auditory system disorders, otitis externa and diseases of the inner ear) were responsible for 1.2% of the total burden of disease among Aboriginal and Torres Strait Islander people in 2011, with hearing disorders comprising 79% of the total burden for hearing and vision disorders [38].

⁵³ Ear problems were those experienced 'in the past year', as reported by carers of children in the younger cohort of the LSIC, during Wave 6 of data collection [156].

⁵⁴ Population is not a random sample, and is not representative of all Aboriginal and Torres Strait Islander children and young people in the NT [158].

⁵⁵ Blocking of the tubes that run between the middle ear and the upper throat.

Oral health

Oral health is defined as the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort and disease of the craniofacial complex [159]. The two most common oral diseases are dental caries (tooth decay) and periodontal disease (gum disease) [160].

Dental caries occurs when bacteria in plaque interacts with sugar in food and drink to produce acids that degrade tooth enamel [161]. The stickiness of the plaque keeps these acids in contact with teeth and, over time, the enamel can break down and a cavity forms. The main contributor to caries is the consumption of free sugars⁵⁶. Untreated caries can lead to pain and an increased likelihood of root canal therapy or tooth extraction being needed.

Periodontal diseases are a group of inflammatory diseases that affect the gums and other parts of the mouth structure [161]. Gingivitis is an early reversible form of the disease which, if untreated, can lead to a serious condition called periodontitis. The factors associated with periodontitis include smoking, diabetes, obesity, low socioeconomic status, adverse maternal outcomes, poor oral hygiene and older age.

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

Prevalence of child oral health problems

The 2012-2014 National Child Oral Health Study (NCOHS) provided estimates of clinically-measured oral health problems among Aboriginal and Torres Strait Islander children [160]. The study had 24,664 participants aged 5 to 14 years, and included a nationally representative sample of Aboriginal and Torres Strait Islander children.

The 2012-2014 NCOHS found that:

- The proportion of Aboriginal and Torres Strait Islander children aged 5-10 years who had experienced any tooth decay in their primary (baby) teeth (61%) was 1.5 times the proportion of non-Indigenous children (41%) [160]. The average number of decayed, missing or filled primary tooth surfaces⁵⁷ for Aboriginal and Torres Strait Islander children aged 5-10 years was 6.3, compared with 2.9 for non-Indigenous children.
- The proportion of Aboriginal and Torres Strait Islander children aged 6-14 years who had experienced any tooth decay in their permanent (adult) teeth (36%) was 1.6 times the proportion of non-Indigenous children (23%) (Derived from [160]). The average number of decayed, missing or filled permanent tooth surfaces for Aboriginal and Torres Strait Islander children aged 6-14 years was 1.3, compared with 0.7 for non-Indigenous children [160].
- Among children aged 5-14 years, the prevalence of visible dental plaque was higher among Aboriginal and Torres Strait Islander children than for non-Indigenous children (60% versus 42%), as was the prevalence of gingivitis (34% versus 21%) [160]. Both are indicators of oral hygiene status.

The 2014-15 NATSISS collected data about the self-reported tooth or gum problems of Aboriginal and Torres Strait Islander children. In 2014-2015, the proportion of 4-14 year-old children with reported tooth or gum problems was 34%, a decrease from 39% in 2008 [94].

Dental services in the NT have been provided to Aboriginal and Torres Strait Islander children under the age of 16 years through a succession of programs funded by the Australian Government and delivered by the NT Government, most recently through the Northern Territory Remote Aboriginal Investment Oral Health Program [162]. In 2016, among the 2,557 service recipients (derived from [162]) for whom complete data is available, tooth decay prevalence was highest among children aged 6 years (90%) and aged 9 years (88%), and lowest among children aged 1-3 years (45%) and aged 12 years (72%)⁵⁸ [162]. There has been some improvement in tooth decay prevalence for young children; between 2013 and 2016, the average amount of tooth decay in children aged 1-3 years decreased by 19%, and in children aged 8 years decreased by 11%.

Prevalence of adult oral health problems

Reliable national estimates of the prevalence of caries and periodontal disease among Aboriginal and Torres Strait Islander adults, based on clinically-obtained data, do not currently exist [25, 161, 163, 164].

The 2012-13 AATSIHS collected information about the self-reported tooth loss of Aboriginal and Torres Strait Islander adults aged 15 years and over, excluding wisdom tooth loss [55]. In 2012-2013, 49% of adults reported no tooth loss; 47% had lost one or more teeth; and 4.7% reported complete tooth loss.

⁵⁶ Free sugars are added sugars plus those naturally occurring in honey, fruit juice and fruit concentrate.

⁵⁷ Counting the number of surfaces of a person's tooth that are decayed, missing or filled gives an indication of oral health.

⁵⁸ Children who receive services through this program are not a random sample of the population and, as such, the data may not be representative of the general population of Aboriginal and Torres Strait Islander children in the NT [162].

Dentist visits and hospitalisation

A number of surveys collected self-reported data about dental visits made by Aboriginal and Torres Strait Islander people.

- In the 2012-13 AATSIHS, around 4.8% of all Aboriginal and Torres Strait Islander people and 4.6% of children aged 2-14 years were reported as visiting a dental professional in the two weeks⁵⁹ prior to the survey [157].
- In the 2014-15 NATSISS, 49% of Aboriginal and Torres Strait Islander children aged less than 15 years were reported as having a dental consultation in the 12 months prior to the survey [25].
- In the 2012-2014 NCOHS, 75% of Aboriginal and Torres Strait Islander children aged 5-14 years were reported as visiting a dental provider in the 12 months prior to the survey, compared with 82% of non-Indigenous children [160].

Nationally preventable hospitalisation rates for dental conditions in 2014-15 were 1.3 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people after age-adjustment [5]. The hospitalisation rate for Aboriginal and Torres Strait Islander people living in remote areas was 2.5 times as high as for those in major cities. 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).

Table 29. Age-specific hospital separation rates for potentially preventable dental conditions among children aged 0-14 years, by Indigenous status, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, Australia, 2014-15

Age-group (years)	Indigenous	Non-Indigenous	Rate ratio
0-4	8.0	5.0	1.6
5-9	12	9.9	1.2
10-14	3.3	6.0	0.5
Total 0-14 years	7.9	7.0	1.1

Notes: 1 Rates per 1,000 population.

2 Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate.

Source: Steering Committee for the Review of Government Service Provision, 2016 [5]

In 2015-16, after age-adjustment, hospitalisation rates for acute dental conditions were 1.4 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (3.9 per 1,000 and 2.8 per 1,000 respectively) (Derived from [111]).

Aboriginal and Torres Strait Islander people undergo more intensive hospital dental treatments at younger ages than the general population [165]. In 2013-15, for non-Indigenous people, dental procedures requiring a general anaesthetic were most common in those aged 15-24 years (17 per 1,000 persons); for Aboriginal and Torres Strait Islander people, the procedure rate was highest among 5-9 year-olds (12 per 1,000 people) [25].

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 [166]. 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 interaction between an individual and their personal and environmental context [73, 167]. 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) [94].

Aboriginal and Torres Strait Islander people may perceive the concept of disability differently to non-Indigenous people [168]. For Aboriginal and Torres Strait Islander people, the concept of disability is often viewed within the context of their beliefs, attitudes and experiences of disability.

The main source of information about the level of disability at a population level in Australia is the ABS periodic Survey of Disability, Ageing and Carers (SDAC)⁶⁰, which collects information about the prevalence of disability and also data about people's needs for assistance with core activities [166]. Information about disability, at a population level, is also collected in Australia's five-yearly censuses [169], and among Aboriginal and Torres Strait Islander people in surveys such as the NATSISS [94].

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 [73, 94].

⁵⁹ This data cannot be used to reliably calculate annual aggregates of service usage [157].

⁶⁰ The SDAC does not include people living in discrete Indigenous communities and very remote areas [166].

Extent of disability among Aboriginal and Torres Strait Islander people

Prevalence

The 2016 Census only provided information on assistance for Australians with a profound or severe disability. In 2016, 6.7% of Aboriginal and Torres Strait Islander people reported a need for assistance with either self-care, mobility or communication (for an additional 6.1% of respondents, a need for assistance was not stated) [169]. Of those who needed assistance, more males (53%) needed assistance than females (47%).

In the 2015 SDAC, 24% of Aboriginal and Torres Strait Islander people living in households in Australia reported living with a disability, compared with 18% of non-Indigenous people [166]. Disability prevalence rates for Aboriginal and Torres Strait Islander males and females were similar, 23% and 25% respectively. Of all Aboriginal and Torres Strait Islander people, 7.3% had a profound or severe limitation with similar rates for males and females (7.1% and 7.0% respectively). Of those with a disability, 60% needed assistance with at least one activity such as self-care, mobility and communication. After age-adjustment, Aboriginal and Torres Strait Islander people were 1.8 times more likely than non-Indigenous people to be living with a disability.

In the 2014-15 NATSISS, 45% of Aboriginal and Torres Strait Islander people aged 15 years and over reported having a disability or restrictive long-term health condition (43% males and 47% females); 8% of Aboriginal and Torres Strait Islander people reported having a profound or severe core activity restriction [94]. The most common type of disability reported was physical disability (29%), followed by disability relating to sight, hearing or speech (21%) and psychological (9%) and intellectual (8%) impairments. Aboriginal and Torres Strait Islander females were more likely than males to have a physical disability (31% compared with 27%), or psychological disability (10% compared with 7%) [94].

Services

The disability services field has experienced many changes in recent years, including the approval of the National Disability Strategy 2010-2020 (NDS), revisions of the National Disability Agreement (NDA) and the introduction of the National Disability Insurance Scheme (NDIS).

The NDS, at a national level, aims to improve the lives of people living with a disability [170]. The second implementation plan for the NDS acknowledges the specific needs of Aboriginal and Torres Strait Islander people with disability [171]. As part of the NDS, the Government developed the plan - Australian Government Plan to Improve Outcomes for Aboriginal and Torres Strait Islander People with Disability - to address these often complex and multi-faceted needs [172]. The plan will cover areas for future attention and includes activities relating to education, employment, health and the NDIS [55].

The NDA previously identified increasing access to disability services for Aboriginal and Torres Strait Islander people, as a priority area for all Australian governments (COAG) [173, 174]. 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 [174]. NDA services⁶¹ include accommodation support, community support, community access, respite and employment services [176].

The NDIS aims to assist people with marked and permanent disabilities who require assistance with everyday activities [177]. Access is determined according to a set of criteria. If eligible, individuals are provided with funding to purchase the support they require. The NDIS is being introduced across Australia in stages and over time most NDA recipients will be expected to transition to the NDIS. Not all NDA users will be eligible for the NDIS, however, the government has guaranteed 'continuity of support services' so they are not disadvantaged [178].

Not all people who could benefit from the use of disability support services access them. To assess the level of use of disability services by Aboriginal and Torres Strait Islander people, 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' [179]. In 2014-15, the proportion of the 'potential population' of Aboriginal and Torres Strait Islander people who used NDA services was lower for accommodation support and community access services compared with the proportion for non-Indigenous people and higher for community support services and respite services [179].

For disability services provided under the NDA for 2016-17, 6.1% of service users were identified as Aboriginal and Torres Strait Islanders (Table 30) [175].

⁶¹ Additional services include advocacy and 'other' support, however, data are not collected for these service groups [175].

Table 30. Numbers and proportions (%) of disability services users, by Indigenous status, Australia, 2012-13 to 2016-17

Year	Indigenous		Non-Indigenous		Not stated ⁵	Total	
	Number	Proportion	Number	Proportion	Number	Number	Proportion
2016-17	19,307	6.1	298,385	94	13,292	330,984	100
2015-16	19,290	6.0	300,097	94	12,430	331,817	100
2014-15	19,031	5.9	302,736	94	12,028	333,795	100
2013-14	18,021	5.8	291,631	94	11,879	321,531	100
2012-13	17,406	5.8	283,306	94	11,827	312,539	100

Notes: 1 Service user data are estimates 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'.

4 The ACT did not collect data in 2015-16 and 2016-17.

5 Includes service users who only accessed recreational/holiday programs. This service type was not required to complete this data item.

Source: AIHW, 2018 [175]

In 2016-17, 85% of Aboriginal and Torres Strait Islander service users were aged under 50 years [175]. The proportion of Aboriginal and Torres Strait Islander service users who lived in major cities was 38%, compared with 66% of non-Indigenous service users. A further 29% lived in an inner regional area, 21% lived in an outer regional area, and 10% lived in a remote or very remote area, these were higher proportions than for non-Indigenous service users (23%, 9% and 0.8% respectively).

In 2016-17, 1,583 Aboriginal and Torres Strait Islander NDA service users transitioned to the NDIS, this included 1,423 people who identified as Aboriginal, 39 who identified as a Torres Strait Islander and 121 who identified as both an Aboriginal and Torres Strait Islander [175].

Communicable diseases

Communicable diseases (caused by infectious agents e.g. bacteria, viruses, parasites, fungi, or their toxic products) can be passed from a person or an animal to another [180]. Risk factors vary according to the type of disease. Improvements to sanitation and the increased use of vaccination and antibiotics have markedly reduced some infectious diseases in Australia [180, 181].

Sexually transmitted infections

Sexually transmissible infections (STIs) include bacterial, viral and parasitic infections that are transmitted through sexual contact [182]. Young people are particularly vulnerable to STI infections. The use of condoms is regarded as fundamental in preventing STI transmission. Most STIs are treatable and early detection is important in the management of STIs.

Chlamydia

Chlamydia is an infection caused by the bacterium *Chlamydia trachomatis* and is asymptomatic in about 80% of cases [183]. In 2017, there were 7,015 notifications of chlamydia for Aboriginal and Torres Strait Islander people accounting for 7% of the notifications in Australia (Indigenous status was not reported for 62% of notifications). For STIs, chlamydia was the most frequently diagnosed infection in Australia in 2017. The notification rate⁶² for chlamydia was 2.8 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (1,194 per 100,000 compared with 427 per 100,000).

Chlamydia is typically diagnosed among young people in both the Aboriginal and Torres Strait Islander and non-Indigenous populations [183]. In 2017, people aged 15-29 years accounted for 82% of chlamydia notifications in the Aboriginal and Torres Strait Islander population and 75% in the non-Indigenous population. For both the Aboriginal and Torres Strait Islander population and non-Indigenous population, females accounted for a greater proportion of chlamydia diagnoses than males. The rates of chlamydia notifications in Aboriginal and Torres Strait Islander females aged 15-19 and 20-29 years were 3.8 and 2.7 times higher respectively than in the non-Indigenous population. Higher notification rates for Aboriginal and Torres Strait Islander females aged 15-19 years may be due to greater health care attendance and subsequent testing.

Gonorrhoea

Gonorrhoea is an infection caused by the bacterium *Neisseria gonorrhoeae* [183]. In 2017, there were 4,119 gonorrhoea notifications for Aboriginal and Torres Strait Islander people accounting for 15% of the notifications in Australia (Indigenous status was not reported for 32% of notifications). The notification rate⁶³ was 6.6 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (628 per 100,000 and 96 per 100,000 respectively).

In 2017, one-third (31%) of gonorrhoea notifications for the Aboriginal and Torres Strait Islander population occurred in the 15-19 years age-group, compared with 6% in the same age-group in the non-Indigenous population [183].

⁶² Chlamydia notifications were based on data from Qld, WA, SA and the NT where Aboriginal and Torres Strait Islander status was ≥50% complete per year for 2017 [183].

⁶³ Gonorrhoea notification rates were based on data from Vic, Qld, WA, SA, Tas, the ACT and the NT where Aboriginal and Torres Strait Islander status was ≥50% complete for 2017 [183].

Aboriginal and Torres Strait Islander females were more likely to be diagnosed with gonorrhoea than Aboriginal and Torres Strait Islander males, with a male to female ratio of 0.8:1, whereas in the non-Indigenous population, the number of diagnoses for males was three times the number reported for females [183]. 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 is an infection caused by the bacterium *Treponema pallidum* [183]. In 2017, there were 779 syphilis notifications for Aboriginal and Torres Strait Islander people accounting for 18% of the notifications in Australia (Indigenous status was not reported for 7% of notifications). The syphilis age-standardised notification rate⁶⁴ for Aboriginal and Torres Strait Islander people was 6.6 times higher than for non-Indigenous people (103 per 100,000 and 16 per 100,000 respectively).

In 2017, the syphilis notification rates for both Aboriginal and Torres Strait Islander males and non-Indigenous males were highest in the 30-39 years age-group (233 per 100,000 and 60 per 100,000 respectively) [183]. For females, rates were highest in the 15-19 years age-group for Aboriginal and Torres Strait Islander females (238 per 100,000), and in the 20-29 years age-group for non-Indigenous females (6.8 per 100,000).

In 2017, the proportion of infectious syphilis notifications for Aboriginal and Torres Strait Islander people was 50% for males and females [183]. For non-Indigenous people, 87% of diagnoses were for males. 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 the non-Indigenous population.

The human immunodeficiency virus (HIV)

The human immunodeficiency virus (HIV) can be transmitted either by sexual or blood contact and from mother to child; if untreated, it can progress to acquired immune deficiency syndrome (AIDS) [183]. In 2017, there were 963 cases of newly diagnosed HIV infection in Australia of which 31 (3%) were among Aboriginal and Torres Strait Islander people [183]. Age-standardised rates of HIV diagnosis were 1.6 times higher for Aboriginal and Torres Strait Islander people than non-Indigenous people (4.6 per 100,000 and 2.8 per 100,000 respectively).

In 2017, the median age of diagnosis among Aboriginal and Torres Strait Islander people was 34 years, and males accounted for 74% of new HIV cases (Derived from [183]). HIV age-standardised notification rates among Aboriginal and Torres Strait Islander males were 6.9 per 100,000, and among non-Indigenous males were 5.1 per 100,000. Rates among Aboriginal and Torres Strait Islander females were 2.2 per 100,000 and among non-Indigenous females were 0.5 per 100,000.

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 2017 [183]. Heterosexual contact was also identified as a common form of exposure to HIV among Aboriginal and Torres Strait Islander people (26%). For the total population, 63% of all new HIV cases were attributed to the categories 'men who have sex with men' and 25% were attributed to 'heterosexual contact' [184].

Hepatitis

Hepatitis is an inflammation of the liver which can be caused by viral infections [180].

Hepatitis C

Transmission of hepatitis C virus (HCV) mainly occurs via blood contact and from mother to newborn [183]. New treatment for HCV; direct-acting antiviral therapies have been found to be highly effective [185]. There is no vaccine to protect people against HCV [186].

In 2017, of the 10,537 people diagnosed with HCV in Australia, 1,201 (11%) were identified as Aboriginal and Torres Strait Islander⁶⁵ [183]. After age-adjustment, the notification rate for HCV was 4.4 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (168 per 100,000 and 38 per 100,000 respectively). The HCV notification rates among Aboriginal and Torres Strait Islander males were higher than for females across all age-groups from 15 years of age.

In 2017, rates of HCV notifications among Aboriginal and Torres Strait Islander males were higher than for non-Indigenous males (227 per 100,000 and 53 per 100,000 respectively [183]). Rates for Aboriginal and Torres Strait Islander females were higher than for non-Indigenous females (110 per 100,000 and 24 per 100,000 respectively).

There has been a 29% increase in the HCV notification rates for Aboriginal and Torres Strait Islander males from 176 per 100,000 in 2013 to 227 per 100,000 in 2017 and a 6% decrease for females from 117 in 2013 to 110 per 100,000 in 2017 [183].

⁶⁴ Syphilis notifications notification rates were based on data from all jurisdictions in Australia with Aboriginal and Torres Strait Islander status being ≥50% complete for 2017 [183].

⁶⁵ HCV notification rates were based on data from Qld, WA, SA, Tas and the NT where Aboriginal and Torres Strait Islander status was ≥50% complete for 2013-2017 [183]. There were 5,182 (49%) notifications in 2017 for which Indigenous status was not reported.

Hepatitis B

Transmission of hepatitis B virus (HBV) may be from blood or sexual contact or from mother to child at birth [183].

In 2017, of the 6,102 people diagnosed with newly acquired HBV in Australia, 151 (2%) were identified as Aboriginal and Torres Strait Islander [183]. After age-adjustment, the notification rate for Aboriginal and Torres Strait Islander people was 2.3 times⁶⁶ higher than for non-Indigenous people (45 per 100,000 and 19 per 100,000 respectively). The HBV notification rates among Aboriginal and Torres Strait Islander males were higher than for females across all age-groups from 15 years of age.

In 2017, rates of HBV notifications among Aboriginal and Torres Strait Islander males were higher than for non-Indigenous males (64 per 100,000 and 21 per 100,000 respectively) [183]. Rates for Aboriginal and Torres Strait Islander females were higher than for non-Indigenous females (27 per 100,000 and 18 per 100,000 respectively); rates for Indigenous females in some age groups were lower than for non-Indigenous females.

There has been a 37% decline in the notification rates for Aboriginal and Torres Strait Islander people from 72 per 100,000 in 2013 to 45 per 100,000 in 2017 [183]. It is suggested that this reduction, mainly in the under 20 years' age-group, is due to immunisation programs for HBV.

Pneumococcal disease

Pneumococcal disease results from infection by the bacterium *Streptococcus pneumoniae* which may cause severe invasive disease including meningitis, pneumonia, bacteraemia and non-invasive disease, including OM [187].

Nationally-funded vaccination for pneumococcal disease is available for Aboriginal and Torres Strait Islander infants, adults aged 50 years and older and those aged 15-49 years at high risk [187].

For 2013-2015, 594 (13%) of the 4,611 cases of invasive pneumococcal disease (IPD) were identified as Indigenous. The age-standardised notification rate for IPD was 6.4 times higher for Aboriginal and Torres Strait Islander people compared with non-Indigenous people (35 per 100,000 and 5.5 per 100,000 respectively) [55]. Age-standardised notification rates were higher for Aboriginal and Torres Strait Islander people than non-Indigenous people across all age groups, particularly in the middle-aged years. For 2014-15, Aboriginal and Torres Strait Islander children aged 0-4 years living in NSW, Vic, Qld, WA, SA and the NT were hospitalised for IPD at 4.6 times the rate of non-Indigenous children (0.4 per 1,000 and 0.1 per 1,000 respectively) [55].

For 2011 and 2012, there were 14 and 9 deaths respectively, attributed to IPD among Aboriginal and Torres Strait Islander people [188].

Meningococcal disease

Meningococcal disease is caused by the bacterium *Neisseria meningitidis* (also known as meningococcus) [187]. The most common clinical presentations of invasive meningococcal disease (IMD) are septicaemia and/or meningitis. Meningococcal disease is more common in infants, young children, adolescents and adults aged over 45 years [189].

The most common serogroups⁶⁷ of meningococcus found in Australia are B, C, W and Y [189], with B responsible for most cases between 2006 and 2015 [190]. State-funded (NSW, Qld, Vic, WA, the ACT and Tas) MenACWY vaccination is available for older adolescents via school-based immunisation and/or primary care providers and has been added to the National Immunisation Program as a single dose at age 12 months [190]. This funding has also been extended to include specific populations, including Aboriginal and Torres Strait Islander people, based on age and region in WA, the NT and Tas. A vaccine for serogroup B is available by private purchase with its impact yet to be determined [189].

In 2016, there were 243 confirmed cases of IMD in Australia (Indigenous status not specified) [189], an increase of 40% from 2015 (n=174) [191]. In 2014, there were 170 confirmed cases of IMD in Australia with 21 cases (12%) identified as Aboriginal [192].

For 2006-2015, the incidence rate of meningococcal serogroup B (MenB) among Aboriginal and Torres Strait Islander people was 3.8 times higher than for non-Indigenous people (2.8 and 0.7 per 100,000 respectively) [193].

Tuberculosis

Tuberculosis (TB) is primarily a lung infection caused by the inhalation of *Mycobacterium tuberculosis* bacteria [194].

For 2010-2014:

- 172 (22%) of the 789 notifications of TB among Australian-born people in Australia were identified as Indigenous [194-197].
- in Australia, the notification rate for TB was 5.0 cases per 100,000 population for Indigenous people; the crude notification rate was highest for the NT (17 cases per 100,000 population) (Derived from [15, 194-197]). After age-adjustment, the notification rate for TB for Indigenous people was 9.0 times higher than for Australian-born non-Indigenous people.⁶⁸

⁶⁶ HBV notification rates were based on data from Qld, WA, SA, Tas and the NT where Aboriginal and Torres Strait Islander status was ≥50% complete for 2013-2017 [183]. There were 3,141 (51%) notifications in 2017 for which Indigenous status was not reported.

⁶⁷ A serogroup is a group of bacteria containing a common antigen.

⁶⁸ 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.

- 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 (Derived from [15, 194-198]).

In 2014-15, Aboriginal and Torres Strait Islander people were hospitalised for TB at a rate of 0.2 per 1,000, after age-adjustment [5]. This rate was 4.1⁶⁹ times the hospitalisation rate for TB for non-Indigenous Australians (0.06 per 1,000). Hospitalisation rates were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people across all age-groups, with a rate ratio of 11.0 for the 45-64 years age-group being the highest (rates of 0.6 per 1,000 and 0.06 per 1,000 respectively).

Haemophilus influenzae type b

Haemophilus influenzae type b (Hib) is a bacterium that can cause a number of conditions including meningitis, pneumonia, epiglottitis, septic arthritis and cellulitis [187]. Children are particularly susceptible to Hib, which is serious in its invasive form [187, 199, 200]. Vaccination has substantially reduced notifications of invasive Hib disease in Australia [201].

For 2012-2014, nine (17%) of the 54 cases of invasive Hib disease notified in all jurisdictions were identified as Aboriginal and Torres Strait Islander (Derived from [192, 202, 203]). The average notification rate for the Aboriginal and Torres Strait Islander population was 5.3 times the rate in the total population (0.48 per 100,000 and 0.09 per 100,000 respectively). In 2014, one Aboriginal and Torres Strait Islander infant, who was unvaccinated, died from Hib.

Skin health

The most common skin infections affecting Aboriginal and Torres Strait Islander children are scabies and impetigo [204, 205]. Scabies is a skin disease caused by the mite *Sarcoptes scabiei* that produces skin inflammation and itching [206]. Scratching in response to a scabies infestation can result in impetigo⁷⁰, a bacterial infection of the skin [206-208]. Recent research suggests that scabies mites could also spread bacterial infection and promote bacterial growth [204, 209]. Impetigo in Aboriginal and Torres Strait Islander communities commonly involves GAS, which brings a risk of severe effects including kidney disease and, possibly, ARF [204, 209-213].

Resource-poor environments [204, 207, 213-215] and the 'normalisation' of infections in communities [216] are associated with an increased burden of skin infections and infestations. However, preventative, focused and collaborative programs based within remote Aboriginal communities have had some positive outcomes [210, 217-219].

Risk factors for impetigo include poverty, overcrowding, lack of water, poor hygiene, tropical climate, scabies and other conditions affecting skin integrity [208, 210, 213, 214, 220].

Prevalence

Scabies is endemic in some remote central and northern Aboriginal and Torres Strait Islander communities, affecting both adults and children [221, 222]. Most prevalence data available is for children, with research indicating that the most frequent age of the first infection for both skin sores and scabies is at three to four months of age [223]. 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 other fungal and bacterial infections [210].

Aboriginal and Torres Strait Islander children under 15 years of age were screened between September 2004 and August 2007 in five remote NT communities for the East Arnhem Healthy Skin Project (EAHSP). Over the course of the study, the average monthly prevalence for pyoderma was 36% and for scabies 13% [218]. For children under three years of age, scabies prevalence was 23%, double that of children aged 3-14 years (11%). However, scabies prevalence did decrease with age. Nearly all participants in the study (92%) had presented with pyoderma and 35% with scabies at least once.

A study of medical records for children born between 2001-2006 participating in the EAHSP found that 69% of children had presented with scabies and 82% had presented with skin sores during their first year of life [224]. A recent study based on the EAHSP data show similar results with 84% of children presenting at least once with skin sores and 71% with scabies before their first birthday [223]. It was also revealed in the study of medical records that skin sores were seven times more likely to be present if scabies was also diagnosed than if scabies was not evident [224]. In the Skin Sore Trial, conducted in seven remote NT communities between November 2009 and November 2012, scabies was detected in almost 17% of Aboriginal and Torres Strait Islander children who had impetigo [204, 213].

Hospitalisation

There were 11,167 hospital separations with a principal diagnosis of 'diseases of the skin and subcutaneous tissue' among Aboriginal and Torres Strait Islander people in 2016-17 [34], representing 4.2% of all separations (excluding dialysis) among Aboriginal and Torres Strait Islander people [34]). After age-adjustment, the hospitalisation rate was 2.5 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (Derived from [34]).

A report by the Australasian College for Emergency Medicine examined the experiences of Aboriginal and Torres Strait Islander people compared with non-Indigenous people presenting to public hospital emergency departments [225]. For the period 2014-15, emergency

⁶⁹ Rounding may result in inconsistencies in calculated rate ratios.

⁷⁰ Impetigo is also referred to as skin sores, or the broader term, pyoderma, and these terms are commonly used interchangeably.

presentations for illness of the skin/subcutaneous tissue/breast were more common among Aboriginal and Torres Strait Islander people, 6.7% compared with non-Indigenous presentations at 4.3%. It was reported most commonly by Aboriginal and Torres Strait Islanders in the 0-14 year age-group (7-10%).

In 2014-15, the age specific hospitalisation rates of 'diseases of the skin and subcutaneous tissue' as principal diagnosis among Aboriginal and Torres Strait Islander children aged four years and under in Australia was 1.8 times higher in major cities than for non-Indigenous children; 3.0 times higher in regional areas; and 7.1 times higher in remote and very remote areas [5]. For Aboriginal and Torres Strait Islander children living in remote and very remote areas the hospitalisation rate was 4.0 and 3.0 times higher than for their counterparts living in major cities and inner and outer regional areas respectively (Derived from [5]).

Between October 2015 and January 2016, 49% of children under 16 years of age (74% who were Aboriginal), admitted to two regional hospitals in WA were diagnosed with impetigo and 8.2% with scabies [226].

For 2006-2010, 10% of medical admissions to Mt Isa Hospital (Qld) for children aged under five years, were due to scabies or pyoderma, all were Aboriginal and Torres Strait Islander children [227].

Burden of disease

In 2011, skin disorders, which include chronic and acute conditions, skin infections and scabies, were responsible for 1.3% of the total burden of disease among Aboriginal and Torres Strait Islander people [38]. Fatal burden accounted for 7.7% of the total burden due to skin disorders with skin infections making up 70% of this fatal burden.

Factors contributing to Aboriginal and Torres Strait Islander health

Selected health risk and protective factors

The factors contributing to the health status of Aboriginal and Torres Strait Islander people should be seen within the broad context of the social determinants of health [180, 228, 229]. The WHO describes the social determinants of health as the conditions in which people are born, grow, live, work and age [230]. A life course approach to health and the risk of disease, known as life course epidemiology, integrates theories about the social determinants of health, fetal and developmental origins of disease and the impact of lifestyle and individual behaviour [231]. The determinants of health, some of which are discussed in the *Social and cultural concepts* section of this Overview, are shaped by a wider set of forces and systems, including policies, political systems and social norms [230, 232].

For the health of Aboriginal and Torres Strait Islander people, social disadvantage needs to be considered together with 'health risk and protective factors'. These are the behaviours, characteristics, or exposures that may increase or decrease the likelihood of developing a particular health condition [233]. Health risk and protective factors can be divided into non-modifiable factors, often biomedical (e.g. age, sex, genetics), and modifiable factors which are environmental or behavioural and which, in theory, can be changed [73]. It is important to note that risk is based on probability, or likelihood [234]. Not everyone who is exposed to a known risk factor will have an adverse outcome, and people may develop a health condition without ever having been exposed to an associated risk factor.

The selected health risk and protective factors summarised in the following sections are generally related to individual behaviour. However, these behavioural factors should be considered within the context of the social determinants of health and structural influences that could be shaping behaviour and ability to make changes [180, 235]. Research undertaken in WA emphasised the importance of having a strong cultural identity in enabling Aboriginal people to make healthy choices [236].

Environmental health

Environmental health refers to the physical, chemical and biological factors that may affect people in particular surroundings or settings [237]. Environmental factors can be associated with ill health conditions including intestinal and skin infections and some chronic diseases, for example, ARF, respiratory issues (such as asthma) and some cancers [238]. Aboriginal and Torres Strait Islander people are disproportionately affected by the diseases associated with environmental health due to a number of factors, including: the remoteness of some communities; poor infrastructure; lack of access to tradespeople and repairs; and the cost of maintenance [238, 239].

This section will primarily cover information relevant to housing and infrastructure. For more detailed information about some of the health conditions associated with environmental health, see the *Cardiovascular health* section for information on ARF, the *Eye health* section for information on trachoma, the *Respiratory health* section for information on asthma and other related conditions, as well as the *Skin health* section for information about scabies and other skin health issues.

Housing

Housing issues such as overcrowding and poor infrastructure contribute significantly to the ill health of some Aboriginal and Torres Strait Islander people [94].

Overcrowding

Cultural aspects need to be considered in relation to housing conditions and overcrowding for Aboriginal and Torres Strait Islander people. Contributions to overcrowding include: visits to other households (to see relatives, for funerals or because of ties to neighbourhoods or towns and to be closer to 'country') and the high importance placed on demand sharing⁷¹ [240].

In the 2016 Census, the ABS introduced a new housing suitability measure, which provides some data on overcrowding in Aboriginal and Torres Strait Islander communities [241]. In 2016, around one fifth (18%) of Aboriginal and Torres Strait Islander people were living in an overcrowded house⁷². In regional and remote areas this figure was higher, with just over a quarter of Aboriginal and Torres Strait Islander people (28%) living in an overcrowded house, compared with 16% in urban areas. The Census also provides some information at a state and territory level. In 2016, the NT had the highest rates of overcrowding, with 53% of houses requiring one or more additional bedrooms. WA and Qld also had high levels of overcrowding (20% and 17% respectively).

More detailed information on overcrowding is available for the period 2014-2015. This data shows that there have been some small decreases in overcrowding in Aboriginal and Torres Strait Islander households in recent years [5]. In 2014-2015, the proportion of Aboriginal and Torres Strait Islander people living in overcrowded households was 21%, this compares with 23% in 2012-2013 and 28% in 2008. Overcrowding was significantly higher in remote and very remote areas, in 2014-2015, 41% of Aboriginal and Torres Strait Islander people were living in overcrowded households, compared with 15% for non-remote areas. However, over time there has been a decrease in overcrowding in very remote areas. In 2004-2005, 63% of Aboriginal and Torres Strait Islander people were living in an overcrowded household, decreasing to 49% in 2014-2015. Aboriginal and Torres Strait Islander people were more than three times as likely to live in a household that required an additional bedroom compared with non-Indigenous people in 2014-2015 (18% and 5% respectively) [94].

The proportion of Aboriginal and Torres Strait Islander people reporting overcrowding as a stressor has also decreased over time. In 2014-2015, 6.5% of Aboriginal and Torres Strait Islander people reported overcrowding as a stressor in the last year, which was a decrease from 21% in 2002 [5]. This decrease was consistent across both remote and non-remote areas, but particularly for remote areas, which dropped from 42% in 2002, to 9.2% in 2014-2015.

Infrastructure

An important contributor to the health and wellbeing of Aboriginal and Torres Strait Islander people is access to working infrastructure in housing and communities, including sewerage, water supply and electricity [242].

In the 2016 National Social Housing Survey (NSHS), 72% of Aboriginal and Torres Strait Islander respondents reported living in a house of an 'acceptable' standard [243]. In addition, 24% of Aboriginal and Torres Strait Islanders reported that their household facilities were of an acceptable standard, but the structure of the dwelling was not.

More detailed information on household infrastructure is available for 2014-2015, when 82% of Aboriginal and Torres Strait Islander households were living in houses of an acceptable standard⁷³ [5]. This proportion has remained relatively stable, with 78% of households living in houses of an acceptable standard in 2012-2013, and 83% in 2008. In 2014-2015, 26% of households reported major structural issues within their dwelling. However this proportion has declined, since 2012-2013 when 35% of Aboriginal and Torres Strait Islander people reported living in a house with major structural issues. Dwellings with major structural problems increased with remoteness. In 2014-2015 for Aboriginal and Torres Strait Islander households living in very remote areas, 37% reported living in a house with major structural problem, compared with 25% for non-remote areas. Nationally, the most significant issues for Aboriginal and Torres Strait Islander dwellings were major cracks in the walls/floors (11%), walls or windows not straight (6.1%), and major plumbing problems (5.7%).

In terms of access to household facilities, the majority of Aboriginal and Torres Strait Islander households across Australia in 2014-2015 had access to working facilities, with over nine in ten households reporting functioning facilities [5]. This included access to working facilities for: washing people (97%); washing clothes and bedding (91%); preparing food (92%) and sewerage facilities (97%). Access to working facilities in remote and very remote areas was lower than in non-remote areas. Overall, access to household facilities has remained relatively stable since 2008.

For Aboriginal and Torres Strait Islander people living in remote communities, a 2017 report, *Water, sanitation and hygiene in remote Indigenous communities: a scan of priorities*, provides an overview of the current status of water, sanitation and hygiene services and challenges however, the information provided is more qualitative than quantitative [244].

Remote housing review

A 2017 review which assessed the outcomes of two Australian Government key strategies, the National Partnership Agreement for Remote Indigenous Housing (NPAIH) and its replacement, the Remote Housing Strategy, found that there has been some progress in

⁷¹ Demand sharing is mainly where resources and money are shared within an extended family group [240].

⁷² A dwelling requiring one or more additional bedrooms, according to the Canadian Nation Occupancy Standard (CNOS), a measure widely used in Australia [241].

⁷³ Housing of an acceptable standard includes two components: working household facilities; and major structural components [5].

the provision of remote housing. However, there was also a range of ongoing issues that need to be addressed to reduce the levels of overcrowding, and to sustain the quality of housing achieved as a result of these strategies [245].

There were also some issues around the implementation and development of the Remote Housing Strategy, which hampered the effectiveness of this program [245]. These included:

- complications because of the Commonwealth being the only funder of the program, which did not ensure that the states and territories were adequately motivated to provide strong outcomes
- obstacles relating to objectives and shifting policy settings
- opportunities for local workers to be engaged in the program were not always available
- a lack of long-term employment and business growth because of the two-year capital work cycles.

Hospitalisation

In 2014-15, after age-adjustment, Aboriginal and Torres Strait Islander people were hospitalised for selected diseases related to environmental health at 2.3 times the rate of non-Indigenous people [5]. In remote and very remote areas, the rate was 4.0 times the rate of non-Indigenous people. Hospitalisation for scabies and ARF were particularly high, with Aboriginal and Torres Strait Islander people nationally hospitalised at 51.3 and 43.2 times the rate of non-Indigenous people respectively. There has been little change in the hospitalisation rates for selected diseases related to environmental health in recent years, with the rate for Aboriginal and Torres Strait Islander people 2.2 times higher than for non-Indigenous people in 2012-13.

Mortality

For 2010-2014 in NSW, Qld, WA, SA and the NT, after age-adjustment, Aboriginal and Torres Strait Islander people died as a result of diseases associated with poor environmental health at 1.7 times the rate of non-Indigenous people [5]. This is a small decrease compared with 2003-2007, where Aboriginal and Torres Strait Islander people died at 1.8 times the rate of non-Indigenous people.

Nutrition

The diet of Aboriginal and Torres Strait Islander people have changed since the time of colonisation, from traditional diets that were high in protein, fibre, polyunsaturated fat and complex carbohydrates to a more highly refined carbohydrate diet, with added sugars, saturated fat, sodium and low levels of fibre [246]. Traditional foods remain an important part of the diet for many people, strongly linked to identity, culture and country.

The nutritional status of Aboriginal and Torres Strait Islander people is influenced by many factors such as socioeconomic disadvantage, and geographical, environmental and social factors [247]. Poor nutrition is an important factor contributing to overweight and obesity, malnutrition, CVD, type 2 diabetes, and tooth decay [247, 248]. The Australian dietary guidelines recommend that adults eat fruit and plenty of vegetables every day, selected from a wide variety of types and colours [248]. 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'⁷⁴ foods and drinks.

A recent report by the AIHW states that there is little difference between the food and nutrient intakes and health outcomes of Aboriginal and Torres Strait Islander people and non-Indigenous Australians [250].

Fruit consumption

Based on data from the 2012-13 National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey (NATSINPAS), Aboriginal and Torres Strait Islander children (2-18 years) averaged 1.6 serves of fruit a day and adults (aged 19 years and over) averaged one serve per day [251]. 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 [252]. Females were 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 (rate ratio 0.9) [45]. 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) [253]; 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 [252].

Vegetable consumption

According to the 2012-13 NATSINPAS, Aboriginal and Torres Strait Islander children (2-18 years) averaged 1.4 serves of vegetables a day and adults (aged 19 years and over) averaged 2.1 serves per day [251]. 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 [252]. 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)

⁷⁴ Foods that are energy dense but do not provide many/any nutrients and that typically contain high levels of sugar, salt and fat [248, 249].

[254]. 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) [45]. 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) [253].

Fruit and vegetable dietary behaviour and labour force

The 2012-13 AATSIHS examined associations between dietary behaviour and labour force status and educational attainment [45]. 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 2012-13 NATSINPAS, Aboriginal and Torres Strait Islander people aged two years and over averaged 1.2 serves per day of milk, yoghurt, cheese and alternatives [251]. Dairy milk was the most frequently consumed product (65%) followed by cheese (30%). Milk products and dishes (dairy foods) were consumed by 83% of Aboriginal and Torres Strait Islander people [253]. 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 2012-13 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%) [253]. 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) [252]. 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) [253]. People in non-remote areas were more likely to consume all discretionary foods types than those in remote areas, except for non-alcoholic beverages (99% of people in both non-remote and remote locations).

Sugar consumption

The WHO recommends that both adults and children consume less than 10% of daily dietary energy from free sugars [255]. According to the 2012-13 NATSINPAS, Aboriginal and Torres Strait Islander people consumed 111 grams (g) of total sugars per day on average [249]. Around two-thirds of this (75 g or 18 teaspoons of white sugar) was free sugars⁷⁵, which equated to an average of 14% of daily dietary energy from free sugars. Ninety-one percent (91%) of the free sugars were added⁷⁶ sugars (Derived from [249]). Males consumed more total sugars on average than females (121 g compared with 101 g) especially in the 14-18 years age-group (147 g compared with 102 g). The variation in sugar consumption across age and sex was mostly due to the consumption of free sugars as the amount of intrinsic and milk sugars consumed remained relatively constant across all age and sex groups. The majority of free sugars consumed were from discretionary foods and beverages.

Sodium (salt) consumption

According to the 2012-13 NATSINPAS, the average daily amount of sodium consumed from food by Aboriginal and Torres Strait Islander people was 2,379 mg (approximately one teaspoon of salt) [252]. This excludes salt added by consumers in household cooking or when preparing food. Sodium consumption was higher among males than females (2,638 mg and 2,122 mg 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.

The average daily sodium intake was similar for Aboriginal and Torres Strait Islander people and non-Indigenous people (2,379 mg and 2,408 mg respectively) [252]. Males recorded a higher consumption of sodium than females in both populations.

Bush foods

As a proxy measure of bush food consumption, participants in the 2012-13 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 [253]. 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).

⁷⁵ Free sugars are added sugars plus those naturally occurring in honey, fruit juice and fruit concentrate [249].

⁷⁶ Added sugars are added to foods during manufacture or by the consumer during food preparation or consumption [249].

Biomarkers of nutrition

The 2012-13 NATSIHMS collected information on biomarkers of nutrition, including vitamin D, anaemia and iodine [50]. It 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 non-Indigenous people (rate 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 most age-groups (rate ratio 1.9 after age-adjustment). Females were more likely to be at risk of anaemia than males (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.

Food security

The 2012-13 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 [256]. This had 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). A recent study conducted in urban settings identified that food insecurity is intermittent, occurring especially when large household bills are due for payment [257].

Burden of disease

The 2011 Australian Burden of Disease study considered the contribution of 29 selected risk factors to the burden of disease, of which 13 risk factors were dietary [38]. When combined, the joint effect of all dietary risks contributed 9.7% to the total burden of disease for Aboriginal and Torres Strait Islander people. The contribution of dietary risk factors to the burden of disease was particularly notable in the 65 years and over age-group, with a diet low in fruit contributing 4% to the burden for Aboriginal and Torres Strait Islander males and 3% for Aboriginal and Torres Strait Islander females.

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 [248, 258]. Breastfeeding promotes sensory and cognitive development and protects the infant against SIDS, asthma, infectious diseases and, chronic diseases later in life. 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' [248]. The WHO recommends exclusive breastfeeding for six months followed by complementary feeding with continued breastfeeding for up to two years or beyond [258]. Breastfeeding contributes to the health of the mother by reducing the risk of ovarian and breast cancers.

In the 2014-15 NATSISS, it was reported that 80% of Aboriginal and Torres Strait Islander children aged 0-3 years had been breastfed [25, 94]. This is similar to the proportion measured in the 2012-13 AATSIHS, where 83% of Aboriginal and Torres Strait Islander children aged 0-3 years had been breastfed. The NATSISS found that Aboriginal and Torres Strait Islander children aged 0-2 years were 1.2 times more likely than non-Indigenous infants to have never been breastfed (18% compared with 14% 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 (15% 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 (4% compared with 12% respectively).

The proportion of Aboriginal and Torres Strait Islander infants aged 0-2 years who had been breastfed ranged from 98% in the NT to 75% in Vic (87% in ACT, 86% in Qld, 83% in SA, 79% in NSW, 78% in Tas and 77% in WA) [25]. Of these, higher proportions of Aboriginal and Torres Strait Islander children than non-Indigenous children were breastfed in Qld, Tas and NT. Breastfeeding proportions for Aboriginal and Torres Strait Islander children were higher in very remote areas (91%) compared with major cities (73%).

According to the 2010 Australian National Infant Feeding Survey, breastfeeding initiation levels were similar among Indigenous and non-Indigenous mothers (87% and 90% respectively), but levels of exclusive breastfeeding declined more rapidly among Indigenous mothers [259]. At five months of age, only 11% of Indigenous babies were exclusively breastfed, compared with 27% of non-Indigenous babies.

A study of infant feeding behaviour among Aboriginal women in rural Australia concluded that lack of intergenerational support, unsupportive social factors and the pervasive presence of infant formula produced strong barriers to breastfeeding [260]. However, a

recent study in SA concluded that Aboriginal Family Birthing program services - where Aboriginal women are cared for by Aboriginal women - are having a positive impact on rates of breastfeeding of Aboriginal infants [261].

Physical activity

Physical activity is important for maintaining good overall health and wellbeing [262]. Low levels of activity, including high levels of sedentary behaviour are risk factors for a range of health conditions as well as being a strong contributor to obesity. *Australia's physical activity and sedentary behaviour guidelines* for adults recommend a combination of moderate and vigorous physical activity on most, preferably all, days of the week to improve health and reduce the risk of chronic disease and other conditions [263]. However, doing some physical activity is better than doing none and the health benefits of being physically active are continuous, starting with any activity above zero [264]. Regular physical activity reduces the risk of many health problems, such as CVD, type 2 diabetes, depression and certain cancers [263].

According to the 2012-13 AATSIHS, 47% of Aboriginal and Torres Strait Islander adults 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) [157]. A smaller proportion (41%) of adults had exercised for at least 150 minutes over five sessions in the previous week. Over one-quarter (29%) of 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 non-Indigenous people. 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 [262].

Among Aboriginal and Torres Strait Islander adults living in non-remote areas, a significantly higher proportion of 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%) [157]. Males in non-remote areas were significantly more likely than 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 [157, 262]. In remote areas, 55% of 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 [262]. 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 [157]. A higher proportion of females than males were physically inactive (68% compared with 53%). 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 [262].

On average, Aboriginal and Torres Strait Islander adults engaged in around one third the amount of physical activity as children aged 5-17 years (39 minutes per day including 21 minutes on walking for transport) [262].

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 non-Indigenous children [262]. 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 performed by 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 a quarter of the children (25%) meeting the recommended 12,000 steps per day. For Aboriginal and Torres Strait Islander children aged five years and over in remote areas, 82% did more than 60 minutes of physical activity on the day prior to the interview. Other than walking (82%), the two most common activities were running (53%) and playing football or soccer (33%).

Aboriginal and Torres Strait Islander children spent less time than non-Indigenous children using the internet or computer for homework; four minutes compared with eight minutes per day for 12-14 year-olds and eight minutes compared with 20 minutes per day for 15-17 year-olds [262]. 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).

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 non-Indigenous children in the same age group (3.5 hours compared with 2.8 hours) [262]. 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.

Bodyweight

The most common measure for classifying a person's weight status is body mass index (BMI) (BMI: weight in kilograms divided by height in metres squared) or by measuring their waist circumference (WC) [265]. Being overweight (BMI 25 to 29) or obese (BMI of 30 or more) [265] increases a person's risk for CVD, type 2 diabetes, certain cancers, CKD and some musculoskeletal conditions [266]. 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 [248, 267]. Being underweight (BMI less than 18.5) [73] can also have adverse health consequences, including lower immunity (leading to increased susceptibility to some infectious diseases) and osteoporosis (bone loss) [248].

Abdominal obesity, a risk factor for the development of metabolic syndrome, can be measured by WC alone (greater than 94 cm for males and greater than 80 cm for females), or waist-hip ratio (WHR) (greater than or equal to 0.90 for males and 0.85 for females) [268].

Obesity and abdominal obesity, as measured by BMI and WC, have been shown to be risk factors for hypertension [269] and type 2 diabetes in Aboriginal and Torres Strait Islander people [270]. 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 [271-273]. It has been suggested that a BMI of 22 might be more appropriate than 25 as a measure of acceptable BMI for Aboriginal people [273]. There is also evidence that measuring the WHR in Aboriginal people is more accurate and easier to measure than BMI. An equation has been developed for calculating fat free mass in Aboriginal and Torres Strait Islander adults using the easily acquired variables of resistance⁷⁷, height, weight, age and sex for use in the clinical assessment and management of obesity [274].

Nationally in 2012-2013, 69% of Aboriginal and Torres Strait Islander people aged over 18 years were considered to be overweight (29%) or obese (40%) [5]. A further 28% were normal weight and 3.1% were underweight. More Aboriginal and Torres Strait Islander males than females were overweight (32% and 27% respectively); however, females were more likely to be obese than males (43% and 36% respectively). The rates of overweight remained relatively stable as age increased, however the obesity rates increased with age, from 28% for those aged 18-24 years to 49% for those aged 55 years and over. This was similar for both males and females. After age-adjustment, the combined overweight/obesity levels were slightly higher for Aboriginal and Torres Strait Islander people aged 18 years or older than for their non-Indigenous counterparts (rate ratio: 1.2). Aboriginal and Torres Strait Islander people were 1.6 times as likely as non-Indigenous people to be obese (rate ratios: 1.4 for males and 1.7 for females) [275].

In 2012-2013, 3.1% of Aboriginal and Torres Strait Islander people aged 18 years or older were underweight, with 2.4% of Aboriginal and Torres Strait Islander males and 3.8% of Aboriginal and Torres Strait Islander females having a BMI of less than 18.5 [275]. After age-adjustment, Aboriginal and Torres Strait Islander people were 1.6 times more likely to be underweight than non-Indigenous people (rate ratios: for males 1.8 and females 1.5) but less likely to be of normal weight (rate ratio: 0.7).

Measurements of WC and WHR were taken in the 2012-13 AATSIHS to help determine levels of risk for developing certain chronic diseases [276]. 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 of developing chronic diseases. Based on WHR, 81% of males and 73% of females aged 18 years or older were at increased risk of developing chronic diseases. The proportion 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 2012-13 AATSIHS, based on BMI information, around 30% of Aboriginal and Torres Strait Islander children aged 2-14 years were either overweight (20%) or obese (10%), 62% were in the normal weight range, and 8% were underweight [45]. 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 for non-Indigenous children (rate ratio: 1.2) mainly due to higher obesity rates in both Aboriginal and Torres Strait Islander boys and girls (boys: 10% compared with 6% respectively; and girls: 11% compared with 7% respectively).

In 2017, the national key performance indicators for Aboriginal and Torres Strait Islander primary health care services reported that, of their regular clients attending their services aged 25 years and over 71% were either overweight or obese in the previous two years. Of these, 27% were overweight and 44% were obese [23]. More females were overweight or obese than males across all age groups. However, the percentage of regular clients classified as obese rose with age for both males and females up until around 64 years, then fell slightly thereafter. Overall more than half of the organisations (114 of 214) reported 73% of their clients, 25 years and above, to be overweight or obese.

Immunisation

In recent decades, vaccination has been very successful in contributing to improvements in Aboriginal and Torres Strait Islander health and child survival [187]. National immunisation coverage rates for Aboriginal and Torres Strait Islander children have improved steadily since 2008, reducing the gap between Indigenous and non-Indigenous children [277]. The National Immunisation Program (NIP) schedule for the Australian population recommends vaccinations at different stages of life and additional recommendations for specific high risk populations [187]. Due to some vaccine-preventable diseases still being experienced at higher rates among Aboriginal and Torres Strait Islander people, other supplementary vaccines⁷⁸ are also specifically prescribed depending on age, location and health risk factors.

⁷⁷ 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.

⁷⁸ These include vaccinations for Bacille Calmette-Guérin (BCG) for newly born babies living in areas of high TB incidence in Qld northern SA and NT, hepatitis A for children living in Qld, WA, SA and the NT, hepatitis B for adults not previously vaccinated against hepatitis B or who are non-immune, influenza for all persons aged 6 months or over, meningococcal for ACWY and B for persons aged 2 months to 19 years, pneumococcal conjugate for children living in Qld, WA, SA and the NT and pneumococcal polysaccharide for persons aged 50 years and older with a second dose for persons 65 years and older with underlying conditions [187].

Childhood vaccination

Nationally, in 2014 it was agreed by the Australian Chief Medical Officer and state and territory chief health officers to set a goal of having 95% of children fully immunised in line with the NIP schedule's recommendations relevant to their age [278]. The NIP requires the following vaccinations for a child to be considered fully immunised by age 5 years; hepatitis B, diphtheria, tetanus, pertussis (whooping cough), *Haemophilus influenza type b* (Hib), measles, mumps and rubella (MMR), polio, pneumococcal conjugate, meningococcal C, varicella (chickenpox) [279, 280]. Across primary health networks (PHN) in 2016-2017, percentages for fully immunised Aboriginal and Torres Strait Islander children varied for all three age-groups [279].

These ranges were:

- 1 year-olds - 96% in Murrumbidgee, NSW to 85% in Perth North, WA
- 2 year-olds - 94% in Eastern Melbourne, Vic to 81% in Perth South, WA
- 5 year-olds - 100%⁷⁹ in Northern Sydney, NSW to 90% in Western Vic.

In 2016-2017, for 5 year-old Aboriginal and Torres Strait Islander children, there were 22 out of 31 PHN areas with vaccination proportions above 95% compared with 2 out of 31 in 2012-2013 [279].

According to data from more than 80 Statistical Areas Level 4 (SA4s), the proportion of Aboriginal and Torres Strait Islander children who were fully immunised in 2016-2017 varied by age [279], ranging from:

- 98% in Moreton Bay South Qld to 80% in Perth South East, WA for 1 year-olds
- 97%⁸⁰ in Mandurah, WA to 75% in Perth – South East, WA, for 2 year-olds
- 99%⁸¹ Melbourne North East, Vic to 86% in Geelong⁸², Vic for 5 year-olds.

According to the Australian Immunisation Register, national immunisation rates for fully immunised Aboriginal and Torres Strait Islander children at September 2018 were lower than the rates for all children: 93% compared with 94% for 1 year-olds, and 88% compared with 91% for 2 year-olds [280]. The national immunisation rate for Aboriginal and Torres Strait Islander 5 years-olds was higher than the rate for all children (97% compared with 95% respectively).

Adult vaccination

Vaccinations for hepatitis B, seasonal influenza, pneumococcal disease, Japanese encephalitis (outer Torres Strait Islander residents) and rubella (non-pregnant women of child bearing age) are recommended for Aboriginal and Torres Strait Islander adults [187]. Due to the high rates of mortality and morbidity associated with hepatitis B in the Aboriginal and Torres Strait Islander population, it is important that people are tested for hepatitis B infection, and offered vaccination if they are not immune.

As reported in the *National key performance indicators for Aboriginal and Torres Strait Islander primary health care: results for 2017*, 36% of Aboriginal and Torres Strait Islanders regular clients⁸³ aged over 50 years were immunised against influenza compared with 32% in June 2017 [23]. Of those clients aged 15-49 years with type 2 diabetes and COPD, 36% and 37% were immunised against influenza respectively.

The 2012-13 AATSIHS found that among Aboriginal and Torres Strait Islander adults aged 50 years and older, influenza vaccination in the previous 12 months was reported by: 51% of adults aged 50-64 years, 74% of adults aged 65 years and above, and overall 57% of adults aged 50 years and older [92]. Vaccination for pneumococcus in the previous five years was reported by: 23% of 50-64 year-olds, 44% of 65 year-olds and older, and 29% overall of 50 years and older.

Tobacco use

Tobacco use has a number of health impacts, including increasing the risk of chronic disease, such as CVD, many forms of cancer, and lung diseases, as well as a variety of other health conditions [25]. 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 exacerbation of middle ear infections, asthma, and increased risk of SIDS.

Extent of tobacco use among Aboriginal and Torres Strait Islander people

The 2014-15 NATSISS is currently the most reliable source of information on the prevalence of tobacco smoking among Aboriginal and Torres Strait Islander people. While the more recent report, the National Drug Strategy Household Survey 2016: detailed findings (NDSHS) has data from 2016, there are issues with the sample size of Aboriginal and Torres Strait Islander people, as well as some other

⁷⁹ Interpret with caution due to low numbers of eligible children.

⁸⁰ Interpret with caution due to low numbers of eligible children.

⁸¹ Interpret with caution due to low numbers of eligible children.

⁸² Interpret with caution due to low numbers of eligible children.

⁸³ A regular client is a person who has an active medical record - that is, a client who attended the primary health care organisation at least three times in the last two years [23].

limitations. Because of this, comparisons against non-Indigenous people must be interpreted with caution [281]. The 2014-15 NATSISS also has more comprehensive data in terms of remoteness, sex and age.

The 2014-15 NATSISS found that 39% of Aboriginal and Torres Strait Islander people aged 15 years and over reported that they were current daily smokers [94]. This represents a significant reduction from levels reported in the 2008 NATSISS (45%) and 2002 (49%). Findings from the NDSHS, which reported on Aboriginal and Torres Strait Islander people aged 14 years and over, also showed a significant decrease in smoking levels, but with smaller numbers of Aboriginal and Torres Strait Islander people, declining from 35% in 2010, to 32% in 2013 and 27% in 2016 [281].

A report which looked at long-term smoking trends among Aboriginal and Torres Strait Islander people has found that there have been some significant decline in smoking rates over the 20 year period 1994 to 2014-15 [282]. In particular, smoking prevalence has decreased in those aged 18 years and over, and also in smoking initiation for the 15-17 years age-group. While the year-to-year declines in smoking rates reported in the major health surveys don't always appear to be significant, this report shows that there are encouraging trends in the younger age cohorts which will result in improved health outcomes over time.

In 2014-2015, the proportion of Aboriginal and Torres Strait Islander males who were current daily smokers (42%) was higher than the proportion of Aboriginal and Torres Strait Islander females (36%) [94]. Aboriginal and Torres Strait Islander males had the highest proportion of current daily smokers across all age-groups, most notably in the 45-54 years age-group (51% compared with 41% of females). For Aboriginal and Torres Strait Islander people, the age-group with the highest proportion of current daily smokers was 35-44 years (47%). After age-adjustment, Aboriginal and Torres Strait Islander people were 2.8 times more likely to smoke than non-Indigenous people (39% compared with 14% respectively).

In 2014-2015, Aboriginal and Torres Strait Islander people living in remote areas reported a higher proportion of current daily smokers (47%) than those living in non-remote areas (37%) [94]. The overall proportion of current smokers in remote areas in 2014-2015 has only seen a minor decrease since 2002 (47% and 50% respectively).

When comparing smoking prevalence over the six years between the 2014-15 NATSISS, and the 2008 NATSISS, the highest reductions in daily smoking have been found in the younger age-groups [94]. In 2008, the proportion of 15-24 year-olds who smoked daily was 39%, compared with 31% in 2014-2015. The proportion for the 25-34 years age-group was 53% in 2008 compared with 45% in 2014-2015.

High rates of smoking have been reported for Aboriginal and Torres Strait Islander mothers, however since 2009 the proportion of Aboriginal and Torres Strait Islander mothers who reported smoking during pregnancy has decreased from 50% in 2009 to 43% in 2016 [19]. The proportion of smoking cessation for Aboriginal and Torres Strait Islander women during the second 20 weeks of pregnancy was 13%, compared with 26% among non-Indigenous women.

In 2014-2015, 57% of Aboriginal and Torres Strait Islander children aged 0-14 years lived in households with a daily smoker (a decline from 63% in 2008) [94]. For those children living with a daily smoker, 13% were living in households where people smoked indoors.

In 2011, tobacco use remained the leading cause of the burden of disease and injury among Aboriginal and Torres Strait Islander people, responsible for 12% of the total burden of disease [38]. It contributed around 40% of the disease burden to CVD, cancer and respiratory diseases. Tobacco use was also the risk factor contributing the most (23%) to the health gap between Aboriginal and Torres Strait Islander and non-Indigenous people.

Alcohol use

Drinking too much alcohol, both on single drinking occasions (binge drinking) and over a person's lifetime can lead to health and social harms including chronic diseases, injury and transport accidents, mental health disorders, intergenerational trauma and violence. This not only affects the individual, but families and the wider community [283, 284]. Many common factors influence why people drink too much alcohol, for example, socioeconomic disadvantage, stress, and early life experience [285]. With regard to Aboriginal and Torres Strait Islander people, it is important to understand the historical and social contexts of colonisation, the effects of dispossession of land and culture and economic exclusion [283, 286, 287].

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 at levels that cause harm [25, 284]. Evidence suggests that Aboriginal and Torres Strait Islander people have better health outcomes when there are adequately resourced and culturally safe alcohol and other drug (AOD) services provided by community controlled organisations [287, 288].

Extent of alcohol use among Aboriginal and Torres Strait Islander people

Assessing risks from use of alcohol

The 2009 NHMRC *Australian guidelines to reduce health risks from drinking alcohol* seek to estimate the overall risk of alcohol-related harm over a person's lifetime [289]:

- Guideline 1 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 2 states that to reduce the risk of injury on a single occasion of drinking, no more than four standard drinks should be consumed.
- Guideline 3 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 4 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

Aboriginal and Torres Strait Islander people are more likely to not drink alcohol than non-Indigenous people. In the 2014-15 NATSISS, 38% of Aboriginal and Torres Strait Islander people aged 15 years and over reported not drinking alcohol in the previous 12 months [94]. In the 2012-13 AATSIHS, 23% of Aboriginal and Torres Strait Islander people aged 18 years or older (17% of males and 28% of females) had never drunk alcohol or had not done so for more than 12 months [290]. After age-adjustment, abstinence was 1.6 times more common among Aboriginal and Torres Strait Islander people than among non-Indigenous people. Similar proportions of Aboriginal and Torres Strait Islander and non-Indigenous people have never drunk alcohol (10% and 8.9% respectively).

Short-term and single occasion risk

The 2012-13 AATSIHS reported that 18% of Aboriginal and Torres Strait Islander people aged 18 years and over did not exceed the 2009 guidelines (four or less standard drinks on a single day for both males and females) and 57% did exceed the guideline [290]. Aboriginal and Torres Strait Islander people were significantly more likely than non-Indigenous people to exceed the 2009 guidelines for drinking at short-term/single occasion risk (52% and 45% respectively after age-adjustment) [290]. Aboriginal and Torres Strait Islander males were 1.5 times more likely than Aboriginal and Torres Strait Islander females to exceed the 2009 guidelines for drinking at risk on a single occasion (68% compared with 46% respectively). In the 2014-15 NATSISS, the proportion of Aboriginal and Torres Strait people exceeding the guidelines for single occasion risk was lower in very remote areas (28%) compared with inner and outer regional and remote areas (33%, 34% and 39% respectively) [94].

Lifetime risk

The 2016 NDSHS reported that between 2010 and 2016 there was a significant decline (from 32% to 20%) in the proportion of Indigenous people aged 12 years and older exceeding the 2009 guidelines for lifetime risk (no more than two standard drinks on any single day) [284]. The 2012-13 AATSIHS reported that among Aboriginal and Torres Strait Islander people aged 18 years and over who drank alcohol, 20% drank at levels exceeding the 2009 guidelines for long-term/lifetime drinking risk [291]. After age-adjustment, lifetime drinking risk was similar for both Aboriginal and Torres Strait Islander people and non-Indigenous people (rate ratio 1.0). Aboriginal and Torres Strait Islander males were 2.7 times more likely than Aboriginal and Torres Strait Islander females to exceed the guidelines for risk of long-term harm (29% compared with 11% respectively).

A lower proportion of Aboriginal and Torres Strait Islander people aged 15 years and older in very remote areas (14%) exceeded the guidelines for lifetime risk when compared with other areas, specifically inner regional (19%) and remote areas (23%) [125].

Alcohol and pregnancy

Drinking alcohol in pregnancy can affect the unborn baby leading to fetal alcohol spectrum disorder (FASD), a diagnostic term that describes a range of conditions including central nervous system dysfunction, poor growth, characteristic facial features and developmental delay [292, 293]. The 2014-15 NATSISS reported a 50% reduction of mothers of Aboriginal and Torres Strait Islander children that drank through pregnancy, from 20% in 2008 to 9.8% in 2014-2015 [94]. In the 2008 NATSISS, 80% of mothers of Indigenous children aged 0-3 years did not drink during pregnancy, 16% drank less, and 3% drank the same or more alcohol during pregnancy [294]. The proportion of mothers who drank the same or more alcohol during pregnancy was greatest in Tas and ACT (6.0%), followed by Vic (5.4%), and WA (5.0%).

Hospitalisation

In 2014-15, the age-standardised alcohol-related hospitalisation rate for Aboriginal and Torres Strait Islander people was 7.3 per 1,000 [5]. Aboriginal and Torres Strait Islander males were hospitalised at 4.0 times the rate for non-Indigenous males and Aboriginal and Torres Strait Islander females were hospitalised at 3.4 times the rate for non-Indigenous females.

Between 2004-05 and 2014-15, age-adjusted hospital separations due to acute intoxication increased among Aboriginal and Torres Strait Islander people⁸⁴, from 2.1 per 1,000 to 5.8 per 1,000 [5]. These rates were higher than for non-Indigenous people in every year (rate ratio 5.7 in 2004-05 increasing to 11.4 in 2014-15). In 2014-15, the highest rate of hospital separations related to alcohol use for Aboriginal and Torres Strait Islander people was for mental/behavioural disorders (7.8 per 1,000) which was 3.7 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 2014-15 varied by level of remoteness [5]. Aboriginal and Torres Strait Islander people living in remote and very remote areas had the highest rate of hospitalisation due to acute intoxication (11 per 1,000) while those people in urban areas had the lowest (3.4 per 1,000). In remote and very remote areas, the hospitalisation rate for alcohol-related diagnoses was 7.1 times higher than the rate for non-Indigenous people [5].

Mortality

For 2013-2017 in NSW, Qld, WA, SA and NT the Aboriginal and Torres Strait Islander death rate due to alcohol was five times greater after age-adjustment than for non-Indigenous people (24 per 100,000 compared with 4.7 per 100,000 respectively) [30]. The death rate for Aboriginal and Torres Strait Islander females was six times that of non-Indigenous females, and five times for Aboriginal and Torres Strait Islander males compared with non-Indigenous males. Aboriginal and Torres Strait Islander males were 2.9 times more likely to die due to alcohol use compared with females. The main cause of alcohol-related deaths was from alcoholic liver disease [30].

In 2011, alcohol use was responsible for 8.3% of the total burden of disease among Aboriginal and Torres Strait Islander people [38]. The highest levels of disease burden from alcohol use among Aboriginal and Torres Strait Islander people were for mental and substance use disorders (22%), injury (19%) and gastrointestinal diseases (15%).

Illicit drug use

Illicit drug use describes the use of drugs that are illegal to possess (e.g. cannabis, heroin, ecstasy and methamphetamine), and the non-medical use of prescribed drugs such as painkillers [5, 295]. Illicit drug use is associated with an increased risk of; mental illness, poisoning, self-harm, infection with blood borne viruses from unsafe injection practices, chronic disease and death [5, 38, 296, 297].

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

Surveys consistently show that most Aboriginal and Torres Strait Islander people do not use illicit drugs [94, 281, 298]. The two most recent national surveys to collect this data, the 2016 NDSHS (which contained a small sample of Aboriginal and Torres Strait Islander respondents)⁸⁵ and the 2014-15 NATSISS found that 73% of Aboriginal and Torres Strait Islander people aged 14 years and over (NDSHS) and 69% of Aboriginal and Torres Strait Islander people aged 15 years and over (NATSISS) reported either never using illicit drugs or had not used illicit drugs in the last 12 months (Derived from [94, 281]).

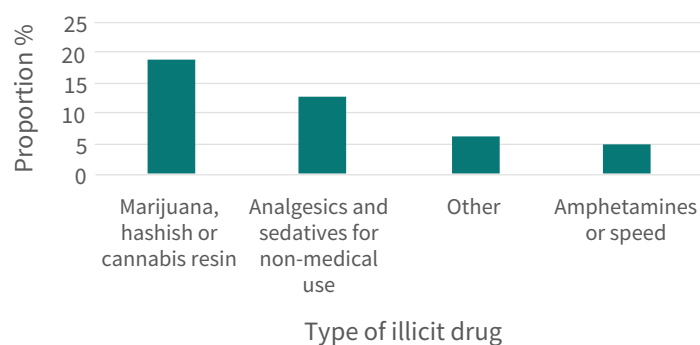
The 2014-15 NATSISS found that 30% of Aboriginal and Torres Strait Islander people aged 15 years and over reported using illicit drugs in the last 12 months [94]. Similar proportions were recorded in the 2016 NDSHS which found 27% of Aboriginal and Torres Strait people aged 14 years and over reported using illicit drugs in the last 12 months [281]. The NDSHS allows some comparison with the non-Indigenous population; Aboriginal and Torres Strait Islander people were around 1.8 times more likely to have used illicit drugs in the past 12 months when compared with non-Indigenous people (derived from [281]).

The 2014-15 NATSISS and the 2016 NDSHS found that cannabis (marijuana, hashish or cannabis resin) was the most commonly used illicit drug, used by 19% of Aboriginal and Torres Strait Islander in the previous 12 months [94, 281]. The NATSISS reported that after cannabis, the most commonly used illicit drugs were analgesics and sedatives for non-medical use (13%), 'other' drugs (heroin, cocaine, petrol, LSD/synthetic hallucinogens, naturally occurring hallucinogens, ecstasy/designer drugs, methadone and kava) (6.4%) and amphetamines (4.8%) (Figure 3) [94].

⁸⁴ In NSW, Vic, Qld, WA, SA and NT.

⁸⁵ Because of the small sample size (n= 568 Aboriginal and Torres Strait Islander respondents), comparison of data between Aboriginal and Torres Strait Islander people and non-Indigenous people should be viewed with caution.

Figure 3. Proportion of Aboriginal and Torres Strait Islander people who reported illicit drug use in the last 12 months, 2014-2015



Note: 'Other' includes heroin, cocaine, petrol, LSD/synthetic hallucinogens, naturally occurring hallucinogens, ecstasy/designer drugs, methadone and kava.

Source: ABS, 2016 [94]

In 2014-2015, Aboriginal and Torres Strait Islander males were more likely than females to have used an illicit drug in the previous 12 months (34% and 27% respectively) [94]. The higher proportions of use by males were found for all drug types, except analgesics and sedatives where the proportions for females were higher (15% and 11% respectively). Almost twice as many Aboriginal and Torres Strait Islander males as females had used cannabis (25% compared with 14%), amphetamines (6.3% compared with 3.2%), and 'other' drugs (8.5% compared with 4.5%). 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 2014-2015 (33% compared with 21%).

In 2016-17, 80 organisations were funded to provide substance use services specifically for Aboriginal and Torres Strait Islander people [299]. Of these, most organisations (95%) provided non-residential services; 40% ran residential care services and 14% sobering-up, residential respite or short-term care services. The most common illicit substance use issues that organisations reported people sought help for were: cannabis (95%), amphetamines (80%) and multiple drug use (60%).

In 2016-17, 15% of clients seeking treatment for alcohol and drug use from general AOD treatment services were Aboriginal and Torres Strait Islander [300]. Since 2012-13 the proportion of clients seeking treatment for amphetamines has increased. After alcohol, the most common principal drug of concern that Aboriginal and Torres Strait Islander people sought treatment for were: cannabis (27%), amphetamines (25%) and heroin (4%).

Hospitalisation

In 2014-15, the most common drug-related conditions resulting in hospitalisation for Aboriginal and Torres Strait Islander people were for 'poisoning' and 'mental and behavioural disorders' [5]. The hospitalisation rate for Aboriginal and Torres Strait Islander people from poisoning due to drug use (2.9 per 1,000) was 2.3 times the rate for non-Indigenous people (1.3 per 1,000). The hospitalisation rate for mental and behavioural disorders due to drug use for Aboriginal and Torres Strait Islander people (3.5 per 1,000) was 3.1 times the rate for non-Indigenous people (1.1 per 1,000). Hospitalisation for mental/behavioural disorders from use of amphetamines⁸⁶ had the highest rate of separations due to drug use and was 3.7 times higher for Aboriginal and Torres Strait Islander people (1.5 per 1,000) than non-Indigenous people (0.4 per 1,000). Cannabis use was the second highest cause of hospitalisation for mental and behavioural disorders due to drug use, with Aboriginal and Torres Strait Islander people 3.9 times more likely to be hospitalised (0.8 per 1,000) than non-Indigenous people (0.2 per 1,000).

Hospitalisation rates due to drug use were higher for Aboriginal and Torres Strait Islander people in major cities (9.1 per 1,000) than in inner and outer regional areas (6.2 per 1,000) and remote areas (3.9 per 1,000) [5].

Mortality

For the period 2010-2014, SA recorded the highest rate of drug-induced deaths for Aboriginal and Torres Strait Islander people (24 per 100,000), followed by NSW (17 per 100,000), and WA (9 per 100,000) [5]. Rates of drug induced deaths were higher for Aboriginal and Torres Strait Islander males (14 per 100,000) than for females (10 per 100,000). The rate of drug-induced deaths was around 1.9 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (Table 31) (derived from [5]).

⁸⁶ ICD code F15 hospitalisation from use of other stimulants includes amphetamine-related disorders and caffeine but not cocaine.

Table 31. Rate of drug induced deaths, by Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA, and the NT, 2010-2014

Jurisdiction	Indigenous rate	Non-Indigenous rate	Rate ratio
NSW	17	6.4	2.6
Qld	9.1	6.7	1.4
WA	9.4	7.1	1.3
SA	24	6.5	3.8
NT	6.1	4.1	1.5
NSW, Qld, WA, SA and the NT	12	6.5	1.9

Notes: 1 Rates are per 100,000 (age-standardised).

2 Deaths where Indigenous status was not stated are excluded from the analysis.

Source: Derived from Steering Committee for the Review of Government Service Provision, 2016 [5]

In 2011, illicit drug use made a greater contribution to the burden of disease for Aboriginal and Torres Strait Islander people than for the total population with an overall burden of 3.7% compared with 1.8% respectively [38, 117]. The highest level of disease burden attributable to illicit drug use for Aboriginal and Torres Strait Islander people was for gastrointestinal disorders including chronic liver disease (31% compared with 17% for the total population) followed by injury (7.4% compared with 1.7 % for the total population). Illicit drug use contributed 5.9% to the burden of disease for mental health for both Aboriginal and Torres Strait Islander and the total population.

Volatile substance use

Volatile substance use (VSU) involves sniffing substances that give off fumes at room temperature such as petrol, paint, glue or deodorants [301]. They are also called ‘inhalants’ because of the way people use them by inhaling the fumes through the nose or mouth.

Most volatile substances are central nervous system depressants which slow down brain activity. Short-term effects include; slurred speech, lack of coordination, dizziness and euphoria [302, 303]. With short lasting effects, users continue to inhale for hours to extend the feelings of intoxication. Sniffing volatile substances can cause the heart to stop within minutes [303]. This condition is known as sudden sniffing death and can happen to a first time user who is otherwise healthy. VSU can also cause a person to lose consciousness, increasing the risk of suffocation [304].

Using volatile substances repeatedly (chronic use) damages the kidneys, liver, heart and lungs, and can cause hearing loss and bone marrow damage [301, 303, 304]. Excessive harmful inhalant use can lead to permanent acquired brain injury [305, 306]. Petrol is one of most dangerous volatile substances to sniff, especially when it contains tetraethyl lead (found in leaded petrol and no longer sold in Australia) which can result in long-term health consequences [307]. However, long-term abstinence from inhalants may allow recovery of normal brain function, where encephalopathy from lead poisoning is not present [306]. The availability of low aromatic unleaded fuel has significantly reduced petrol sniffing in many communities [308]. Since 2005, the Australian Government has made subsidised low aromatic fuel (LAF) available in regional and remote communities across Australia with around 175 retail outlets now stocking LAF [309]. These include sites in Qld, WA, SA the NT.

Extent of VSU use among Aboriginal and Torres Strait Islander people

There are limited national data about VSU in Australia as it is not a criminal offence and the data collected do not always include Indigenous status [310].

A study of petrol sniffing in 41 Aboriginal and Torres Strait Islander communities found that the number of people sniffing petrol decreased by 29% from 298 in 2011-12 to 204 in 2013-14 [308]. Since 2005, an overall decline in reported use for 17 of these communities for which there are comparable data, shows that the total number of people sniffing petrol has fallen, from 647 in 2005-06 to 78 in 2013-14, a reduction of 88%. This decrease in prevalence of sniffing has been associated with the replacement of regular unleaded petrol with LAF.

The 2012-13 AATSIHS reported that 6.6% of males and 4.2% of females had ever used petrol or other inhalants [80].

Hospitalisation

In 2014-15 the rate of hospital separations for Aboriginal and Torres Strait Islander people from poisoning and accidental poisoning due to the toxic effect of organic solvents (e.g. petrol) was 0.04 per 1,000 for both. Aboriginal and Torres Strait Islander people were hospitalised due to the toxic effect of organic solvents at rates 3.9 to 5.1 times the rates for non-Indigenous people [5].

The rate of hospital separations due to mental/behavioural disorders from use of volatile substances was 0.05 per 1,000 which was which was 9.2 times the rate for non-Indigenous people (0.5 per 100,000) [5].

Mortality

The systematic collection of VSU associated mortality data is very limited due to the practice of listing the medical explanation for death rather than the use of volatile substances as a cause [311]. For example, the death of a chronic petrol sniffer may be recorded as 'end stage renal failure', not 'petrol sniffing'. This practice has most likely resulted in VSU mortality and morbidity rates being underestimated.

Early research using a combination of coronial and government reports, community death registers and personal communication identified 37 petrol sniffing deaths between 1998 and 2003 in Australia with the main reported causes of death being respiratory failure/asphyxia and suicide [310, 312, 313].

Concluding comments

The Overview continues to provide a comprehensive summary of the health of Aboriginal and Torres Strait Islander people. Once again, it is clear that, despite some improvements, there are still significant health disparities between Aboriginal and Torres Strait Islander people and other Australians. To continue our commitment to strengths based approaches, we have highlighted those areas where improvements have been achieved or more positive outcomes realised, in the companion document to this Overview, the *Summary of Aboriginal and Torres Strait Islander health status* <https://healthinonet.ecu.edu.au/learn/health-facts/summary-aboriginal-torres-strait-islander-health>.

In a watershed year for the Closing the Gap Campaign, by 2018 many of the targets were again not on track [314] including:

- to halve the gap in child mortality rates by 2018
- to close the gap in school attendance by 2018
- to close the gap in life expectancy by 2031
- to halve the gap in reading and numeracy by 2018
- to halve the gap in employment by 2018.

The following targets were on track:

- to have 95% of Indigenous four year olds enrolled in early childhood by 2025. In 2017, 95% of Indigenous four year olds were enrolled in early childhood education
- to halve the gap in Year 12 attainment or equivalent by 2020.

Four of the seven targets were due to expire in 2018 so the Australian Government has worked with Aboriginal and Torres Strait Islander people to develop the Closing the Gap Refresh [314]. In December 2018, the Prime Minister, Scott Morrison, met with COAG First Ministers and agreed to form a partnership with Aboriginal and Torres Strait Islander representatives.

On 12 December 2018, COAG released the COAG statement on the Closing the Gap Refresh [315], this is a draft of the strengths-based framework that recognises the importance of genuine partnership between the governments and Aboriginal and Torres Strait Islander people and outlined refreshed targets. For the Closing the Gap Refresh, the Commonwealth, states and territories share accountability with the priority areas of:

- Families, children and youth
- Housing
- Justice, including youth justice
- Health
- Economic development
- Culture and language
- Education
- Healing
- Eliminating racism and systemic discrimination.

The statement sets timeframes for all governments to:

- establish a new formal partnership with Aboriginal and Torres Strait Islander peoples, through their representatives, by the end of February 2019
- finalise all draft targets by mid-2019
- review the *National Indigenous reform agreement* (NIRA) [316] by mid-2019

- work with the Productivity Commission's Indigenous Commissioner to develop an independent, Aboriginal and Torres Strait Islander-led approach to the three-yearly comprehensive evaluation and review of progress at a national level, and in each jurisdiction.

The refresh represents a fundamental recalibration of the aspirations of not only the targets but also, and perhaps more significantly, how these targets will be met. The Prime Minister in his Closing the Gap report has signalled a whole of government commitment to some principles that he believes will shift the narrative in profoundly important ways [314]. The principles are not new in the sense that they have been called for by Aboriginal leaders for some time, for example in the Redfern Statement [317] and the Uluru Statement from the Heart [318]. They include a commitment to strengths based approaches, authentic partnerships, co-design, community led solutions, a strong evidenced based approach, whole of government (including states and territories) approaches and clearly articulated accountabilities. Implicit in the Closing the Gap report is recognition that business as usual will not, and cannot, succeed. The principles outlined by the Prime Minister are concerned primarily with procedural fairness; the fairness of the procedures used to achieve the desired outcomes.

The Closing the Gap targets, including those identified in the refresh, are mostly about distributive fairness or the fairness of the outcomes but the research evidence is unequivocal, showing that a commitment to procedural fairness is directly related to trust and confidence, particularly in authoritative institutions such as governments [319]. Trust and confidence are, self-evidently, vital to harmonious, and mutually respectful and productive relationships.

Another key element that is implicit in the Prime Minister's words is a commitment to moral inclusion of Aboriginal and Torres Strait Islander people. Moral inclusion is about ensuring that people or groups are included in a scope of justice [320]. Those inside the so called moral envelope believe that they are entitled to and should receive fair treatment. Those outside the scope of justice are not seen to be deserving of fair treatment and can be treating unjustly with impunity.

The findings from the 2018 Australian Reconciliation Barometer suggest that overall many Aboriginal and Torres Strait Islander people may feel that they are outside the scope of justice in Australia [321]. Almost half of Aboriginal and Torres Strait Islander people have experienced racism and feel that Australia is a racist country. Less than half (40%) of Aboriginal people feel that the Australians in general have high trust in them and tellingly only 27% of non-Indigenous Australians have trust towards Aboriginal and Torres Strait Islander people. According to the Barometer, trust by Aboriginal and Torres Strait Islander in most professions has decreased since 2014. Thirty-five percent of the general Australian community felt that Aboriginal and Torres Strait Islander people were responsible for their own disadvantage with only 33% disagreeing with the proposition.

Of course, there are some encouraging and positive indicators as well. For example, over 90% of Aboriginal and Torres Strait Islander people and non-Indigenous people feel that the relationship between them is important [321]. A majority also believe that some process of formal truth telling process is important.

Although the Reconciliation Barometer provides some evidence of progress towards achieving a just, equitable and reconciled Australia, recommendations for progress are to [321]:

- develop a deeper reconciliation process for Australia through truth, justice and healing
- support addressing unresolved issues of national reconciliation
- support closing the gap in Aboriginal and Torres Strait Islander disadvantage
- invest in and support anti-racism campaigns and resources
- support work across the breadth of reconciliation issues.

The media is a place where exclusionary narratives and discourses thrive [322, 323]. A recent study demonstrated that the overwhelming majority of stories about Aboriginal and Torres Strait Islander people were negative [324]. While there has been a slight improvement, 50% of Aboriginal people believe that media portrayals of them are negative [321].

As accountability is a key principle of progress, we as a nation should hold ourselves accountable not only for the outcomes but also for the processes and procedures by which those outcomes are determined. So in addition to measuring the outcomes of the Closing the Gap initiative, we should also measure the quality of the relationship in terms of perceptions of distributive fairness, procedural fairness and moral inclusion. There are some simple, intuitive and easily measured 'rules' or criteria for enhancing perceptions of distributive and procedural fairness and perceptions of being included within the scope of justice [319, 325]. There will be a direct relationship between the quality of relationships and the positive outcomes of the Closing the Gap initiative, including the key health indicators. The principles in the Closing the Gap Refresh and the Reconciliation Barometer, offer the promise of enhanced moral inclusion.

We welcome and embrace the continued opportunity to work collaboratively with Aboriginal and Torres Strait Islander leaders, peoples and communities; government and all those working in the health sector to realise the aspirations of the Closing the Gap Refresh to deliver positive outcomes that are distributively and procedurally fair, and morally inclusive.

Appendix 1

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 to achieve accurate counts of the Aboriginal and Torres Strait Islander population in the five-yearly Australian censuses [241]. Despite these efforts, there are impacts on data quality such as non-responses for identification.

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 [64]. 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 Aboriginal and Torres Strait Islander deaths are correctly identified as such [29]. Due to concerns about the mortality rates of Aboriginal and Torres Strait Islander people relative to the total population, there has been ongoing data integration to investigate the quality of the data using health and death records by several state and territory government departments.

The ABS Death Registration collection collects information on Indigenous status from the 'death registration form'; some states and territories also collect this information from medical certificates of causes of death [26]. While, according to the ABS, most deaths of Aboriginal and Torres Strait Islander people are registered, the Indigenous status of some deaths is not registered, raising concerns about the accuracy of this information [26, 27]. Aboriginal and Torres Strait Islander deaths may be underestimated because of:

- inaccurate data
- lag in registration (the interval between when a death occurs and when it is registered).

This lag in registration is often longer for the Aboriginal and Torres Strait Islander population than the non-Indigenous population [27]. However, there is normally only a slight difference between registered and occurring deaths because, for each year, the number of deaths not registered balances out the deaths that occurred in the previous year but were registered late.

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 [29].

The Indigenous Mortality Study (now the 2016 Death Registrations to Census Linkage Project [326]) involved linking death registrations with 2006 Census records with the aim to assess the consistency of Indigenous status across the two datasets [29]. This was repeated for the 2011 Census and the 2016 Census. Based on the 2016 Census, of the 3,246 Aboriginal and Torres Strait Islander death records 2,315 (71%) were linked.

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 [327]. Completeness of identification varied across the country, with only Vic, Qld, WA, SA and the NT having levels above 90%.

The National Perinatal Data Collection provides data on pregnancy and childbirth; prior to 2011, the Indigenous status of the baby was based on the Indigenous status of the mother, since then, the Indigenous status of the baby has been based on the mother and/or father identifying as being of Aboriginal and/or Torres Strait Islander origin [5]. This means that previously there was an underestimation of Aboriginal and/or Torres Strait Islander births. Indigenous status for around 6% of births is unknown, due to unknown status of the father. Identification of the father is not compulsory for birth registrations.

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 [328]. 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. Another limitation is that all hospitalisation data for Tas, ACT and the NT include only public hospitals [34].

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, a leading cause of death among Aboriginal and Torres Strait Islander people. The AIHW's *Cancer in Australia 2017* 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 bowel cancer (self-reported) and not for cervical cancer [329, 330].
- 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.

Glossary

Aboriginal and Torres Strait Islander

people who identify themselves as being of Aboriginal and/or Torres Strait Islander origin. See also **Indigenous**

age-adjustment or age-adjusted

see **age-standardisation**

age-specific rate

an estimate of the number of people experiencing a particular event in a specified age-group relative to the total number of people 'at risk' of that event in that age-group

age-specific death rate

the number of deaths of persons of a specific age-group in a calendar year per 1,000 persons of the same age-group. For the purposes of this report the age-specific death rate is calculated per 100,000 persons of the same age-group so the rate can be expressed as a whole number

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 method of removing the influence of age when comparing populations with different age structures. This is necessary because the rates of many diseases increase with age. The age structures of the different populations are converted to the same 'standard' structure; then the disease rates that would have occurred with that structure are calculated and compared. See **direct standardisation** and **indirect standardisation**

avoidable mortality

a death that, theoretically, could have been avoided given an understanding of causation, the adoption of available disease prevention initiatives and the use of available health care

biomedical data

data collected from the results of blood and urine testing

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+)

burden of disease (and injury)

the quantified impact of a disease or injury on a population using the **disability-adjusted life year** measure

cause of death

as entered on the medical certificate of cause of death - refers to all diseases, morbid conditions or injuries that either resulted in or contributed to death

crude rate

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

disability-adjusted life year

a year of healthy life lost, either through premature death or living with disability due to illness or injury

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. This form of standardisation is used when the populations under study are large and the age-specific rates are reliable

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

fatal burden

the burden of dying prematurely from a disease or injury as measured by **years of life lost**. It offers a way to compare the impact of different diseases, conditions or injuries on a population. See **non-fatal burden**

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 (from admission to discharge, transfer or death), or part of a patient's stay in hospital that results in a change to the type of care (for example, from acute care to rehabilitation)

hospital separation

see **hospitalisation**. Also, the formal process by which a hospital records the completion of treatment and/or care for an admitted patient

hospital separation rate

the total number of episodes of care for admitted patients divided by the total number of persons in the population under study. Often presented as a rate per 1,000 or 100,000 members of a population. Rates may be crude or standardised

incidence

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

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

term used to refer collectively to the two Indigenous sub-populations within Australia – Australian Aboriginal and Torres Strait Islander people

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. This form of standardisation is used when the populations under study are small and the age-specific rates are unreliable or not known

infant mortality

the death of a live-born child who dies before reaching his/her first birthday

infant mortality rate

the number of deaths of children under one year of age in a specified period per 1,000 live births in the same period

International Classification of Disease

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 1999 to report morbidity data

life expectancy

see **expectation of life**

maternal mortality

pregnancy-related deaths occurring to women during pregnancy or up to 42 days after delivery

maternal mortality ratio

number of maternal deaths divided by the number of confinements (expressed 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

mortality gap

calculated as the difference between two or more populations in potential years of life lost due to premature death

non-fatal burden

the burden from living with ill health, as measured by **years lived with disability**

non-Indigenous

a person who does not identify as Aboriginal and/or Torres Strait Islander

other Australians

includes people who did not identify as being of Aboriginal and/or Torres Strait Islander origin, and people for whom information on their Indigenous status is not available

potentially preventable hospitalisations

hospital separations from a specified range of conditions where hospitalisation is considered to be largely preventable if timely and adequate care had been provided through population health services, primary care and outpatient services

prevalence

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

rate

one number (the numerator) divided by another number (the denominator). The numerator is commonly the number of events in a specified time. The denominator is the population at risk of the event. Rates (crude, age-specific and age-standardised) are generally multiplied by a number such as 100,000 to create whole numbers

rate ratio

the rate for one population (example, Aboriginal and Torres Strait Islander) divided by the rate for another population (example, non-Indigenous population)

risk factor

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

self-reported data

data based on how an individual perceives their own health. It relies on survey participants being aware, and accurately reporting, their health status and health conditions, which is not as accurate as data based on clinical records or measured data

standardised mortality ratio

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 standardised mortality ratio is expressed sometimes as the ratio multiplied by 100. See **age-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 **age-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

years lived with disability

measures the years of what could have been a healthy life that were instead spent in states of less than full health. Years lived with disability represent **non-fatal burden**

years of life lost

measures years of life lost due to premature death, defined as dying before the ideal lifespan (based on the lowest observed death rates from multiple countries). Years of life lost represent **fatal burden**

Abbreviations

AATSIHS - Australian Aboriginal and Torres Strait Islander Health Survey

ABS - Australian Bureau of Statistics

ACCHOs - Aboriginal Community Controlled Health Organisations

ACT - Australian Capital Territory

AHMAC - Australian Health Ministers' Advisory Council

AIHW - Australian Institute of Health and Welfare

ANZDATA - Australia and New Zealand Dialysis and Transplant Registry

AOD - Alcohol and other drug

AOM - Acute otitis media

ARF - Acute rheumatic fever

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

DALY - Disability-adjusted life year

DNA - Deoxyribonucleic acid

DR - Diabetic retinopathy

EAHSP - East Arnhem Healthy Skin Program

ERP - Estimated resident population

ESRD - End-stage renal disease

GAS - Group A streptococcus

GDM - Gestational diabetes mellitus

GP - General practitioner

HBV - Hepatitis B virus

HCV - Hepatitis C virus

HD - Haemodialysis

Hib - *Haemophilus influenzae* type b

HIV - Human immunodeficiency virus

ICD - International Classification of Diseases - the World Health Organization's internationally accepted classification of death and disease

IFG - Impaired fasting glycemia

IMR - Infant mortality rate

IMD - Invasive meningococcal disease

IPD - Invasive pneumococcal disease

LSIC - Longitudinal Study of Indigenous Children

LAF - Low aromatic fuel

LBW - Low birthweight

MMR - Maternal mortality ratio

NCOHS - National Child Oral Health Study

NATSIHMS - National Aboriginal and Torres Strait Islander Health Measures 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

NDIS - National Disability Insurance Scheme

NDS - National Disability Strategy

NDSHS - National Drug Strategy Household Survey

NEHS - National Eye Health Survey

NHMRC - National Health and Medical Research Council

NIP - National Immunisation Program

NSW - New South Wales

NT - Northern Territory

OM - Otitis media

PD - Peritoneal dialysis

Qld - Queensland

RHD - Rheumatic heart disease

SA - South Australia

SCRGSP - Steering Committee for the Review of Government Service Provision

SDAC - Survey of Disability, Ageing and Carers

SEWB - Social and emotional wellbeing

SIDS - Sudden infant death syndrome

SMR - Standardised mortality ratio

STI - Sexually transmitted infection

Tas - Tasmania

TB - Tuberculosis

VI - Vision impairment

Vic - Victoria

VSU - Volatile substance use

WA - Western Australia

WC - Waist circumference

WHO - World Health Organization

WHR - Waist to hip ratio

References

1. Dudgeon, P., Wright, M., Paradies, Y., Garvey, D., & Walker, I. (2014). Aboriginal social, cultural and historical contexts. In P. Dudgeon, H. Milroy & R. Walker (Eds.), *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice* (2nd ed., pp. 3-24). Canberra: Department of The Prime Minister and Cabinet.
2. Zubrick, S. R., Shepherd, C. C. J., Dudgeon, P., Gee, G., Paradies, Y., Scrine, C., & Walker, R. (2014). Social determinants of social and emotional wellbeing. In P. Dudgeon, H. Milroy & R. Walker (Eds.), *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice* (2nd edition ed., pp. 93-112 (chapter 116)). Canberra: Department of The Prime Minister and Cabinet.
3. NSW Department of Health. (2004). *Communicating positively: a guide to appropriate Aboriginal terminology*. Sydney: NSW Department of Health.
4. Gee, G., Dudgeon, P., Schultz, C., Hart, A., & Kelly, K. (2014). Aboriginal and Torres Strait Islander social and emotional wellbeing. In P. Dudgeon, H. Milroy & R. Walker (Eds.), *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice* (2nd ed., pp. 55-68). Canberra: Department of The Prime Minister and Cabinet.
5. Steering Committee for the Review of Government Service Provision. (2016). *Overcoming Indigenous disadvantage: key indicators 2016 report*. Canberra: Productivity Commission.
6. Parliament of Australia. (2016). Indigenous parliamentarians, federal and state: a quick guide. Retrieved 19 October 2016 from http://parlinfo.aph.gov.au/parlInfo/download/library/prspub/3923594/upload_binary/3923594.pdf
7. Davis, M. (2013). Community control and the work of the National Aboriginal Community Controlled Health Organisation: putting meat on the bones of the 'UNDRIP'. *Indigenous Law Bulletin*, 8(7), 11-14.
8. National Aboriginal Community Controlled Health Organisation. (2013). *Healthy Futures 2013-2030: NACCHO 10 point plan*. Canberra: National Aboriginal Community Controlled Health Organisation.
9. World Health Organization. (2008). *The World Health Report 2008 - primary health care (now more than ever)*. Geneva: World Health Organization.
10. Australian Bureau of Statistics. (2017). Census of population and housing: reflecting Australia - stories from the Census, 2016: Aboriginal and Torres Strait Islander population. Retrieved 28 June 2017 from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/2071.02016?OpenDocument>
11. Australian Bureau of Statistics. (2018). Schools, Australia, 2017. Retrieved 2 February 2018 from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4221.02017?OpenDocument>
12. Australian Curriculum Assessment and Reporting Authority. (2017). *National Assessment Program - Literacy and Numeracy: achievement in reading, writing, language conventions and numeracy: national report for 2017*. Sydney: Australian Curriculum Assessment and Reporting Authority.
13. Australian Bureau of Statistics. (2012). *Census of population and housing: characteristics of Aboriginal and Torres Strait Islander Australians, 2011*. Canberra: Australian Bureau of Statistics.
14. Australian Bureau of Statistics. (2017). *Australian demographic statistics, September quarter 2017*. Canberra: Australian Bureau of Statistics.
15. Australian Bureau of Statistics. (2014). *Estimates and projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026*. Canberra: Australian Bureau of Statistics.
16. Australian Bureau of Statistics. (2018). *Australian demographic statistics, Jun 2018*. Retrieved 20 December 2018 from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Jun%202018?OpenDocument>
17. Australian Bureau of Statistics. (2018). *Estimates of Aboriginal and Torres Strait Islander Australians, June 2016*. Retrieved 31 August 2018 from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3238.0.55.001>
18. Australian Bureau of Statistics. (2017). *Census of population and housing - counts of Aboriginal and Torres Strait Islander Australians, 2016*. Canberra: Australian Bureau of Statistics.
19. Australian Institute of Health and Welfare. (2018). *Australia's mothers and babies 2016: in brief*. Canberra: Australian Institute of Health and Welfare.
20. Australian Bureau of Statistics. (2018). *Births, Australia, 2017*. Retrieved 11 December 2018 from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3301.0Main+Features12017?OpenDocument>
21. Australian Government Department of Health. (2018). *Clinical practice guidelines: pregnancy care*. Canberra: Australian Government Department of Health.
22. Brown, S., Glover, K., Weetra, D., Ah Kit, J., Stuart-Butler, D., Leane, C., . . . Yelland, J. (2016). Improving access to antenatal care for Aboriginal women in South Australia: evidence from a population-based study. *Birth*, 43(2), 134-143.

23. Evans, R., Liu, J., Miller, D., Harvey, M., Howle, T., & Seebus, I. (2018). National Key Performance Indicators for Aboriginal and Torres Strait Islander primary health care: results for 2017. Canberra: Australian Institute of Health and Welfare.
24. Australian Institute of Health and Welfare. (2014). Birthweight of babies born to Indigenous mothers. Canberra: Australian Institute of Health and Welfare.
25. Australian Health Ministers' Advisory Council. (2017). Aboriginal and Torres Strait Islander Health Performance Framework 2017 report. Canberra: Department of the Prime Minister and Cabinet.
26. Australian Bureau of Statistics. (2018). Deaths, Australia, 2017. Retrieved 26 September 2018 from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3302.0?OpenDocument>
27. Australian Bureau of Statistics. (2013). Life tables for Aboriginal and Torres Strait Islander Australians, 2010-2012. Canberra: Australian Bureau of Statistics.
28. 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. Canberra: Australian Institute of Health and Welfare.
29. Australian Bureau of Statistics. (2018). Life tables for Aboriginal and Torres Strait Islander Australians, 2015-2017. Canberra: Australian Bureau of Statistics.
30. Australian Bureau of Statistics. (2018). Causes of death, Australia, 2017. Retrieved 26 September 2018 from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3303.0?OpenDocument>
31. Australian Institute of Health and Welfare. (2018). Maternal deaths in Australia 2016. Retrieved 17 December 2018 from <https://www.aihw.gov.au/reports/mothers-babies/maternal-deaths-in-australia-2016/contents/report>
32. Humphrey, M., & Rek, J. (2017). Maternal deaths in Australia 2012-2014. Canberra: Australian Institute of Health and Welfare.
33. Thomson, N., & Ali, M. (2003). Births, deaths, and hospitalisation. In N. Thomson (Ed.), *The health of Indigenous Australians* (pp. 44-74). South Melbourne: Oxford University Press.
34. Burgess, K., Gilbert, M., McIntyre, J., & Mole, T. (2018). Admitted patient care 2016-17: Australian hospital statistics. Canberra: Australian Institute of Health and Welfare.
35. 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.
36. Baker IDI. (2012). Cardiovascular disease. Retrieved 2012 from <https://www.baker.edu.au/health-hub/fact-sheets/cardiovascular-disease>
37. World Health Organization. (2016). International Statistical Classification of Diseases and Related Health Problems 10th Revision. Retrieved 2016 from <http://apps.who.int/classifications/icd10/browse/2016/en#/XIX>
38. Australian Institute of Health and Welfare. (2016). Australian Burden of Disease Study: impact and causes of illness and death in Aboriginal and Torres Strait Islander people 2011. Canberra: Australian Institute of Health and Welfare.
39. World Heart Federation. (2012). Cardiovascular disease risk factors. Retrieved 2012 from <http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/>
40. Australian Institute of Health and Welfare. (2015). Cardiovascular disease, diabetes and chronic kidney disease - Australian facts: risk factors. Canberra: Australian Institute of Health and Welfare.
41. Rémond, M. G. W., Stewart, S., Carrington, M. J., Marwick, T. H., Kingwell, B. A., Meikle, P., . . . Maguire, G. P. (2017). Better Indigenous Risk stratification for Cardiac Health study (BIRCH) protocol: rationale and design of a cross-sectional and prospective cohort study to identify novel cardiovascular risk indicators in Aboriginal Australian and Torres Strait Islander adults. *BMC Cardiovascular Disorders*, 17. Retrieved from: <https://doi.org/10.1186/s12872-017-0662-7>
42. Australian Institute of Health and Welfare. (2013). Rheumatic heart disease and acute rheumatic fever in Australia: 1996-2012. Canberra: Australian Institute of Health and Welfare.
43. 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. Darwin: Menzies School of Health Research.
44. Maguire, G. P., Carapetis, J. R., Walsh, W. F., & Brown, A. D. H. (2012). The future of acute rheumatic fever and rheumatic heart disease in Australia [editorial]. *Medical Journal of Australia*, 197(3), 133-134.
45. Australian Bureau of Statistics. (2014). Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012-13. Canberra: Australian Bureau of Statistics.

46. 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>
47. 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>
48. 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>
49. 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>
50. Australian Bureau of Statistics. (2014). Australian Aboriginal and Torres Strait Islander health survey: biomedical results, 2012-13. Canberra: Australian Bureau of Statistics.
51. Foreman, J., Keel, S., Xie, J., van Wijngaarden, P., Crowston, J., Taylor, H. R., & Dirani, M. (2016). The National Eye Health Survey 2016 report. Melbourne: Vision 2020 Australia.
52. Keel, S., Foreman, J., Xie, J., Taylor, H. R., & Dirani, M. (2017). The prevalence of self-reported stroke in the Australian National Eye Health Survey. *Journal of Stroke and Cerebrovascular Diseases*, 26(7), 1433-1439.
53. Australian Institute of Health and Welfare. (2016). Better Cardiac Care measures for Aboriginal and Torres Strait Islander people: second national report 2016. Canberra: Australian Institute of Health and Welfare.
54. Tong, B., Sheppard, C., Guda, R., Penm, R., & Gersekowski, K. (2018). Better Cardiac Care measures for Aboriginal and Torres Strait Islander people: third national report. Canberra: Australian Institute of Health and Welfare.
55. Australian Institute of Health and Welfare. (2017). Aboriginal and Torres Strait Islander Health Performance Framework. Retrieved 30 May 2017 from <https://www.aihw.gov.au/reports/indigenous-health-welfare/health-performance-framework/contents/overview>
56. Chronic Care for Aboriginal People. (2017). Acute rheumatic fever and rheumatic heart disease in NSW: framework. Sydney: Agency for Clinical Innovation.
57. Public Health Association of Australia. (2017). Communicable Diseases Control Conference 2017: infectious diseases: a global challenge: abstract book. Melbourne: Public Health Association of Australia.
58. Roberts, K. V., Maguire, G. P., Brown, A., Atkinson, D. N., Remenyi, B., Wheaton, G., . . . Carapetis, J. (2015). Rheumatic heart disease in Indigenous children in northern Australia: differences in prevalence and the challenges of screening. *Medical Journal of Australia*, 203(5), 221e221-221e227.
59. Vaughan, G., Tune, K., Peek, M. J., Jackson Pulver, L., Remenyi, B., Belton, S., & Sullivan, E. A. (2018). Rheumatic heart disease in pregnancy: strategies and lessons learnt implementing a population-based study in Australia. *International Health*, 10(6), 480-489.
60. National Heart Foundation of Australia. (2016). Australian Heart Maps. Retrieved 2016 from <http://www.heartfoundation.org.au/for-professionals/australian-heart-maps>
61. National Cancer Institute. (2015). What is cancer? Retrieved 2017 from <https://www.cancer.gov/about-cancer/understanding/what-is-cancer>
62. Cancer Council Australia. (2014). What is cancer? Retrieved 1 December 2014 from <http://www.cancer.org.au/about-cancer/what-is-cancer/>
63. Cancer Australia. (2015). National Aboriginal and Torres Strait Islander cancer framework. Sydney: Cancer Australia.
64. Australian Institute of Health and Welfare. (2013). Towards better Indigenous health data. Canberra: Australian Institute of Health and Welfare.
65. Australian Institute of Health and Welfare. (2018). Cancer in Aboriginal and Torres Strait Islander people of Australia. Retrieved 15 March 2018 from <https://www.aihw.gov.au/reports/cancer/cancer-in-indigenous-australians/contents/table-of-contents>
66. Harvey, J., Budd, A., Tanevsk, B., Ng, F., & Meere, D. (2018). Cervical screening in Australia 2018. Canberra: Australian Institute of Health and Welfare.

67. Tanevska, B., Budd, A., & Ng, F. (2018). BreastScreen Australia monitoring report: 2018. Canberra: Australian Institute of Health and Welfare.
68. Australian Institute of Health and Welfare, & Cancer Australia. (2013). Cancer in Aboriginal and Torres Strait Islander peoples of Australia: an overview. Canberra: Australian Institute of Health and Welfare.
69. Cunningham, J., Rumbold, A. R., Zhang, X., & Condon, J. R. (2008). Incidence, aetiology, and outcomes of cancer in Indigenous peoples in Australia. *The Lancet Oncology*, 9(6), 585-595.
70. Valery, P. C., Coory, M., Stirling, J., & Green, A. C. (2006). Cancer diagnosis, treatment, and survival in Indigenous and non-Indigenous Australians: a matched cohort study. *The Lancet*, 367(9525), 1842-1848.
71. Moore, S. P., Green, A. C., Bray, F., Garvey, G., Coory, M., Martin, J., & Valery, P. C. (2014). Survival disparities in Australia: an analysis of patterns of care and comorbidities among Indigenous and non-Indigenous cancer patients. *BMC Cancer*, 14. Retrieved from: <http://dx.doi.org/10.1186/1471-2407-14-517>
72. Goodwin, M. (2017). Burden of cancer in Australia: Australian Burden of Disease Study 2011. Canberra: Australian Institute of Health and Welfare.
73. Australian Institute of Health and Welfare. (2016). Australia's health 2016. Canberra: Australian Institute of Health and Welfare.
74. 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.
75. Australian Institute of Health and Welfare. (2009). Insulin-treated diabetes in Australia 2000-2007. Canberra: Australian Institute of Health and Welfare.
76. Australian Institute of Health and Welfare. (2010). Diabetes in pregnancy: its impact on Australian women and their babies. Canberra: Australian Institute of Health and Welfare.
77. Australian Institute of Health and Welfare. (2011). Prevalence of Type 1 diabetes in Australian children, 2008. Canberra: Australian Institute of Health and Welfare.
78. 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
79. Australian Institute of Health and Welfare. (2018). Incidence of insulin-treated diabetes in Australia. Retrieved 29 January 2018 from <https://www.aihw.gov.au/reports/diabetes/incidence-insulin-treated-diabetes-australia-2016/contents/introduction>
80. Australian Institute of Health and Welfare. (2015). Aboriginal and Torres Strait Islander health performance framework 2014 report: detailed analyses. Canberra: Australian Institute of Health and Welfare.
81. Australian Institute of Health and Welfare. (2018). Diabetes indicators for the Australian National Diabetes Strategy 2016-2020. Retrieved 10 October 2018 from <https://www.aihw.gov.au/reports/diabetes/diabetes-indicators-strategy-2016-2020/contents/summary>
82. 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. Canberra: Closing the Gap Clearinghouse.
83. Griffiths, K., Coleman, C., Lee, V., & Madden, R. (2016). How colonisation determines social justice and Indigenous health - a review of the literature. *Journal of Population Research*, First online (<http://dx.doi.org/10.1007/s12546-016-9164-1>).
84. World Health Organization. (2013). Mental health action plan 2013 - 2020. Geneva: World Health Organization.
85. World Health Organization. (2012). Risks to mental health: an overview of vulnerabilities and risk factors. Background paper by WHO secretariat for the development of a comprehensive mental health action plan. Geneva: World Health Organization.
86. Australian Department of Health. (2017). The fifth national mental health and suicide prevention plan. Canberra: Australian Department of Health.
87. 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.
88. Parker, R., & Milroy, H. (2014). Aboriginal and Torres Strait Islander mental health: an overview. In P. Dudgeon, H. Milroy & R. Walker (Eds.), *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice* (2nd ed., pp. 25-38). Canberra: Department of The Prime Minister and Cabinet.
89. 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.

90. Australian Bureau of Statistics. (2016). National Aboriginal and Torres Strait Islander Social Survey, 2014-15: Table 14. Stressors, by sex and remoteness [data cube]. Retrieved 28 April 2016 from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4714.02014-15?OpenDocument>
91. Australian Bureau of Statistics. (2016). National Aboriginal and Torres Strait Islander Social Survey, 2014-15: Table 19. Selected wellbeing indicators, by long-term health conditions [data cube]. Retrieved 28 April 2016 from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4714.02014-15?OpenDocument>
92. Steering Committee for the Review of Government Service Provision. (2014). Overcoming Indigenous disadvantage: key indicators 2014. Canberra: Productivity Commission.
93. Australian Bureau of Statistics. (2016). National Aboriginal and Torres Strait Islander Social Survey, 2014-15: Table 17. Overall life satisfaction, by selected characteristics [data cube]. Retrieved 28 April 2016 from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4714.02014-15?OpenDocument>
94. Australian Bureau of Statistics. (2016). National Aboriginal and Torres Strait Islander Social Survey, 2014-15. Canberra: Australian Bureau of Statistics.
95. Australian Bureau of Statistics. (2015). General social survey: summary results, Australia, 2014. Retrieved 29 June 2015 from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4159.0>
96. Kidney Foundation of Canada. (2015). What is kidney disease? Retrieved 2015 from <http://www.kidney.ca/page.aspx?pid=320>
97. Kidney Health Australia. (2015). *Chronic kidney disease (CKD) management in general practice* (3rd ed.). Melbourne: Kidney Health Australia.
98. Australia and New Zealand Dialysis and Transplant Registry. (2018). The fortieth annual Australia and New Zealand Dialysis and Transplant Registry report 2017. Retrieved 19 January 2018 from http://www.anzdata.org.au/v1/report_2017.html
99. Australian Institute of Health and Welfare. (2011). Chronic kidney disease in Aboriginal and Torres Strait Islander people 2011. Canberra: Australian Institute of Health and Welfare.
100. Kidney Health Australia. (2010). The economic impact of end-stage kidney disease in Australia - projections to 2020. Melbourne: Kidney Health Australia.
101. Hughes, J. T., Dembski, L., Kerrigan, V., Majoni, S. W., Lawton, P. D., & Cass, A. (2017). Indigenous patient voices: gathering perspectives - finding solutions for chronic and end stage kidney disease: 2017 symposium report. Darwin: Menzies School of Health Research.
102. Devitt, J., Anderson, K., Cunningham, J., Preece, C., Snelling, P., & Cass, A. (2017). Difficult conversations: Australian Indigenous patients' views on kidney transplantation. *BMC Nephrology*, 18. Retrieved from: <https://doi.org/10.1186/s12882-017-0726-z>
103. Johnson, D. (2013). Risk factors for early chronic kidney disease. Melbourne: Kidney Health Australia.
104. Hoy, W. E., White, A. V., Tipiloura, B., Singh, G., Sharma, S. K., Bloomfield, H., . . . McCredie, D. A. (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.
105. Das, S. K., Mannan, M., Faruque, A. S. G., Ahmed, T., McIntyre, H. D., & Al Mamun, A. (2016). Effect of birth weight on adulthood renal function: a bias-adjusted meta-analytic approach. *Nephrology*, 21(7), 547-565.
106. Australian Bureau of Statistics. (2003). Australian demographic statistics quarterly: September quarter 2002. Canberra: Australian Bureau of Statistics.
107. Australian Bureau of Statistics. (2014). Australian demographic statistics, Dec 2013. Retrieved 19 June 2014 from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3101.0Main+Features1Dec%202013?OpenDocument>
108. Australian and New Zealand Dialysis and Transplant Registry. (2017). *End stage renal disease notifications, by Indigenous status, age, jurisdiction and year [2011 to 2015, unpublished]*. Australian and New Zealand Dialysis and Transplant Registry. Adelaide.
109. Agar, J. W. M., Hawley, C. M., George, C. R. P., Mathew, T. H., McDonald, S. P., & Kerr, P. G. (2010). Home haemodialysis in Australia — is the wheel turning full circle? *Medical Journal of Australia*, 192(7), 403-406.
110. Australian Institute of Health and Welfare. (2017). Chronic kidney disease compendium [web report]. Retrieved 22 December 2017 from <https://www.aihw.gov.au/reports/chronic-kidney-disease/chronic-kidney-disease-compendium/>
111. Steering Committee for the Review of Government Service Provision. (2018). Report on government services 2018, Volume E: Health. Canberra: Productivity Commission.
112. National Public Health Partnership. (2005). The national Aboriginal and Torres Strait Islander safety promotion strategy. Canberra: National Public Health Partnership.

113. National Public Health Partnership. (2005). The national injury prevention and safety promotion plan: 2004-2014. Canberra: National Public Health Partnership.
114. Clapham, K., O'Dea, K., & Chenhall, R. (2007). Interventions and sustainable programs. In B. Carson, T. Dunbar, R. D. Chenhall & R. Bailie (Eds.), *Social determinants of Indigenous health* (pp. 271-295). Crows Nest, NSW: Allen and Unwin.
115. Moller, J. (1996). Understanding national injury data regarding Aboriginal and Torres Strait Islander peoples. *Australian Injury Prevention Bulletin*, 14(December), 1-8.
116. WHO. (2016). Q&As: injuries. Retrieved 2016 from <http://www.who.int/topics/injuries/qa/en/>
117. Australian Institute of Health and Welfare. (2016). Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011. Canberra: Australian Institute of Health and Welfare.
118. 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 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%206%20long-term%20conditions%20by%20age%20by%20indigenous%20status,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&A9CAF0F3F64E992CA257CA6000E32B3&0&2012-13&26.03.2014&Latest>
119. 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>
120. World Health Organization. (2017). About chronic respiratory diseases. Retrieved 2017 from http://www.who.int/respiratory/about_topic/en/
121. Australian Institute of Health and Welfare. (2005). Chronic respiratory diseases in Australia: their prevalence, consequences and prevention. Canberra: Australian Institute of Health and Welfare.
122. Australian Institute of Health and Welfare. (2010). Asthma, chronic obstructive pulmonary disease and other respiratory diseases in Australia. Canberra: Australian Institute of Health and Welfare.
123. Janu, E. K., Annabattula, B. I., Kumariah, S., Zajackowska, M., Whitehall, J. S., Edwards, M. J., . . . Masters, I. B. (2014). Paediatric hospitalisations for lower respiratory tract infections in Mount Isa. *Medical Journal of Australia*, 200(10), 591-594.
124. Hall, K. K., Chang, A. B., Anderson, J., Dunbar, M., Arnold, D., & O'Grady, K. F. (2017). Characteristics and respiratory risk profile of children aged less than 5 years presenting to an urban, Aboriginal-friendly, comprehensive primary health practice in Australia. *Journal of Paediatrics and Child Health*, 53(7), 636-643.
125. 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>
126. Australian Institute of Health and Welfare. (2014). Mortality from asthma and COPD in Australia. Canberra: Australian Institute of Health and Welfare.
127. Biotext. (2008). Risk factors for eye disease and injury: literature review. Canberra: National Health and Medical Research Council, Australia.
128. Steering Committee for the Review of Government Service Provision. (2015). Report on government services 2015: Indigenous compendium. Canberra: Productivity Commission.
129. Access Economics. (2010). Clear focus: the economic impact of vision loss in Australia in 2009. Melbourne: Vision 2020 Australia.
130. George Institute for Global Health. (2017). Low vision, quality of life and independence: a review of the evidence on aids and technologies. Sydney: Macular Disease Foundation Australia.
131. Taylor, H. R., 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.
132. Estevez, J., Kaidonis, G., Henderson, T., Craig, J. E., & Landers, J. (2017). Association of disease-specific causes of visual impairment and 10-year mortality among Indigenous Australians: the Central Australian Ocular Health Study. *Clinical & Experimental Ophthalmology*, Accepted Articles(<http://dx.doi.org/10.1111/ceo.13009>), 1-17.
133. Taylor, H. R., & 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.
134. Australian Department of Health and Ageing, & Victorian Department of Human Services. (2005). Eye health in Australia: a background paper to the national framework for action to promote eye health and prevent avoidable blindness and vision loss. Canberra: Australian Government Department of Health and Ageing.

135. Australian Institute of Health and Welfare. (2015). The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2015. Canberra: Australian Institute of Health and Welfare.
136. Australian Institute of Health and Welfare. (2017). Indigenous eye health measures 2016. Canberra: Australian Institute of Health and Welfare.
137. Keel, S., Xie, J., Foreman, J., van Wijngaarden, P., Taylor, H., , & Dirani, M. (2017). The prevalence of diabetic retinopathy in Australian adults with self-reported diabetes: The National Eye Health Survey. *Ophthalmology*, 124(7), 977-984.
138. Keel, S., Xie, J., Foreman, J., Taylor, H. R., & Dirani, M. (2017). The prevalence of vision loss due to ocular trauma in the Australian National Eye Health Survey. *Injury*, 48(11), 2466-2469.
139. Foreman, J., Xie, J., Keel, S., van Wijngaarden, P., Taylor, H. R., & Dirani, M. (2017). The validity of self-report of eye diseases in participants with vision loss in the National Eye Health Survey. *Scientific Reports*, 7. Retrieved from: <http://dx.doi.org/10.1038/s41598-017-09421-9>
140. 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 <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4727.0.55.0012012-13?OpenDocument>
141. The Kirby Institute. (2018). Australian trachoma surveillance report 2017. Sydney: The Kirby Institute, University of New South Wales.
142. The Kirby Institute. (2017). Australian trachoma surveillance report 2016. Sydney: The Kirby Institute, University of New South Wales.
143. Australian Institute of Health and Welfare. (2018). Indigenous eye health measures 2017. Retrieved 26 April 2018 from <https://www.aihw.gov.au/reports/indigenous-australians/indigenous-eye-health-measures-2017/contents/summary>
144. 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.
145. Australian Medical Association. (2017). 2017 AMA report card on Indigenous health: a national strategic approach to ending chronic otitis media and its life long impacts in Indigenous communities. Canberra: Australian Medical Association.
146. Coates, H., Kong, K., Mackendrick, A., Lanninghan, F., Vijayasekaran, S., & Bumbak, P. (2012). Aboriginal ear health manual. Perth, WA.
147. Leach, A. (2016). Bulging ear drums and hearing loss: Aboriginal kids have the highest otitis media rates in the world. Retrieved 16 September 2016 from <https://theconversation.com/bulging-ear-drums-and-hearing-loss-aboriginal-kids-have-the-highest-otitis-media-rates-in-the-world-64165>
148. House of Representatives Standing Committee on Health, A. C. a. S. (2017). Still waiting to be heard... report on the Inquiry into the Hearing Health and Wellbeing of Australia. Canberra: Parliament of Australia.
149. Howard, D., & Barney, J. (2018). Minced words: the importance of widespread hearing loss as an issue in the mental health of Indigenous Australians. *Australian Indigenous HealthBulletin*, 18(1). Retrieved from: <http://healthbulletin.org.au/articles/minced-words-the-importance-of-widespread-hearing-loss-as-an-issue-in-the-mental-health-of-indigenous-australians>
150. Burrow, S., Galloway, A., & Weisssofner, N. (2009). Review of educational and other approaches to hearing loss among Indigenous people. *Australian Indigenous HealthBulletin*, 9(2). Retrieved from: <http://healthbulletin.org.au/articles/review-of-educational-and-other-approaches-to-hearing-loss-among-indigenous-people/>
151. Burns, J., & Thomson, N. (2013). Review of ear health and hearing among Indigenous Australians. Perth, WA: Australian Indigenous HealthInfoNet.
152. WHO/CIBA. (2000). Prevention of hearing impairment from chronic otitis media. Geneva: WHO.
153. Morris, P. S., Leach, A. J., Silberberg, P., Mellon, G., Wilson, C., Hamilton, E., & Beissbarth, J. (2005). Otitis media in young Aboriginal children from remote communities in Northern and Central Australia: a cross-sectional survey. *BMC Pediatrics*, 5. Retrieved from: <http://dx.doi.org/10.1186/1471-2431-5-27>
154. Leach, A. J., Wigger, C., Andrews, R., Chatfield, M., Smith-Vaughan, H., & Morris, P. S. (2014). Otitis media in children vaccinated during consecutive 7-valent or 10-valent pneumococcal conjugate vaccination schedules. *BMC Pediatrics*, 14. Retrieved from: <http://dx.doi.org/10.1186/1471-2431-14-200>
155. Leach, A. J., Wigger, C., Beissbarth, J., Woltring, D., Andrews, R., Chatfield, M. D., . . . Morris, P. S. (2016). General health, otitis media, nasopharyngeal carriage and middle ear microbiology in Northern Territory Aboriginal children vaccinated during consecutive periods of 10-valent or 13-valent pneumococcal conjugate vaccines. *International Journal of Pediatric Otorhinolaryngology*, 86, 224-232.

156. Lovett, R., & Thurber, K. A. (2017). Health conditions and health service utilisation among children in LSIC. In M. Walter, K. L. Martin & G. Bodkin-Andrews (Eds.), *Indigenous children growing up strong: a longitudinal study of aboriginal and Torres Strait Islander families* (pp. 209-231). London: Palgrave Macmillan.
157. Australian Bureau of Statistics. (2013). Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13. Canberra: Australian Bureau of Statistics.
158. Gersekowski, K., Bin Tong, B., & Penm, R. (2018). Northern Territory Outreach Hearing Health Program: July 2012 to December 2017. Canberra: Australian Institute of Health and Welfare.
159. FDI World Dental Federation. (2016). FDI unveils new universally applicable definition of 'oral health'. Retrieved 6 September 2016 from <http://www.fdiworldental.org/media/press-releases/latest-press-releases/06092016-fdi-unveils-new-universally-applicable-definition-of-%E2%80%98oral-health%E2%80%99.aspx>
160. Do, L. G., & Spencer, A. J. (Eds.). (2016). Oral health of Australian children: *The National Child Oral Health Study 2012-14*. Adelaide: University of Adelaide Press.
161. Australian Health Policy Collaboration, & Australian Dental Association. (2018). Australia's oral health tracker. Melbourne: Victoria University.
162. Sheppard, C., Tong, B., & Penm, R. (2018). Northern Territory remote Aboriginal investment: Oral Health Program July 2012 to December 2016. Canberra: Australian Institute of Health and Welfare.
163. de Silva, A. M., Martin-Kerry, J. M., McKee, K., & Cole, D. (2016). Caries and periodontal disease in Indigenous adults in Australia: a case of limited and non-contemporary data. *Australian Health Review*, Online early(<http://dx.doi.org/10.1071/AH15229>).
164. Schuch, H. S., Haag, D. G., Kapellas, K., Arantes, R., Peres, M. A., Thomson, W. M., & Jamieson, L. M. (2017). The magnitude of Indigenous and non-Indigenous oral health inequalities in Brazil, New Zealand and Australia. *Community Dentistry and Oral Epidemiology*, 45(5), 434-441.
165. Australian Institute of Health and Welfare. (2014). Oral health and dental care in Australia: key facts and figures trends 2014. Canberra: Australian Institute of Health and Welfare.
166. Australian Bureau of Statistics. (2017). Disability, ageing and carers, Australia: summary of findings, 2015. Canberra: Australian Bureau of Statistics.
167. World Health Organization. (2011). World report on disability. Geneva: World Health Organization.
168. Do, P. L. (2017). How well does the National Disability Insurance Scheme respond to the issues challenging Indigenous people with disability? *Aotearoa New Zealand Social Work*, 29(4), 49-60.
169. Australian Bureau of Statistics. (2017). 2016 Census community profiles: Aboriginal and Torres Strait Islander peoples profile. Retrieved 23 October 2017 from http://www.censusdata.abs.gov.au/census_services/getproduct/census/2016/communityprofile/036?opendocument
170. Council of Australian Governments. (2011). National disability strategy 2010-2020. Canberra: Council of Australian Governments.
171. Department of Social Services. (2016). National Disability Strategy 2010-2020 second implementation plan: driving action 2015-2018. Canberra: Department of Social Services.
172. Australian Department of Social Services. (2017). Australian Government plan to improve outcomes for Aboriginal and Torres Strait Islander People with disability. Sydney: Australian Department of Social Services.
173. Council of Australian Governments. (2012). National disability agreement: intergovernmental agreement on federal financial relations. Canberra: Council of Australian Governments.
174. Disability Policy & Research Working Group. (2012). National Indigenous access framework. Sydney: Disability Policy & Research Working Group.
175. Australian Institute of Health and Welfare. (2018). Disability support services: services provided under the National Disability Agreement 2016-17. Canberra: Australian Institute of Health and Welfare.
176. Australian Institute of Health and Welfare. (2017). Disability support services: services provided under the National Disability Agreement 2015-16. Canberra: Australian Institute of Health and Welfare.
177. National Disability Insurance Scheme Act 2013 (2016).
178. Australian Government Department of Social Services. (2016). Disability and carers: transition of Commonwealth programs to the National Disability Insurance Scheme. Retrieved 27 September 2016 from <https://www.dss.gov.au/disability-and-carers/programs-services/for-people-with-disability/national-disability-insurance-scheme/transition-of-commonwealth-programs-to-the-national-disability-insurance-scheme-ndis>

179. Steering Committee for the Review of Government Service Provision. (2017). Report on government services 2017, volume F: Community services. Canberra: Productivity Commission.
180. Australian Institute of Health and Welfare. (2018). Australia's health 2018. Canberra: Australian Institute of Health and Welfare.
181. Williams, S. (2014). National framework for communicable disease control. Canberra: Australian Department of Health.
182. Australian Government Department of Health. (2018). Fourth National Sexually Transmissible Infections Strategy 2018-2022. Canberra: Australian Government Department of Health.
183. The Kirby Institute. (2018). Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people: annual surveillance report 2018. Sydney: The Kirby Institute.
184. The Kirby Institute. (2018). HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2018. Sydney: The Kirby Institute.
185. Hepatitis C Virus Infection Consensus Statement Working Group. (2018). Australian recommendations for the management of hepatitis C virus infection: a consensus statement (September 2018). Melbourne: Gastroenterological Society of Australia.
186. Australian Government Department of Health. (2018). Fifth National Hepatitis C Strategy 2018-2022. Canberra: Australian Government Department of Health.
187. Australian Department of Health. (2018). Australian Immunisation Handbook. Retrieved 18 September 2018 from <http://immunisationhandbook.health.gov.au>
188. Toms, C., & de Kluiver, R. (2016). Invasive pneumococcal disease in Australia, 2011 and 2012. *Communicable Diseases Intelligence*, 40(2), E267-E284.
189. Lahra, M. M., & Enriquez, R. (2017). Australian Meningococcal Surveillance Programme annual report, 2016. *Communicable Diseases Intelligence*, 41(4), e369-e382.
190. National Centre for Immunisation Research & Surveillance. (2018). Meningococcal vaccines for Australians: information for immunisation providers (pp. 12). Sydney: National Centre for Immunisation Research & Surveillance.
191. Lahra, M., & Enriquez, R. (2016). Australian Meningococcal Surveillance Programme annual report, 2015. *Communicable Diseases Intelligence*, 40(4), E503-E511.
192. National Notifiable Diseases Surveillance System Annual Report Writing Group. (2016). Australia's notifiable disease status, 2014: annual report of the National Notifiable Diseases Surveillance System. Canberra: National Notifiable Diseases Surveillance System.
193. Archer, B. N., Chiu, C. K., Jayasinghe, S. H., Richmond, P. C., McVernon, J., Lahra, M. M., . . . McIntyre, P. B. (2017). Epidemiology of invasive meningococcal B disease in Australia, 1999-2015: priority populations for vaccination. *Medical Journal of Australia*, 207(9), 382-387.
194. Toms, C., Stapledon, R., Coulter, C., Douglas, P., & National Tuberculosis Advisory Committee. (2017). Tuberculosis notifications in Australia, 2014. *Communicable Diseases Intelligence*, 41(3), E247-E263.
195. Bareja, C., Waring, J., Stapledon, R., & National Tuberculosis Advisory Committee. (2014). Tuberculosis notifications in Australia 2010. *Communicable Diseases Intelligence*, 38(1), E36-E48.
196. 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.
197. Toms, C., Stapledon, R., Waring, J., & Douglas, P. (2015). Tuberculosis notifications in Australia, 2012 and 2013. *Communicable Diseases Intelligence, Submitted to CDI*, E217-E235.
198. Australian Bureau of Statistics. (2012). Australian demographic statistics, June quarter 2012. Canberra: Australian Bureau of Statistics.
199. Naidu, L., Chiu, C., Habig, A., Lowbridge, C., Jayasinghe, S., Wang, H., . . . 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.
200. Cleland, G., Leung, C., Wan Sai Cheong, J., Francis, J., Heney, C., & Nourse, C. (2018). Paediatric invasive *Haemophilus influenzae* in Queensland, Australia, 2002-2011: young Indigenous children remain at highest risk. *Journal of Paediatrics and Child Health*, 54(1), 36-41.
201. 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.
202. 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.

203. 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.
204. Tasani, M., Tong, S. Y. C., Andrews, R., Holt, D. C., Currie, B. J., Carapetis, J. R., & Bowen, A. C. (2016). The importance of scabies coinfection in the treatment considerations for impetigo. *Pediatric Infectious Disease Journal*, 35(4), 374-378.
205. Australian Healthy Skin Consortium. (2018). National healthy skin guideline: for the prevention, treatment and public health control of impetigo, scabies, crusted scabies and tinea for Indigenous populations and communities in Australia - 1st edition. Perth: Telethon Kids Institute.
206. 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.
207. Romani, L., Steer, A. C., Whitfeld, M. J., & Kaldor, J. M. (2015). Prevalence of scabies and impetigo worldwide: a systematic review. *The Lancet Infectious Diseases*, 15(8), 960-967.
208. McMeniman, E., Holden, L., Kearns, T., Clucas, D. B., Carapetis, J. R., Currie, B. J., . . . Andrews, R. M. (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.
209. Mofiz, E., Seemann, T., Bahlo, M., Holt, D., Currie, B. J., Fischer, K., & Papenfuss, A. T. (2016). Mitochondrial genome sequence of the scabies mite provides insight into the genetic diversity of individual scabies infections. *PLOS Neglected Tropical Diseases*, 10(2). Retrieved from: <https://doi.org/10.1371/journal.pntd.0004384>
210. Currie, B. J., & Carapetis, J. R. (2000). Skin infections and infestations in Aboriginal communities in northern Australia. *Australasian Journal of Dermatology*, 41(3), 139-145.
211. McDonald, M., Currie, B. J., & Carapetis, J. R. (2004). Acute rheumatic fever: a chink in the chain that links the heart to the throat? *The Lancet Infectious Diseases*, 4(4), 240-245.
212. Bowen, A. C., Harris, T., Holt, D. C., Giffard, P. M., Carapetis, J. R., Campbell, P. T., . . . Tong, S. Y. (2016). Whole genome sequencing reveals extensive community-level transmission of group A Streptococcus in remote communities. *Epidemiology and Infection*, 144(9), 1991-1998.
213. Bowen, A. C., Tong, S. Y. C., Andrews, R. M., O'Meara, I. M., McDonald, M. I., Chatfield, M. D., . . . Carapetis, J. R. (2014). Short-course oral co-trimoxazole versus intramuscular benzathine benzylpenicillin for impetigo in a highly endemic region: an open-label, randomised, controlled, non-inferiority trial. *The Lancet*, 384(9960), 2132-2140.
214. McDonald, E., Bailie, R., Brewster, D., & Morris, P. (2008). Are hygiene and public health interventions likely to improve outcomes for Australian Aboriginal children living in remote communities? A systematic review of the literature. *BMC Public Health*, 8. Retrieved from: <http://www.biomedcentral.com/1471-2458/8/153>
215. Currie, B., & Couzos, S. (2008). Skin infections. In S. Couzos & R. Murray (Eds.), *Aboriginal primary health care: an evidence-based approach* (3rd ed., pp. 410-444). South Melbourne: Oxford University Press.
216. Thomas, S., Crooks, K., Taylor, K., Massey, P. D., Williams, R., & Pearce, G. (2017). Reducing recurrence of bacterial skin infections in Aboriginal children in rural communities: new ways of thinking, new ways of working. *Australian Journal of Primary Health*, Online early(<http://dx.doi.org/10.1071/PY16135>).
217. Lokuge, B., Kopczynski, A., Woltmann, A., Alvoen, F., Connors, C., Guyula, 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.
218. Andrews, R. M., Kearns, T., Connors, C., Parker, C., Carville, K., Currie, B. J., & Carapetis, J. R. (2009). A regional initiative to reduce skin infections amongst Aboriginal children living in remote communities of the Northern Territory, Australia. *PLOS Neglected Tropical Diseases*, 3(11), 1-9.
219. Hendrickx, D., Stephen, A., Lehmann, D., Silva, D., Boelaert, M., Carapetis, J., & Walker, R. (2016). 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*, 40(1), 30-36.
220. McDonald, M. I., Towers, R. J., Andrews, R. M., Bengner, N., Currie, B. J., & Carapetis, J. R. (2006). Low rates of streptococcal pharyngitis and high rates of pyoderma in Australian Aboriginal communities where acute rheumatic fever is hyperendemic. *Clinical Infectious Diseases*, 43(6), 683-689.
221. Fischer, K., & Kemp, D. J. (2009). Scabies and bacterial skin infections at a molecular level. *Microbiology Australia*, 30(5), 177-180.
222. Clucas, D. B., Carville, K. S., 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.

223. Lydeamore, M. J., Campbell, P. T., Cuningham, W., Andrews, R. M., Kearns, T., Clucas, D., , . . . McVernon, J. (2018). Calculation of the age of the first infection for skin sores and scabies in five remote communities in northern Australia. *Epidemiology and Infection, FirstView*(<https://doi.org/10.1017/S0950268818001061>), 1-8.
224. Kearns, T., Clucas, D., Connors, C., Currie, B. J., Carapetis, J. R., & Andrews, R. M. (2013). Clinic attendances during the first 12 months of life for Aboriginal children in five remote communities of Northern Australia. *PLOS ONE*, 8(3). Retrieved from: <http://dx.doi.org/10.1371/journal.pone.0058231>
225. Australasian College for Emergency Medicine. (2018). Aboriginal and Torres Strait Islander and non-Indigenous presentations to Australian emergency departments. Melbourne: Australasian College for Emergency Medicine.
226. Yeoh, D. K., Anderson, A., Cleland, G., & Bowen, A. C. (2017). Are scabies and impetigo 'normalised'? A cross-sectional comparative study of hospitalised children in northern Australia assessing clinical recognition and treatment of skin infections. *PLOS Neglected Tropical Diseases*, 11(7). Retrieved from: <https://doi.org/10.1371/journal.pntd.0005726>
227. 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.
228. Solar, O., & Irwin, A. (2010). A conceptual framework for action on social determinants of health: social determinants of health discussion paper 2 (policy and practice). Geneva: World Health Organization.
229. Gubhaju, L., McNamara, B. J., Banks, E., Joshy, G., Raphael, B., Williamson, A., & Eades, S. J. (2013). The overall health and risk factor profile of Australian Aboriginal and Torres Strait Islander participants from the 45 and up study. *BMC Public Health*, 13. Retrieved from: <http://dx.doi.org/10.1186/1471-2458-13-661>
230. World Health Organization. (2016). What are social determinants of health? Retrieved 2016 from http://www.who.int/social_determinants/sdh_definition/en/
231. Detels, R., Gulliford, M., Abdool K.Q., & Tan, C. C. (Eds.). (2015). *Oxford textbook of global public health* (6th ed.). Oxford, UK: Oxford University Press.
232. World Health Organization. (2010). A conceptual framework for action on social determinants of health: SDH discussion paper 2. Geneva: World Health Organization.
233. World Health Organization. (2016). Risk factors. Retrieved 2016 from http://www.who.int/topics/risk_factors/en/
234. Rickwood, D. (2006). Pathways of recovery: preventing further episodes of mental illness (monograph). Canberra: Commonwealth of Australia.
235. World Health Organization. (2000). The implications for training of embracing: a life course approach to health (pp. 12). Geneva: World Health Organization.
236. Waterworth, P., Dimmock, J., Pescud, M., Braham, R., & Rosenberg, M. (2016). Factors affecting Indigenous West Australians' health behavior: Indigenous perspectives. *Qualitative Health Research*, 26(1), 55-68.
237. enHealth. (2016). Preventing disease and injury through healthy environments: Environmental Health Standing Committee (enHealth) strategic plan 2016 to 2020. Canberra: enHealth.
238. Clifford, H. D., Pearson, G., Franklin, P., Walker, R., & Zosky, G. R. (2015). Environmental health challenges in remote Aboriginal Australian communities: clean air, clean water and safe housing. *Australian Indigenous Health Bulletin*, 15(2), 1-14.
239. enHealth. (2010). Environmental health practitioner manual: a resource manual for environmental health practitioners working with Aboriginal and Torres Strait Islander communities. Canberra: Department of Health, Australia.
240. Memmott, P., Greenop, K., & Birdsall-Jones, C. (2014). How is crowding in Indigenous households managed? Melbourne: Australian Housing and Urban Research Institute.
241. Australian Bureau of Statistics. (2018). Census of population and housing: characteristics of Aboriginal and Torres Strait Islander Australians, 2016.
242. Ware, V.-A. (2013). Housing strategies that improve Indigenous health outcomes. Canberra: Closing the Gap Clearinghouse.
243. Australian Institute of Health and Welfare. (2017). National Social Housing Survey: detailed results 2016. Canberra: Australian Institute of Health and Welfare.
244. Hall, N., Barbosa, M. C., Currie, D., Dean, A. J., Head, B., Hill, P. S., . . . Willis, J. (2017). Water, sanitation and hygiene in remote Indigenous Australian communities: a scan of priorities. Brisbane: Global Change Institute, The University of Queensland.
245. Towart, R., Griew, R., Murphy, S., & Pascoe, F. (2017). Remote housing review: a review of the National Partnership Agreement on Remote Indigenous Housing and the Remote Housing Strategy (2008-2018). Canberra: Department of the Prime Minister and Cabinet.

246. Ferguson, M., Brown, C., Geoga, C., Miles, E., Wilson, A., & Brimblecombe, J. (2017). Traditional food availability and consumption in remote Aboriginal communities in the Northern Territory, Australia. *Australian and New Zealand Journal of Public Health*, 41(3), 294-298.
247. 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.
248. 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.
249. Australian Bureau of Statistics (ABS). (2016). Australian Aboriginal and Torres Strait Islander Health Survey: consumption of added sugars, 2012-13. Canberra: Australian Bureau of Statistics (ABS).
250. Craig, P., & Watson, M. (2018). Nutrition across the life stages. Canberra: Australian Institute of Health and Welfare.
251. Australian Bureau of Statistics (ABS). (2016). Australian Aboriginal and Torres Strait Islander Health Survey: consumption of food groups from the Australian Dietary Guidelines, 2012-13. Canberra: Australian Bureau of Statistics (ABS).
252. Australian Bureau of Statistics. (2015). Australian Aboriginal and Torres Strait Islander health survey: nutrition results - food and nutrients, 2012-13. Canberra: Australian Bureau of Statistics.
253. 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
254. 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>
255. World Health Organization. (2015). Guideline: sugars intake for adults and children. Geneva: World Health Organization.
256. 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
257. McCarthy, L., Chang, A. B., & Brimblecombe, J. (2018). Food security experiences of Aboriginal and Torres Strait Islander families with young children in an urban setting: influencing factors and coping strategies. *International Journal of Environmental Research and Public Health*, 15(12). Retrieved from: <https://doi.org/10.3390/ijerph15122649>
258. World Health Organization. (2013). Breastfeeding. Retrieved 2013 from https://www.who.int/nutrition/topics/exclusive_breastfeeding/en/
259. Australian Institute of Health and Welfare. (2011). 2010 Australian national infant feeding survey: indicator results. Canberra: Australian Institute of Health and Welfare.
260. Helps, C., & Barclay, L. (2015). Aboriginal women in rural Australia; a small study of infant feeding behaviour. *Women and Birth*, In press(<http://dx.doi.org/10.1016/j.wombi.2014.12.004>).
261. Brown, S., Stuart-Butler, D., Leane, C., Ah Kit, J., Glover, K., Mitchell, A., . . . Gartland, D. (2017). Aboriginal Family Birthing Program in South Australia: making a difference to breastfeeding of Aboriginal infants? [conference abstract]. *Journal of Paediatrics and Child Health*, 53(S2), 14.
262. Australian Bureau of Statistics. (2014). Australian Aboriginal and Torres Strait Islander health survey: physical activity, 2012-13. Canberra: Australian Bureau of Statistics.
263. Australian Government Department of Health. (2014). Australia's physical activity and sedentary behaviour guidelines. Canberra: Australian Government Department of Health.
264. Australian Government Department of Health. (2014). Australia's physical activity and sedentary behaviour guidelines - guidelines evidence summary. Canberra: Australian Government Department of Health.
265. Dawson, J., Morland, R., & Brooks, R. (2017). A picture of overweight and obesity in Australia: 2017. Canberra: Australian Institute of Health and Welfare.
266. Dunford, M., & Prescott, V. (2017). Impact of physical inactivity as a risk factor for chronic conditions: Australian Burden of Disease Study. Canberra: Australian Institute of Health and Welfare.
267. National Health and Medical Research Council. (2013). *Eat for Health: Australian dietary guidelines summary*. Canberra: National Health and Medical Research Council.

268. World Health Organization. (2011). Waist circumference and waist-hip ratio: report of a WHO expert consultation Geneva.
269. Li, M., & McDermott, R. (2015). Obesity, albuminuria, and gamma-glutamyl transferase predict incidence of hypertension in Indigenous Australians in rural and remote communities in northern Australia. *Journal of Hypertension*, 33(4), 704–710.
270. Adegbija, O., Hoy, W. E., & Wang, Z. (2015). Corresponding waist circumference and body mass index values based on 10-year absolute type 2 diabetes risk in an Australian Aboriginal community. *BMJ Open Diabetes Research & Care*, 3(1). Retrieved from: <http://dx.doi.org/10.1136/bmjdc-2015-000127>
271. 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.
272. Li, M., & McDermott, R. A. (2010). Using anthropometric indices to predict cardio-metabolic risk factors in Australian Indigenous populations. *Diabetes Research and Clinical Practice*, 87(3), 401–406.
273. Gracey, M., Burke, V., Martin, D. D., Johnston, R. J., Jones, T., & Davis, E. A. (2007). Assessment of risks of “lifestyle” diseases including cardiovascular disease and type 2 diabetes by anthropometry in remote Australian Aborigines. *Asia Pacific Journal of Clinical Nutrition*, 16(4), 688–697.
274. Hughes, J. T., Maple-Brown, L. J., Piers, L. S., Meerkin, J., O'Dea, K., & Ward, L. C. (2015). Development of a single-frequency bioimpedance prediction equation for fat-free mass in an adult Indigenous Australian population. *European Journal of Clinical Nutrition*, 69(1), 28–33.
275. Australian Bureau of Statistics. (2014). Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012–13: table 8 [data cube]. Retrieved 6 June 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&472705500608.xls&4727.0.55.006&Data%20Cubes&2414D8800A3A8364CA257CEE0010D832&0&2012%9613&06.06.2014&Latest>
276. Australian Bureau of Statistics. (2014). Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012–13: table 14 [data cube]. Retrieved 6 June 2014 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&472705500614.xls&4727.0.55.006&Data%20Cubes&7116BB02CF341792CA257CEE0010D9AF&0&2012%9613&06.06.2014&Latest>
277. 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.
278. Australian Institute of Health and Welfare. (2017). Healthy Communities: immunisation rates for children in 2015–16. Canberra: Australian Institute of Health and Welfare.
279. Australian Institute of Health and Welfare. (2018). Healthy Communities: immunisation rates for children in 2016–17. Canberra: Australian Institute of Health and Welfare.
280. Department of Health. (2018). Childhood immunisation coverage. Retrieved 27 April 2018 from <https://beta.health.gov.au/topics/immunisation/childhood-immunisation-coverage>
281. Claydon, C., Webber, K., & Sweeney, J. (2017). National Drug Strategy Household Survey 2016: detailed findings. Canberra: Australian Institute of Health and Welfare.
282. Australian Bureau of Statistics. (2017). Aboriginal and Torres Strait Islander peoples: smoking trends, Australia, 1994 to 2014–15. Retrieved 19 October 2017 from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4737.0?OpenDocument>
283. Australian Government Department of Health. (2017). National drug strategy 2017–2026. Canberra: Australian Government Department of Health.
284. Australian Institute of Health and Welfare. (2017). National Drug Strategy Household Survey 2016: detailed findings. Canberra: Australian Institute of Health and Welfare.
285. Australian Institute of Health and Welfare. (2014). National Drug Strategy Household Survey detailed report: 2013. Canberra: Australian Institute of Health and Welfare.
286. Gray, D., Cartwright, K., Stearne, A., Saggars, S., Wilkes, E., & Wilson, M. (2018). Review of the harmful use of alcohol among Aboriginal and Torres Strait Islander people. *Australian Indigenous Health Bulletin*, 18(1), 42.
287. Intergovernmental Committee on Drugs. (2015). National Aboriginal and Torres Strait Islander peoples' drug strategy 2014–2019. Canberra: National Drug Strategy.
288. Gray, D., & Wilkes, E. (2010). Reducing alcohol and other drug related harm. Canberra: Closing the Gap Clearinghouse.
289. National Health and Medical Research Council. (2009). Australian guidelines to reduce health risks from drinking alcohol. Canberra: National Health and Medical Research Council.
290. 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 <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4727.0.55.0012012-13?OpenDocument>

291. 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 <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4727.0.55.0012012-13?OpenDocument>
292. Bower, C., & Elliott, E. J. (2016). Australian guide to the diagnosis of FASD. Perth, WA: Telethon Kids Institute.
293. Watkins, R. E., Elliott, E. J., Wilkins, A., Mutch, R. C., Fitzpatrick, J. P., Payne, J. M., . . . Bower, C. (2013). Recommendations from a consensus development workshop on the diagnosis of fetal alcohol spectrum disorders in Australia. *BMC Pediatrics*, 13. Retrieved from: <http://dx.doi.org/10.1186/1471-2431-13-156>
294. Australian Institute of Health and Welfare. (2013). Aboriginal and Torres Strait Islander health performance framework 2012: detailed analyses. Canberra: Australian Institute of Health and Welfare.
295. Stafford, J., & Breen, C. (2016). Australian drug trends 2015: findings from the Illicit Drug Reporting System (IDRS). Sydney: National Drug and Alcohol Research Centre.
296. 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.
297. The Kirby Institute. (2017). Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people: annual surveillance report 2017. Sydney: The Kirby Institute.
298. 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>
299. Australian Institute of Health and Welfare. (2018). Aboriginal and Torres Strait Islander health organisations: online services report - key results 2016-17. Canberra: Australian Institute of Health and Welfare.
300. Australian Institute of Health and Welfare. (2018). Alcohol and other drug treatment services in Australia 2016-17. Canberra: Australian Institute of Health and Welfare.
301. d'Abbs, P., & Maclean, S. (2008). Volatile substance misuse: a review of interventions. Barton, ACT: Australian Government Department of Health and Ageing.
302. Lubman, D. I., Hides, L., & Yucel, M. (2006). Inhalant misuse in youth: time for a coordinated response. *Medical Journal of Australia*, 185(6), 327-330.
303. National Institute on Drug Abuse. (2012). NIDA InfoFacts: inhalants. Retrieved 2010 from <http://drugabuse.gov/infofacts/inhalants.html>
304. Brouette, T., & Anton, R. (2001). Clinical review of inhalants. *The American Journal on Addictions*, 10(1), 79-94.
305. Wilkes, E., Gray, D., Casey, W., Stearne, A., & Dadd, L. (2014). Harmful substance use and mental health. In P. Dudgeon, H. Milroy & R. Walker (Eds.), *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice* (2nd edition ed., pp. 125-146 (chapter 128)). Canberra: Department of The Prime Minister and Cabinet.
306. Cairney, S., O'Connor, N., Dingwall, K. M., Maruff, P., Shafiq-Antonacci, R., Currie, J., & Currie, B. J. (2013). A prospective study of neurocognitive changes 15 years after chronic inhalant abuse. *Addiction*, 108(6), 1107-1114.
307. Cairney, S., Maruff, P., Burns, C. B., Currie, J., & Currie, B. J. (2005). Neurological and cognitive recovery following abstinence from petrol sniffing. *Neuropsychopharmacology*, 30(5), 1019-1027.
308. d'Abbs, P., & Shaw, G. (2016). Monitoring trends in the prevalence of petrol sniffing in selected Australian Aboriginal communities 2011-2014: final report. Darwin: Menzies School of Health Research.
309. Department of Prime Minister and Cabinet. (2017). Low aromatic fuel. Retrieved 2017 from <https://www.dpmc.gov.au/indigenous-affairs/health-and-wellbeing/low-aromatic-unleaded-fuel>
310. Marel, C., MacLean, S., & Midford, R. (2016). Review of volatile substance use among Aboriginal and Torres Strait Islander people. Perth: Australian Indigenous HealthInfoNet.
311. Parliament of Victoria Drugs and Crime Prevention Committee. (2002). Inquiry into the inhalation of volatile substances: final report. Melbourne: Parliament of Victoria.
312. Shaw, G., Biven, A., Gray, D., Mosey, A., Stearne, A., & Perry, J. (2004). An evaluation of the Comgas scheme: they sniffed it and they sniffed it but it just wasn't there. Canberra: Department of Health and Ageing.
313. South Australian Centre for Economic Studies. (2010). Cost benefit analysis of legislation to mandate the supply of opal fuel in regions of Australia: final report. Adelaide: Australian Government Department of Health and Ageing.

314. Department of the Prime Minister and Cabinet. (2019). Closing the Gap report 2019. Canberra: Department of the Prime Minister and Cabinet.
315. Council of Australian Governments. (2018). COAG statement on the Closing the Gap Refresh. Canberra: Council of Australian Governments.
316. Council of Australian Governments. (2009). National Indigenous reform agreement (closing the gap). Canberra: Council of Australian Governments.
317. National Congress of Australia's First Peoples. (2016). The Redfern statement: Aboriginal and Torres Strait Islander peak organisations unite. Sydney: National Congress of Australia's First Peoples.
318. Referendum Council. (2017). Uluru statement from the heart: Referendum Council.
319. Drew, N. M., Bishop, B. J., & Syme, G. (2002). Justice and local community change: towards a substantive theory of justice. *Journal of Community Psychology*, 30(6), 623-634.
320. Opatow, S. (2017). Social justice theory and practice: fostering inclusion in exclusionary contexts. In P. L. Hammack (Ed.), *The Oxford handbook of social psychology and social justice*. New York: Oxford University Press.
321. Reconciliation Australia. (2019). Australian reconciliation barometer 2018. Canberra: Reconciliation Australia.
322. Sweeney, P., & Opatow, S. (2013). 'Why there?' Islamophobia, environmental conflict, and justice at Ground Zero. *Social Justice Research*, 26(4), 492-512.
323. McCallum, K. (2011). Journalism and Indigenous health policy. *Australian Aboriginal Studies*, 2011(2), 21-31.
324. Stoneham, M. J., Goodman, J., & Daube, M. (2014). The portrayal of Indigenous health in selected Australian media. *The International Indigenous Policy Journal*, 5(1). Retrieved from: <https://doi.org/10.18584/iipj.2014.5.1.5>
325. Drew, N. (2015). Social and emotional wellbeing, natural helpers, critical health literacy and translational research: connecting the dots for positive health outcomes. *Australasian Psychiatry*, 23(6), 620-622.
326. Australian Bureau of Statistics. (2018). Linking death registrations to the 2016 Census, 2016-17. Canberra: Australian Bureau of Statistics.
327. Australian Institute of Health and Welfare. (2010). National best practice guidelines for collecting Indigenous status in health data sets. Canberra: Australian Institute of Health and Welfare.
328. Australian Institute of Health and Welfare. (2013). Indigenous identification in hospital separations data: quality report. Canberra: Australian Institute of Health and Welfare.
329. Moon, L., Connell, E., Rompotis, C., Martin, F., Bartlett, N., & Harvey, J. (2017). Cancer in Australia 2017. Canberra: Australian Institute of Health and Welfare.
330. Meere, D., & Harvey, J. (2018). National Bowel Cancer Screening Program: monitoring report 2018. Canberra: Australian Institute of Health and Welfare.

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