



Australian Indigenous
HealthInfoNet

Overview of Aboriginal and Torres Strait Islander health status 2016



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The Australian Indigenous HealthInfoNet

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

The HealthInfoNet achieves its mission by undertaking research into various aspects of Aboriginal and Torres Strait Islander health and disseminating the results (and other relevant knowledge and information) mainly via its Internet site (www.healthinfonet.ecu.edu.au). The research involves analysis and synthesis of data and other information obtained from academic, professional, government and other sources. The HealthInfoNet'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 HealthInfoNet recognises and acknowledges the sovereignty of Aboriginal and Torres Strait Islander peoples as the original custodians of the country. Aboriginal and Torres Strait cultures are persistent and enduring, continuing unbroken from the past to the present, characterised by resilience and a strong sense of purpose and identity despite the undeniably negative impacts of colonisation and dispossession. Aboriginal and Torres Strait Islander people throughout the country represent a diverse range of people, communities and groups each with unique identity, cultural practices and spirituality. We recognise that the current health status of Aboriginal and Torres Strait Islander people has been significantly impacted by past and present practices and policies. It is not our intention to homogenise in summary health data and where possible we endeavour to disaggregate analyses to recognise geographical, social and cultural diversity.

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

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Preface

The main purpose of the *Overview* is to provide a comprehensive summary of the most recent indicators of the health and current health status of Australia's Aboriginal and Torres Strait Islander people. It has been prepared by Australian Indigenous HealthInfoNet staff as part of our contribution to supporting those who work in the Aboriginal and Torres Strait Islander health sector. The *Overview* is a key element of the HealthInfoNet commitment to authentic and engaged knowledge development and exchange.

The initial sections of this *Overview* provide information about the context of Aboriginal and Torres Strait Islander health, population, and various measures of population health status. Most of the subsequent sections about specific health conditions comprise an introduction about the condition and evidence of the current burden of the condition among Aboriginal and Torres Strait Islander people. Information is provided for state and territories and for demographics such as sex and age when it is available and appropriate.

While 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 (www.healthinonet.ecu.edu.au/health-facts/reviews-home). Additional, more in depth, information about the topics summarised in this *Overview* is included in the corresponding sections of the HealthInfoNet's website (www.healthinonet.ecu.edu.au). For more information on accessing and using the HealthInfoNet resource please view our instructional videos accessible from the web resource and also located on YouTube at www.youtube.com/channel/UCftVbk_1fVQz2i_9TyQ1E2Q.

In this edition, we have included a featured section on Healing as 2017 will be the 20th anniversary of the *Bringing Them Home* report. It is timely and important to highlight the contribution of healing workers and organisations to supporting people, families and communities impacted by the Stolen Generations. We have also, for the first time, included a section on environmental health. Environmental health has important impacts on health outcomes and is linked to the social determinants of health with indicators such as housing, infrastructure, sewerage and water supply.

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 2016*.



Neil Drew, Director on behalf of the HealthInfoNet team

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- 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 www.healthinonet.ecu.edu.au/contact)



Bibdjool

Donna Lei Rioli - a Western Australian Indigenous artist - was commissioned by the HealthInfoNet to create a logo incorporating a gecko, chosen as it is one of a few animals that are found across the great diversity of Australia.

Donna is a Tiwi/Nyoongar woman who is dedicated to the heritage and culture of the Tiwi people on her father's side, Maurice Rioli, and the Nyoongar people on her mother's side, Robyn Collard. Donna enjoys painting because it enables her to express her Tiwi and Nyoongar heritage and she combines the two in a unique way.

Donna interpreted the brief with great awareness and conveyed an integrated work that focuses symbolically on the pathway through life. This is very relevant to the work and focus of the Australian Indigenous HealthInfoNet in contributing to improving the health and wellbeing of Aboriginal and Torres Strait Islander Australians.

Key facts

Population

- At 30 June 2016, the estimated Australian Aboriginal and Torres Strait Islander population was 744,956.
- In 2016, it was estimated that NSW had the highest number of Aboriginal and Torres Strait Islander people (229,951 people, 31% of the total Aboriginal and Torres Strait Islander population).
- In 2016, it was estimated that the NT had the highest proportion of Aboriginal and Torres Strait Islander people in its population, with 30% of the NT population identifying as Aboriginal and/or Torres Strait Islander.
- In 2016, around 35% of Aboriginal and Torres Strait Islander people lived in a capital city.
- The Aboriginal and Torres Strait Islander population is much younger than the non-Indigenous population.

Births and pregnancy outcomes

- In 2015, there were 18,537 births registered in Australia with one or both parents identified as Aboriginal and/or Torres Strait Islander (6.1% of all births registered).
- In 2015, Aboriginal and Torres Strait Islander mothers were younger than non-Indigenous mothers; the median age was 25.1 years for Aboriginal and Torres Strait Islander mothers and 31 years for all mothers.
- In 2015, total fertility rates were 2,271 births per 1,000 for Aboriginal and Torres Strait Islander women and 1,807 per 1,000 for all women.
- In 2014, the average birthweight of babies born to Aboriginal and Torres Strait Islander mothers was 3,215 grams compared with 3,355 grams for babies born to non-Indigenous mothers.
- In 2014, the proportion of low birthweight (LBW) babies born to Aboriginal and Torres Strait Islander women was twice that of non-Indigenous women (12% compared with 6.2%).
- For 2004 to 2014 there was a slight decrease in the proportion of LBW babies born to Aboriginal and Torres Strait Islander mothers.

Mortality

- For 2015, the age-standardised death rate for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT was 1.7 times the rate for non-Indigenous people.
- Between 1998 and 2013, there was a 16% 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 2010-2012, life expectancy was estimated to be 69.1 years for males and 73.7 years for females, around 10-11 years less than the estimates for non-Indigenous males and females.
- For 2013-2015, 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 2013-2015, the infant mortality rate was higher for Aboriginal and Torres Strait Islander infants than for non-Indigenous infants living in NSW, Qld, WA, SA and the NT; the rate for Aboriginal and Torres Strait Islander infants was highest in the NT.
- For 1998 to 2014, there were significant declines in infant mortality rates for Aboriginal and Torres Strait Islander infants.
- In 2013, the leading causes of death among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT were cardiovascular disease, neoplasms (mainly cancers) and injury.
- For 2008-2012, for direct maternal deaths, the rate ratio was 2.2 times higher for Aboriginal and Torres Strait Islander women than for non-Indigenous women.

Hospitalisation

- In 2014-15, 4.4% of all hospital separations were for Aboriginal and Torres Strait Islander people.
- In 2014-15, the age-adjusted separation rate for Aboriginal and Torres Strait Islander people was 2.4 times higher than for non-Indigenous people.
- In 2014-15, 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 50% of all Aboriginal and Torres Strait Islander separations.

- In 2014-15, the rate of overall potentially preventable hospitalisations was around three times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Selected health conditions

Cardiovascular disease

- In 2012-2013, 13% of Aboriginal and Torres Strait Islander people reported having a long-term heart or related condition; after age-adjustment, these conditions were around 1.2 times more common for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2011, CVD was the third largest contributor (12%) to total disease burden among Aboriginal and Torres Strait Islander people.
- In 2014-15, hospitalisation rates for circulatory disease were almost twice as high for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2015, 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; the age-adjusted death rate due to ischaemic heart disease for Aboriginal and Torres Strait Islander people was twice the rate for non-Indigenous people.
- For 1998 to 2014, the gap in CVD mortality rates between Aboriginal and Torres Strait Islander and non-Indigenous people narrowed.

Cancer

- For 2006-2010, age-adjusted cancer incidence rates were slightly lower for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT than for non-Indigenous people.
- For 2006-2010, the most common cancers diagnosed among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT were lung and breast (females) cancers.
- 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.
- In 2014-15, age-adjusted hospitalisation rates for cancer were lower for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT than for non-Indigenous people.
- For 2009-2013, the age-adjusted death rate for cancer for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT was 1.3 times higher than for non-Indigenous 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 more than three times more likely to report having some form of diabetes than non-Indigenous people.
- In 2015, 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.
- In 2015, Aboriginal and Torres Strait Islander people living in NSW, Qld, SA, WA and the NT died from diabetes at five times the rate of non-Indigenous 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 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 2014-15, there were 16,941 hospital separations with a principal diagnosis of ICD 'Mental and behavioural disorders' identified as Aboriginal and/or Torres Strait Islander.
- In 2015, the death rate for ICD 'Intentional self-harm' (suicide) for Aboriginal and Torres Strait Islander people was twice the rate reported for non-Indigenous people.

Kidney health

- For 2010-2014, after age-adjustment, the notification rate of end-stage renal disease was 6.6 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2011, kidney and urinary diseases accounted for 2.5% of the total burden of disease among Aboriginal and Torres Strait Islander people.
- In 2014-15, 'care involving dialysis' was the most common reason for hospitalisation among Aboriginal and Torres Strait Islander people.
- For 2010-2014, the age-adjusted death rate from kidney disease was 2.7 times higher for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and NT than for non-Indigenous people.

Injury, including family violence

- In 2014-15, after age-adjustment, Aboriginal and Torres Strait Islander people were hospitalised for injury at almost twice the rate for non-Indigenous people.
- In 2014-15, 19% of injury-related hospitalisations among Aboriginal and Torres Strait Islander people were for assaults, compared with 2% among non-Indigenous people.
- In 2015, age-adjusted death rates from intentional self-harm were twice 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 nearly three times higher and injury from assault over eight times higher.

Respiratory disease

- In 2012-2013, 31% of Aboriginal and Torres Strait Islander people reported having a respiratory condition. After age-adjustment, the level of respiratory disease was 1.2 times higher for Aboriginal and Torres Strait Islander than for non-Indigenous people.
- In 2012-2013, 18% of Aboriginal and Torres Strait Islander people reported having asthma.
- In 2011, respiratory diseases were responsible for 7.9% of the total burden of disease among Aboriginal and Torres Strait Islander people.
- 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 2015, chronic lower respiratory disease was the leading cause of death from respiratory disease and 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 2012, age-adjusted death rates for respiratory disease in NSW, Qld, WA, SA and NT declined by 26% for 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 2012-2013, eye and sight problems were reported by 33% of Aboriginal and Torres Strait Islander people.
- In 2012-2013, myopia and hyperopia for Aboriginal and Torres Strait Islander people were reported at 0.8 and 1.1 times the proportions for non-Indigenous people.
- In 2015, the estimated prevalence of active trachoma among Aboriginal and Torres Strait Islander children aged 5-9 years living in at-risk communities in the WA, SA and the NT was 4.6%.
- In the period 2011-12 to 2012-13, after age-adjustment, Aboriginal and Torres Strait Islanders were less likely to be hospitalised for diseases of the eye and adnexa than non-Indigenous people.

Ear health and hearing

- In 2012-2013, ear disease/hearing problems were reported by 12% of Aboriginal and Torres Strait Islander people.
- In 2014-15, the hospitalisation rate for ear disease for Aboriginal and Torres Strait Islander children aged 4-14 years was 1.4 times higher than the rate for non-Indigenous children.

Oral health

- In 2014-15, 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 2012-13, 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 2012, the overall rate of disability among Aboriginal and Torres Strait Islander Australians was 23%; after age-adjustment, the rate of disability for Aboriginal and Torres Strait Islander was 1.7 times the rate for non-Indigenous people.
- In 2014-15, 6% of disability service users were Aboriginal and Torres Strait Islander people, with most aged under 50 years (84%).

Communicable diseases

- For 2009-2013, after age-adjustment, the notification rate for tuberculosis was 11.3 times higher for Aboriginal and Torres Strait Islander people than for Australian born non-Indigenous people.
- In 2015, the age-adjusted notification rate for hepatitis B was three times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- For 2011-2015, there was a 22% decline in the hepatitis B notification rates for Aboriginal and Torres Strait Islander people.
- In 2015, the age-adjusted notification rate for hepatitis C was almost five times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- For 2012-2014, the average notification rate for *Haemophilus influenzae type b* among Aboriginal and Torres Strait Islander people was 5.3 times the rate in the total population.
- For 2011-2014, the rate of invasive pneumococcal disease for Aboriginal and Torres Strait Islander people decreased.
- In 2007-2010, the age-adjusted notification rate of meningococcal disease was 2.7 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people; the rate for Aboriginal and Torres Strait Islander children aged 0-4 years was 3.8 times higher than for non-Indigenous children.
- In 2015, Aboriginal and Torres Strait Islander people had higher crude notification rates for gonorrhoea, syphilis and chlamydia than non-Indigenous people.
- In 2015, age-adjusted notification rates of human immunodeficiency virus (HIV) diagnosis were 1.3 times higher for Aboriginal and Torres Strait Islander people than non-Indigenous people.

Factors contributing to Aboriginal and Torres Strait Islander health

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% of Aboriginal and Torres Strait Islander people 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.
- In 2012-2013, 83% of Aboriginal and Torres Strait Islander people reported consuming dairy foods daily.
- In 2012-2013, 54% of Aboriginal and Torres Strait Islander people reported consuming sugar daily.
- In 2012-2013, Aboriginal and Torres Strait Islander people living in remote areas were more likely to eat bush food compared with non-Indigenous people.

- 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 2012-2013, 83% of Aboriginal and Torres Strait Islander children aged 0-3 years had been breastfed, compared with 93% of non-Indigenous children.

Physical activity

- In 2012-2013, 47% of Aboriginal and Torres Strait Islander adults in non-remote areas met the target of 30 minutes of moderate intensity physical activity on most days.
- In 2012-2013, after age-adjustment, 61% of Aboriginal and Torres Strait Islander people in non-remote areas reported that they were physically inactive, a similar level to non-Indigenous people.

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.

Immunisation

- In 2016, 95% of Aboriginal and Torres Strait Islander children aged five years were fully immunised against the recommended vaccine-preventable diseases.

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 2014-2015, 36% of Aboriginal and Torres Strait Islander people reported they had never smoked.
- In 2014, 45% of Aboriginal and Torres Strait Islander mothers reported smoking during pregnancy, compared with 13% of non-Indigenous mothers.
- For 2009 to 2014, the proportion of Aboriginal and Torres Strait Islander mothers who smoked during pregnancy decreased.

Alcohol use

- In 2011, alcohol use was responsible for 8.3% of the total burden of disease among Aboriginal and Torres Strait Islander people.
- In 2012-2013, 23% of Aboriginal and Torres Strait Islander adults abstained from alcohol; this level was 1.6 times higher than among the non-Indigenous population.
- In 2012-2013, after age-adjustment, lifetime drinking risk was similar for both the Aboriginal and Torres Strait Islander and non-Indigenous populations.
- For 2010 to 2013, there was a significant decline for risky drinking in the proportion (from 32% to 23%) of Aboriginal and Torres Strait Islander people aged 14 years and older.
- For 2011-12 to 2012-13, after age-adjustment, for a principal diagnosis related to alcohol use, Aboriginal and Torres Strait Islander males were hospitalised at 4.5 times and females at 3.6 times the rates of non-Indigenous males and females.
- In 2008-2012, the age-adjusted death rates for alcohol-related deaths for Aboriginal and Torres Strait Islander people was 4.9 times higher than for non-Indigenous people.

Illicit drug use

- In 2011, illicit substance use was responsible for 3.7% of the total burden of disease for Aboriginal and Torres Strait Islander people.
- In 2014-2015, there were 69% and in 2012-2013 there were 52% of Aboriginal and Torres Strait Islander people aged 15 years and older who reported that they had never used illicit substances.
- In 2014-2015, 30% of Aboriginal and Torres Strait Islander people aged 15 years and over 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 more than three times higher for Aboriginal and Torres Strait Islander people than 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.

Volatile substance use

- For 2014-15, hospitalisation rates for accidental poisoning from the toxic effects of organic solvents including petroleum derivatives and glues and paints were between two to five times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Environmental health

- In 2014-15, 21% of Aboriginal and Torres Strait Islander people were living in overcrowded households.
- In 2014-15, 82% of Aboriginal and Torres Strait Islander households were living in houses of an acceptable standard.
- In 2014-15, 26% of Aboriginal and Torres Strait Islander households reported structural issues within their dwelling.
- In 2014-15, 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.

Introduction

This *Overview of Aboriginal and Torres Strait Islander health status* provides a comprehensive summary of the most recent indicators of the health of Aboriginal and Torres Strait Islander 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).

Sources of information

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

- The *Overcoming Indigenous disadvantage* reports, produced by the SCRGSP and published by the Productivity Commission; the report has been published biennially since 2003.
- Reports in the *Aboriginal and Torres Strait Islander health performance framework* series with substantial detailed analyses, prepared by AHMAC since 2006.
- *Reports on government services*, produced by the SCRGSP and published annually by the Productivity Commission since 2003.
- *The health and welfare of Australia's Aboriginal and Torres Strait Islander people* series, produced by the ABS and the AIHW since 1997. The AIHW produced an updated version in 2015 [1].

In addition to these substantial reports, continuing attention has been directed at improving the various data collections that feed into these and other reports. This work, overseen by the National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data (NAGATSIHID), has achieved considerable progress, but the NAGATSIHID strategic plan 2011-2015 acknowledged the need for 'new data collections or enhancing existing collections' ... 'so that a comprehensive information base is available to inform policy, practice and service delivery' [2, p.13]. See Appendix 1 for a full discussion of data limitations.

This *Overview* draws on information from the main administrative data collections (such as the birth and death registration systems and the hospital inpatient collections) and national surveys, for example, the Australian Aboriginal and Torres Strait Islander health surveys. Information from these sources has been published mainly in government reports, particularly those produced by the ABS, the AIHW, and the SCRGSP. It also relies on a wide variety of other information sources including: registers for specific diseases and other conditions; regional and local surveys; and 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).

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

A number of sections include the results of our own analyses of data obtained from a variety of sources. For example, estimates of the age-adjusted incidence of end-stage renal disease were made using notification data provided by ANZDATA. Similarly, information about a number of communicable diseases was derived from data published by the Kirby Institute.

The context of Aboriginal and Torres Strait Islander health

The historical context of Aboriginal and Torres Strait Islander health

Aboriginal people are the original people of Australia [3]. Their continuity, history and cultural traditions are unrivalled in the world [4]. Aboriginal people have occupied their traditional lands throughout mainland Australia for 50,000 to 120,000 years [4]. The Torres Strait Islander people, on the other hand, have occupied 270 or so islands in the Torres Straits (which run between Australia and Papua New Guinea) for over 2,500 years [4]. However, in addition to living in other parts of Australia, they continue to live on 17 of the islands with two communities on the far northern Queensland coast.

Aboriginal people have survived many challenges including droughts and floods [5]. Scientific proof of extreme climate due to a period of arid climate change has been found in an ancient site known as Warraty, in the Flinders Range, SA where Aboriginal settlement dating from 50,000 years ago demonstrated the resilience of people, who endured even when large animals became extinct due to the conditions [6].

There are distinctive ethnic and cultural differences within Aboriginal and Torres Strait Islander societies, each having their own language and traditions [7]. Aboriginal and Torres Strait Islander people are the original custodians of many identified places in Australia. They enjoyed a semi-nomadic lifestyle in family and community groups, moving across a defined area following seasonal changes [4]. According to their cultural beliefs, the physical environment of each local area was created by the actions of spiritual ancestors as they travelled across the landscape.

Despite their differences, Aboriginal and Torres Strait Islander people have had many shared experiences of colonisation that have led to negative impacts on their health. Multiple generations have had pervasive risks to their wellbeing: psychologically; socially; spiritually and culturally and because of their connection to land [8]. The historical determinants of health still influence the current disadvantages in health outcomes [9]. Since the arrival of non-Indigenous people in 1788², introduced illness has caused a great deal of harm to the health of Aboriginal people. Negative health outcomes have been associated with deep underlying causes such as racism and discrimination, forced removal of children, loss of identity, language, culture and land [10].

The *Overcoming Indigenous disadvantage: key indicators 2016* report highlights major events that characterise the historical context [10]:

- 1860 – the *Aborigines Acts* saw the suppression of many human rights and liberties, through the regulation of Aboriginal human lives on reserves. Torres Strait Islander people also faced special laws that included segregated cinemas, schools, travel restrictions and poorer health and educational opportunities.
- late 1800s through much of the twentieth century – the suppression of the rights of Aboriginal people continued with government control of wages and pensions, a practice now called ‘stolen wages’.
- 1938 – a lack of response to petitions to the Commonwealth Government seeking representation in Parliament and the establishment of a national department of native affairs and state advisory councils led to Aboriginal people from around Australia forming NAIDOC.
- 1966 – the Gurindji walk off, 250 Aboriginal pastoral workers left their posts in Wave Hill NT, over poor industrial rights, including unfair wages and extremely poor health and living conditions.
- 1980-1999 – the Royal Commission into Aboriginal Deaths in Custody reported on the toxic effects of dispossession and mainstreamed, institutionalised racism towards Aboriginal and Torres Strait Islander people [10].

Despite many challenges, Aboriginal and Torres Strait Islander people have made significant advances towards taking control of their futures and their health outcomes. In 2010, Kenneth (Ken) Wyatt AM, became the first Aboriginal Member of the Australian House of Representatives followed by Nova Peris (2013), Linda Burney, The Australian Labor Party’s Shadow Minister for Human Services in 2016, while Patrick Dodson and Malarndirri McCarthy were elected to the Senate in the same year [11]. In 2016, Kenneth (Ken) Wyatt AM became the first Aboriginal person to be elevated to a ministerial role as Minister for Aged Care and Indigenous Health [12].

Deficit thinking has been a barrier to improving Aboriginal and Torres Strait Islander health outcomes. Shifting towards a strengths based approach has offered an alternative, as it highlights the value of people as cooperating individuals: it focuses on productive measures and offers no time for blame or negativity in the pursuit of shared progress. The *Overcoming Indigenous disadvantage: key indicators 2016* report, reiterates a strong level of support for the strengths based pathway [10]. The approach is best described through tangible examples, which can be found in a number of health topics in this overview.

² The first Australian colony was formally proclaimed in 1788.

The strengths based pathway has been navigated as a direct response to the *National Aboriginal and Torres Strait Islander health plan 2013-2023* which defines the strengths based approach:

A strengths based approach views situations realistically and looks for opportunities to complement and support existing strengths and capacities as opposed to a deficit-based approach which focusses on the problem or concern [13].

Through self-determination and strong community leadership, there is now momentum for culturally determined 'health protecting factors' including connection to land, culture, spirituality and ancestry [8]. The strengths based approach continues to embrace and endorse strategies, programs and policies that embody these health protective factors. It is also very important for strengths based approaches to adopt a decolonising agenda; 'why it is vital that we all employ a more open and decolonising gaze' [14].

Indicators of Aboriginal and Torres Strait Islander social disadvantage

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

Education

The 2011 Australian *Census* [15] reported that:

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

An ABS school report [16] showed that in 2015:

- there were 198,799 students who identified as Aboriginal and/or Torres Strait Islander, an increase of 4.1% from 2014. Increases in recent years are partly due to the success of programs to improve identification and collection of data.
- almost 60% of Aboriginal and Torres Strait Islander students who started secondary school in year 7/8 continued through to year 12 compared with 47% in 2010.

A national report on schooling in Australia [17] showed that in 2016:

- 81% of year 3 Indigenous students and 71% of year 5 Indigenous students were at or above the national minimum standard for reading, compared with 96% of year 3 non-Indigenous students and 94% of year 5 non-Indigenous students
- 85% of year 3 Indigenous students and 74% of year 5 Indigenous students were at or above the national minimum standard for writing, compared with 97% of year 3 non-Indigenous students and 94% of year 5 non-Indigenous students
- 78% of year 3 Indigenous students and 74% of year 5 Indigenous students were at or above the national minimum standard for spelling, compared with 95% of year 3 non-Indigenous students and 94% of year 5 non-Indigenous students
- 82% of year 3 Indigenous students and 74% of year 5 Indigenous students were at or above the national minimum standard for grammar and punctuation, compared with 96% of year 3 non-Indigenous students and 95% of year 5 non-Indigenous students
- 83% of year 3 Indigenous students and 76% of year 5 Indigenous students were at or above the national minimum standard for numeracy, compared with 96% of year 3 non-Indigenous students and 96% of year 5 non-Indigenous students.

Employment

According to the 2011 Australian *Census* [15]:

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

Income

The median real equivalised³ gross weekly household income for Aboriginal and Torres Strait Islander households in 2011-13 was \$465 compared with \$869 for non-Indigenous households [18].

Healing: featured section

In 2017, it will be the 20th anniversary of the release of the *Bringing Them Home report*. To recognise this important milestone, we are presenting this short feature on healing. The *Bringing Them Home report* highlighted the importance of Aboriginal and Torres Strait Islander ownership of the design, implementation and management of services to support members of the Stolen Generations, their families and their communities [19]. The HealthInfoNet in partnership with the Healing Foundation has developed a Healing Portal to support workers in this important area (www.healthinonet.ecu.edu.au/related-issues/healing).

Aboriginal and Torres Strait Islander people suffer significant health concerns, socio-economic disadvantage and shortened life expectancy compared with non-Indigenous Australians [20]. Underpinning this is the historical trauma associated with the legacy of colonisation, persistent unresolved issues over such things as land rights, self-determination and identity, and poor economic development and outcomes. This trauma has resulted in a sense of powerlessness, loss, grief, disconnection and helplessness for Aboriginal and Torres Strait Islander people [20]. It is thought that healing from the impacts of the historical colonial legacy, using both cultural and contemporary understandings and processes, is necessary for individuals, families and communities, before many other contemporary Aboriginal and Torres Strait Islander health issues can be addressed [20].

Stolen Generations

Since European colonisation of Australia, Aboriginal and Torres Strait Islander children have been forcibly separated from their families: these children are collectively known as the Stolen Generations [20, 21]. Removal of Stolen Generations members from their families, identities, lands, languages and cultures by past governments has a profound impact on Aboriginal and Torres Strait Islander individuals, families and communities, causing considerable grief, loss and trauma [22]. The *Bringing Them Home report* outlined government removal policies which extended from the early 1900s to the 1970s and included the deliberate stripping of cultural practices and traditional law so that these practices would no longer exist in future generations [20, 21]. These policies have resulted in a significant impact on the health and wellbeing of Aboriginal and Torres Strait Islander people, difficulties for parenting the next generation and for re-establishing cultural links [20].

In 2008, there were an estimated 26,885 Aboriginal and Torres Strait Islander people who reported that they were removed from their natural family [23]. The 2014-2015 *National Aboriginal and Torres Strait Islander social survey* (NATSISS) reported 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 other long-term health conditions (42%) and those with no long-term health conditions (34%) [24].

Healing Work

Stolen Generations members deal with trauma in ways that mostly do not involve generic counselling models used by the mainstream population [22]. The *Bringing Them Home report* highlighted that 'only Indigenous people themselves are able to comprehend the full extent of the effects of the removal policies' and recommended that 'services to redress these effects must be designed, provided and controlled by Indigenous people themselves' [19]. Many Stolen Generations members find that coming together and sharing stories with other survivors in a community setting, helps them heal [22]. Themes in healing projects include: self-determination and community governance; reconnection and community life; and restoration and community resilience [20].

The Healing Foundation recently evaluated 31 healing projects based on the aforementioned principles and involved more than 3,676 Stolen Generations members, it found that: 72% of participants said they were better able to care for their trauma and grief in healthy ways; 68% felt more confident in accessing community support; and 77% reported an increased sense of belonging and connection to their culture [22].

Aboriginal and Torres Strait Islander population

Based on information from the 2011 Australian *Census*, the ABS has estimated the Aboriginal and Torres Strait Islander population at 744,956 on 30 June 2016 [25] (Table 1). The Aboriginal and Torres Strait Islander population accounted for 3.1% of Australia's total population of 24 million [25, 26]. The estimation for the Aboriginal and Torres Strait Islander population in NSW is the highest (229,951 people), followed by Qld (213,160), WA (97,681), and the NT (74,543). The NT has the highest proportion of Aboriginal and Torres Strait Islander people among its population (30%) and Vic the lowest (0.9%).

³ Equivalised household income adjusts the actual incomes of households to make households of different sizes and compositions comparable.

Table 1. Estimated Aboriginal and Torres Strait Islander (Indigenous) population, by jurisdiction, Australia, 30 June 2016

Jurisdiction	Indigenous population (number)	Proportion of Australian Indigenous population (%)	Proportion of jurisdiction population (%)
NSW	229,951	31	3.0
Vic	53,663	7.2	0.9
Qld	213,160	29	4.3
WA	97,681	13	3.5
SA	41,515	5.6	2.4
Tas	27,052	3.6	5.2
ACT	7,103	1.0	1.8
NT	74,543	10	30
Australia	744,956	100	3.1

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

Source: Derived from ABS, 2014 [25], ABS, 2016 [26]

There was a 21% increase in the number of Aboriginal and Torres Strait Islander people counted⁴ in the 2011 *Census* compared with the 2006 *Census* [27]. The largest increases were in the ACT (34%), Vic (26%), NSW (25%) and Qld (22%) [28]. For all jurisdictions, the 55 years and over age-group showed the largest relative increase (i.e. the Indigenous population is ageing). There are a number of 'structural' reasons contributing to the growth of the Indigenous population [29]:

- the slightly higher fertility rates of Aboriginal and Torres Strait Islander women compared with the rates of other Australian women (see 'Births and pregnancy outcomes' section)
- a higher proportion of Aboriginal and Torres Strait Islander people are in their childbearing years compared with the non-Indigenous population
- the significant numbers of Indigenous babies born to Indigenous fathers and non-Indigenous mothers.

Three other factors are considered likely to have contributed to the increase in the Indigenous population in the 2011 *Census* [29]:

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

In 2016, around 35% of Aboriginal and Torres Strait Islander people (262,297 people) lived in major cities, 45% (333,238 people) lived in inner and outer regional areas and 20% (149,421 people) lived in remote and very remote areas [25].

In terms of specific geographical areas, more than one-half (53%) of all Aboriginal and Torres Strait Islander people counted in the 2011 *Census* lived in nine of the 57 Indigenous regions⁵ [30]. In 2016, the largest projected populations were in three regions in eastern Australia (Brisbane, NSW Central and the North Coast, and Sydney-Wollongong), which accounted for 29% of the total Aboriginal and Torres Strait Islander population [25].

According to the 2011 *Census*, around 90% of Indigenous people were Aboriginal, 6% were Torres Strait Islander and 4% identified as being of both Aboriginal and Torres Strait Islander descent [30]. Around 63% of Torres Strait Islander people⁶ lived in Qld; NSW was the only other state with a large number of Torres Strait Islander people.

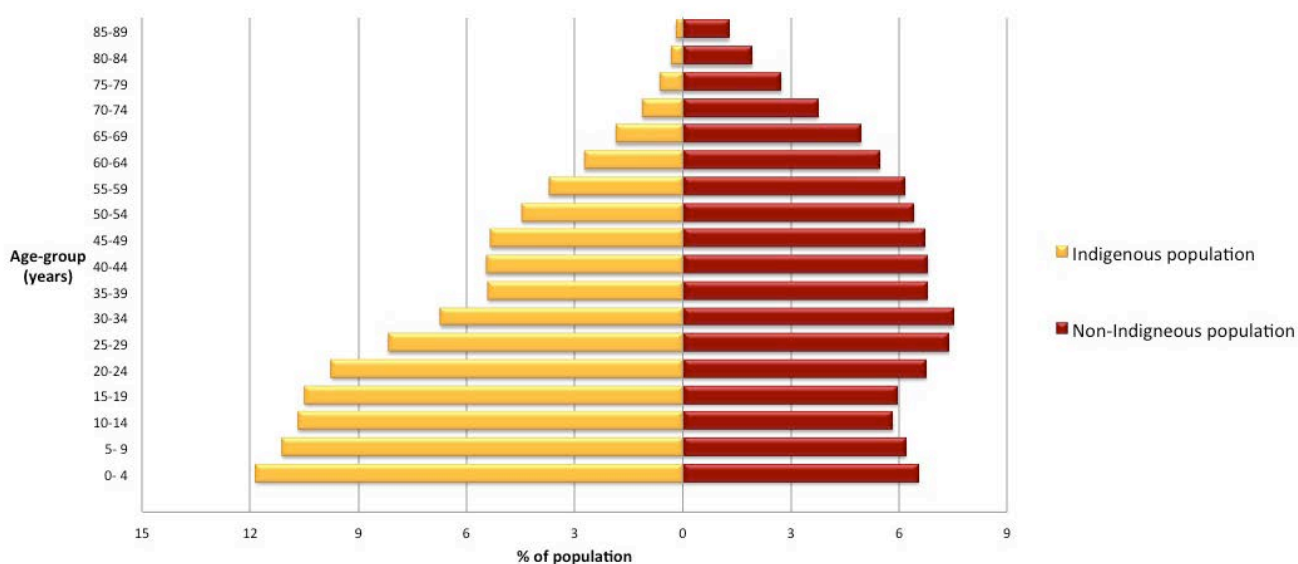
The Aboriginal and Torres Strait Islander population is much younger overall than the non-Indigenous population (Figure 1) (Derived from [25, 31]). According to estimates from the 2011 *Census*, at 30 June 2016 about 34% of Aboriginal and Torres Strait Islander people were aged less than 15 years, compared with 19% of non-Indigenous people. About 4.2% of Aboriginal and Torres Strait Islander people were aged 65 years or over, compared with 15% of non-Indigenous people.

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

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

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

Figure 1. Population pyramid of Aboriginal and Torres Strait Islander and non-Indigenous populations, 30 June 2016



Note: Excludes 90 years and older

Source: Derived from ABS, 2014 [25], ABS, 2013 [31]

Births and pregnancy outcomes

In 2015, there were 18,537 births registered in Australia with one or both parents identified as Aboriginal and/or Torres Strait Islander (6.1% of all births registered) [32]. (This probably underestimates the true number slightly as Indigenous status is not always identified, and there may be a lag in birth registrations.) For births registered as Indigenous: 30% registered 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 28% of registrations only the father was recorded as Aboriginal and/or Torres Strait Islander (including births where the mother's Indigenous status was unknown).

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, and 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.⁷ These rates are the annual number of births per 1,000 women in five-year age-groups from 15 to 44 years. (The relatively small numbers of births to women aged less than 15 years are included in the 15-19 years age-group.) The summary measure of fertility is the total fertility rate, which is the sum of age-specific fertility rates multiplied by five (since five-year age-groups are involved). It estimates the number of children that would be born to 1,000 women if each woman experienced current age-specific fertility rates at each age of her reproductive life.

⁷ The study of birth information is known as fertility analysis, where 'fertility' refers to the number of babies born alive. This meaning is different to the lay use of the word, which means the capacity to bear children. The technical term for the capacity to bear children is 'fecundity'.

Age of mothers

In 2015, Aboriginal and Torres Strait Islander women had more babies and had them at younger ages than non-Indigenous women; teenagers had 16% of the babies born to Aboriginal and Torres Strait Islander women, compared with 2.8% of those born to all mothers [32]. The median age of Indigenous mothers was 25.1 years, compared with 31 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 Indigenous women (58 babies per 1,000 women) was nearly five times that of all teenage women (12 babies per 1,000).

Table 2. Age-specific fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2015

Age-group of mother (years)	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Aboriginal and Torres Strait Islander mothers							
15-19	54	36	60	87	51	65	58
20-24	125	96	131	179	113	117	128
25-29	134	104	122	161	104	92	122
30-34	96	79	91	109	87	72	91
35-39	44	30	47	52	41	41	44
40-44	10	12	12	15	5.0	9.0	11
All mothers							
15-19	12	6.9	16	14	11	36	12
20-24	48	35	60	54	47	94	48
25-29	98	83	102	99	98	100	95
30-34	126	121	117	123	122	113	122
35-39	74	74	62	68	63	64	70
40-44	17	15	12	13	12	14	15

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

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

Source: ABS, 2016 [32]

Total fertility rates

In 2015, total fertility rates were 2,271 births per 1,000 for Aboriginal and Torres Strait Islander women and 1,807 per 1,000 for all women (Table 3) [32]. The highest total fertility rate for Aboriginal and Torres Strait Islander women was for those in WA (3,014 babies per 1,000 women), followed by NSW (2,317 per 1,000) and Qld (2,312 per 1,000).

Table 3. Total fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2015

Status of mother	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Aboriginal and Torres Strait Islander mothers	2,317	1,780	2,312	3,014	2,010	1,975	2,271
All mothers	1,869	1,678	1,847	1,846	1,763	2,108	1,807

Notes: 1 Total fertility rate is the number of children born to 1,000 women at the current level and age pattern of fertility (see Box: About births and 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, 2016 [32]

Antenatal care

Antenatal care from health professionals helps pregnant women by monitoring their health, providing information and support, screening and preventative treatment [33]. 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 [34].

In 2014, pregnant Aboriginal and Torres Strait Islander women attended an average of nine antenatal visits [35].⁸ (The Department of Health recommends 10 visits for first-time pregnancy without complications and seven visits for subsequent uncomplicated pregnancies [33].) Over half (53%) of these women attended the first antenatal visit during the first trimester of pregnancy. The proportion of expectant Aboriginal and Torres Strait Islander mothers attending antenatal care in the first trimester increased from 41% in 2010 to 52% in 2014 [35].

⁸ This excludes very pre-term births and data from Vic.

Birthweight

The average birthweight of babies born to Aboriginal and Torres Strait Islander mothers in 2014 was 3,215 grams, 140 grams less than the average for babies born to non-Indigenous mothers (3,355 grams) [35]. Around 13% of babies born to Aboriginal and Torres Strait Islander mothers were of low birthweight (LBW), compared with 6.6% 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.) There has been a slight decrease in the proportion of LBW babies born to Aboriginal and Torres Strait Islander mothers between 2004 and 2014.

Table 4. Proportion of low birthweight babies, by sub-categories and Indigenous status, Australia, 2014

	Babies born to Aboriginal and Torres Strait Islander mothers	Babies born to non-Indigenous mothers
Low birthweight (1,500-2,499 grams)	9.7	5.2
Very low birthweight (less than 1,500 grams)	2.1	1.0
Extremely low birthweight (less than 1,000 grams)	1.0	0.4

Source: AIHW, 2016 [35]

In 2014, LBW for babies of Aboriginal and Torres Strait Islander mothers varied slightly by remoteness from 12% of babies in major cities to 13% in very remote areas [35].

Factors impacting on LBW include pre-term birth, socio-economic disadvantage, the age of the mother, and antenatal care [36]. A mother's alcohol consumption and use of tobacco and other drugs during pregnancy also impact on the birthweight of her baby. Tobacco, in particular, has a major impact on birthweight. In 2014, 45% of Aboriginal and Torres Strait Islander mothers and 13% of non-Indigenous mothers reported smoking during pregnancy [35]. The proportion of Aboriginal and Torres Strait Islander mothers who smoked during pregnancy has decreased from 50% in 2009 to 45% in 2014.

The impact of tobacco smoking during pregnancy can be seen in the proportions of LBW babies [37]. In 2009-2011, 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 19% for other mothers [37]. It has been estimated that if the smoking rate for Aboriginal and Torres Strait Islander pregnant women was the same as it was for other mothers, the proportion of LBW babies could be reduced by up to 26%.

Mortality

There were 3,088 deaths in Australia in 2015 where the deceased person was identified as Aboriginal and/or Torres Strait Islander [38]. (Details for jurisdictions are provided in Table 5).

Table 5. Numbers and proportions of Aboriginal and Torres Strait Islander deaths, by jurisdiction, 2015

Jurisdiction	Number of deaths	Proportion of deaths %
NSW	822	1.5
Vic	141	0.4
Qld	842	2.8
WA	511	3.5
SA	167	1.2
Tas	50	1.1
NT	537	45.9
ACT	17	0.9
Australia	3,088	1.9

Source: ABS, 2016 [38]

Data quality

The ABS Death Registration collection collects information on Indigenous status from the 'death registration form'; some states and territories also collect this information from the medical certificate [38]. While the ABS deems it likely that most deaths of Aboriginal and Torres Strait Islander people are registered, the Indigenous status of some deaths is not registered, which raises concerns about the accuracy of this data [38, 39]. 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 [39]. However, there is normally only a slight difference between registered and occurring deaths because, for each year, the number of deaths not registered balance out the deaths that occurred in the previous year but were registered late.

In 2015, there were 401 deaths for which no Indigenous status was reported, representing 0.3% of registered deaths; it is very likely that some of these deaths were among Aboriginal and Torres Strait Islander people [38]. The number of deaths with no Indigenous status reported has decreased over time [39].

Age-standardised death rates

During 2013-2015, age-standardised death rates for Aboriginal and Torres Strait Islander people were calculated only for NSW, Qld, WA, SA and the NT as they were the jurisdictions with adequate data quality [38]. During this period, the age-standardised death rate for Aboriginal and Torres Strait Islander people was 9.8 per 1,000 population, a small decrease from 10 per 1,000 in 2003-2005. Between 2003-2005 and 2013-2015, age-standardised death rates decreased for Aboriginal and Torres Strait Islander males (from 12 per 1,000 to 11 per 1,000) and increased for females (from 8.6 per 1,000 to 8.9 per 1,000).

Overall, 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 (5.4 per 1,000) in 2015 (Table 6) [38]. Rates for Aboriginal and Torres Strait Islander people varied by jurisdiction, with the highest rate occurring in the NT (15 per 1,000) and the lowest in NSW (8.0 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, 2015

Jurisdiction	Indigenous rate	Non-Indigenous rate	Rate ratio
NSW	8.0	5.8	1.4
Qld	9.6	5.6	1.7
WA	12	5.3	2.2
SA	8.6	6.0	1.4
NT	15	5.9	2.6
Total NSW, Qld, WA, SA & NT	9.8	5.7	1.7

Notes: 1 Rates are per 1,000

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

Source: AIHW, 2016 [38]

Between 1998 and 2013, there was a 16% reduction in the age-standardised death rates for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT; there was also a significant closing of the gap in death rates between Aboriginal and Torres Strait Islander and non-Indigenous people during this time period [37].

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 Aboriginal and Torres Strait Islander and non-Indigenous populations using a process known as standardisation. The process is also referred to as age-adjustment or age-standardised.

Direct standardisation, the preferred method, applies detailed information about Aboriginal and Torres Strait Islander deaths, including sex and age, to a 'standard' population [40]. In Australia, the 2001 Australian estimated resident population (ERP) is generally used as the standard population. Direct standardisation enables accurate comparisons of Indigenous and non-Indigenous rates, and time-series analyses.

If detailed information is not available, it is still possible to use indirect standardisation to estimate standardised mortality ratios (SMRs). The SMR is the ratio of the numbers of deaths (or of other health measures) registered/observed to the number expected. SMRs allow for the comparison of numbers of registered Indigenous deaths with the numbers expected from the corresponding age-sex-specific death rates for the total population or, preferably, the non-Indigenous population.

Expectation of life

In 2013, the ABS published revised estimates for expectation of life at birth for Indigenous people [39]. After adjustment for the underestimate of the number of deaths identified as Indigenous, the ABS estimated that Aboriginal and Torres Strait Islander males born in Australia in 2010-2012 could expect to live to 69.1 years, 10.6 years less than the 79.7 years expected for non-Indigenous males. The expectation of life at birth of 73.7 years for Aboriginal and Torres Strait Islander females born in Australia in 2010-2012 was 9.5 years less than the expectation of 83.1 years for non-Indigenous females. Revised estimates were also published for Indigenous people living in NSW, Qld, WA and the NT (Table 7).

Table 7. Expectation of life at birth in years, by Indigenous status and sex, selected jurisdictions, Australia, 2010-2012

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

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

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

3 Differences are based on unrounded estimates

Source: ABS, 2013 [39]

Data quality

Based on a linkage study of Indigenous identification in deaths registration and the 2011 *Census*, the ABS revised its estimates of life expectancy of Indigenous people [39]. The levels of under-identification, which differed by age-group, jurisdiction and remoteness of residence, were taken into account for the new estimates of Indigenous life expectancy. The ABS noted that correction of the underestimates of death numbers and rates would need similar adjustments. These findings confirm the caution that the ABS notes should be exercised in the interpretation of the estimates of Indigenous mortality, particularly estimates of trends over time. This caution is reflected in recent ABS publications that do not include detailed tables of Indigenous deaths, nor information about overall death rates. As a result, there is no consistency about the extent of information available for recent years. Reflecting this, readers should be aware that the following sections vary in terms of the years to which they relate.

Age at death

During 2013-2015, the median age at death⁹ for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT was 57.9 years [38]. This marked an increase from 53.8 years in 2003-2005. The median age at death for Aboriginal and Torres Strait Islander males, 54.9 years in 2013-2015, increased from 50.9 years in 2003-2005; there was also an increase for females to 61.5 years from 58.4 years for the same period. The non-Indigenous median age at death was substantially higher at 81.9 years in 2013-2015.

The median age at death for Aboriginal and Torres Strait Islander males ranged from 51.5 years in WA to 58.0 years in NSW in 2015 (Table 8) [38]. For Aboriginal and Torres Strait Islander females, it ranged from 58.1 years in the NT to 65.2 years for those living in NSW. While the levels varied by jurisdiction for non-Indigenous males and females, the median ages were consistently higher for them than for Aboriginal and Torres Strait Islander people.

Table 8. Median age at death, by Indigenous status and sex, NSW, Qld, WA, SA and the NT, 2015

Jurisdiction	Indigenous		Non-Indigenous	
	Males	Females	Males	Females
NSW	58.0	65.2	79.1	85.2
Qld	55.7	62.6	77.6	84.2
WA	51.5	58.8	78.0	84.4
SA	53.4	60.1	80.1	85.7
NT	53.0	58.1	68.8	71.1
All jurisdictions	54.9	61.5	78.6	84.9

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

Source: ABS, 2016 [38]

In 2013-2015, 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 [38]. The rate ratios were highest in the young and middle-adult years. Age-specific death rates have decreased since 2003-2005 in most age-groups for Aboriginal and Torres Strait Islander people.

In 2013-2015, the Aboriginal and Torres Strait Islander age-specific death rates were double the non-Indigenous rate in the 25-64 years age-group in NSW, and the 5-14 years and 25-74 years age-groups in Qld. In WA, SA, and the NT, age-standardised death rates were up to four times higher for Aboriginal and Torres Strait Islander people than those for their non-Indigenous people in some age-groups.

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 2013-2015, the Aboriginal and Torres Strait Islander IMR (6.5 per 1,000) was almost twice as high as the non-Indigenous IMR [38]. The IMR for Aboriginal and Torres Strait Islander infants in the NT decreased from 16 per 1,000 in 2003-2005 to 13 per 1,000 in 2013-2015.

Table 9. Infant mortality rates, by Indigenous status and sex, and Indigenous: non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2015

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio	
	Males	Females	Males	Females	Males	Females
NSW	5.6	3.8	3.6	3.2	1.6	1.2
Qld	7.5	6.9	4.1	4.0	1.8	1.7
WA	6.3	4.8	2.1	1.9	3.0	2.5
SA	6.1	5.0	3.3	2.2	1.8	2.3
NT	14	12	2.0	4.1	7.0	2.9
All jurisdictions	7.1	5.8	3.5	3.1	2.0	1.9

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 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, 2016 [38]

In the five-year period 2010-2014, 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 [10]. This accounted for around half of all Aboriginal and Torres Strait Islander infant deaths for 0<1 year (live births), 3.2 per 1,000, and 1.8 per 1,000 for non-Indigenous infants (rate ratio: 1.8). For deaths of children

⁹ 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.

0-4 years, it accounted for 43% of all Aboriginal and Torres Strait Islander deaths, 72 deaths per 100,000 and 36 per 100,000 of non-Indigenous deaths (rate ratio: 2.0). After deaths attributed to 'disorders related to length of gestation and fetal growth', the next major cause in the perinatal period was 'disorders related to length of gestation and fetal growth' accounting for 32% of Aboriginal and Torres Strait Islander perinatal deaths and 24% of non-Indigenous deaths. After the infancy period had passed, injury and poisoning accounted for 53% of Aboriginal and Torres Strait Islander deaths of children aged 0-4 years (19 per 100,000) and 33% of non-Indigenous children (6.4 per 100,000 (rate ratio: 3.0).

From 1998 to 2014, the IMR for Aboriginal and Torres Strait Islander infants 0-4 years has declined from 217 per 100,000 to 159 deaths per 100,000 [10]. This was a greater decline than for non-Indigenous children (from 115 per 100,000 to 73 deaths per 100,000) narrowing the gap from 102 per 100,000 to 86 per 100,000. Closing the gap would have been achieved if the deaths of 64 Aboriginal and Torres Strait Islander children had been prevented.

Causes of death

Cardiovascular disease was the leading cause of death of Aboriginal and Torres Strait Islander people in 2013, being responsible for 24% of the deaths of Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT [41]. The next most common causes of death were: ICD 'Neoplasms' (mainly cancers) being responsible for 21% of deaths; followed by ICD 'External causes' (injury) (15%); ICD 'Endocrine, nutritional and metabolic diseases' (including diabetes) (9.1%); and ICD 'Diseases of the respiratory system' (8.2%).

In terms of specific conditions, coronary heart disease (CHD) (also known as ischaemic heart disease) was the leading cause of death of Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT in 2015, at twice the rate of non-Indigenous people (Table 10) [42]. The other leading specific causes of death of Aboriginal and Torres Strait Islander people were diabetes (rate ratio: 4.7), chronic lower respiratory disease (rate ratio: 2.6) and lung and related cancers (rate ratio: 1.8).

Table 10. Numbers and rates of the leading causes of Aboriginal and Torres Strait Islander deaths and Indigenous: non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2015

Cause of death	Number	Rate	Rate ratio
Coronary heart disease	394	143	2.0
Diabetes	194	77	4.7
Chronic lower respiratory disease	175	72	2.6
Lung and related cancers	154	56	1.8
Suicide	152	26	2.0
Cirrhosis and other liver diseases	104	25	3.8
Cerebrovascular disease	91	45	1.1
Land transport accidents	84	15	2.9
Dementia	71	50	1.1
Diseases of the urinary system	68	29	2.5

Notes: 1 See source for the ICD codes for the causes of death; excludes 'symptoms, signs and ill-defined conditions'

2 Rates are deaths per 100,000, standardised to the Australian 2001 ERP

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

Source: ABS, 2016 [42]

The leading causes of death were different for Aboriginal and Torres Strait Islander and non-Indigenous people in NSW, Qld, WA, SA and the NT during 2015 [42]. While in both populations people died most commonly from CHD, the next leading causes of death for non-Indigenous people were dementia followed by cerebrovascular diseases. Diabetes and chronic lower respiratory disease – the other leading causes of death for Aboriginal and Torres Strait Islander people – were ranked lower for non-Indigenous people.

In 2015, the leading specific causes of death differed for Aboriginal and Torres Strait Islander males and females living in NSW, Qld, WA, SA and the NT [42]. While the first leading cause of death of both Aboriginal and Torres Strait Islander males and females was CHD, the next leading causes of death for males was suicide and diabetes. The next leading causes of death for Aboriginal and Torres Strait Islander females were diabetes and chronic lower respiratory disease.

Maternal mortality

Maternal deaths

Maternal deaths refer to pregnancy-related deaths occurring to women during pregnancy or up to 42 days after delivery [43]. 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.

In Australia in 2008-2012, eight of the 102 maternal deaths were of Aboriginal and Torres Strait Islander women (Indigenous status was not reported in 23 of the deaths) [43]. The leading contributors to causes of maternal death among Aboriginal and Torres Strait Islander women were cardiovascular conditions, sepsis, and psychosocial conditions.

Reflecting the higher rate of confinements, the MMR for Aboriginal and Torres Strait Islander women in 2008-2012 was 14 deaths per 100,000 confinements, around 2.1 times higher than the ratio of 6.6 per 100,000 for non-Indigenous women (Table 11) [43]. For direct maternal deaths, the ratio of 6.9 per 100,000 for Aboriginal and Torres Strait Islander women was 2.2 times the ratio of 3.2 per 100,000 for non-Indigenous women (Derived from [43-48]).

Table 11. Numbers of women who gave birth and maternal deaths, and maternal mortality ratios, by Indigenous status, Australia, 2008-2012

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

Notes: 1 Maternal mortality ratio is the number of maternal deaths divided by the number of women who gave birth (in 100,000s)
2 Due to some uncertainty about the numbers of Indigenous deaths and confinements, some caution must be exercised in the interpretation of the ratios
3 The non-Indigenous numbers and ratios include deaths for which Indigenous status was not known. This probably results in a slight, unknown overestimate of non-Indigenous numbers and ratios, and a resultant underestimate of the differences between Indigenous and non-Indigenous women

Sources: Derived from Laws, Li, Sullivan, 2010 [44], Li, McNally, Hilder, Sullivan, 2011 [45], Li, Zeki, Hilder, Sullivan, 2012 [46], Zeki, Hilder, Sullivan, 2013 [47], Hilder, Zhichao, Parker, Jahan, Chambers, 2014 [48], Humphrey, Bonello, Chughtai, Macaldowie, Harris, Chambers, 2015 [43]

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) [49].

There were 7,079 deaths from avoidable causes among Aboriginal and Torres Strait Islander people aged 0-74 years living in NSW, Qld, WA, SA and the NT in the five-year period 2008-2012 [37]. Age-adjusted rates for avoidable deaths of Indigenous people were highest in the NT (789 per 100,000) and lowest in NSW (304 per 100,000) [18]. Aboriginal and Torres Strait Islander people died from avoidable causes at 3.0 times the rate of non-Indigenous people.

In 2008-2012, the most common conditions contributing to avoidable deaths among Aboriginal and Torres Strait Islander people aged 0-74 years living in NSW, Qld, WA, SA and the NT were CHD (19%), cancer (18%), diabetes (10%), and suicide (8.9%) [18]. The death rates from avoidable causes were 12.0 times higher for Indigenous people than for non-Indigenous people for diabetes, 3.8 times higher for CHD, 1.7 times higher for cancer and 2.0 times higher for suicide.

Between 1998 and 2012, after age-adjustment, there was a 27% decline in the death rate from avoidable causes for Aboriginal and Torres Strait Islander people aged 0-74 years living in NSW, Qld, WA, SA and the NT [18].

Hospitalisation

Statistics on hospitalisation provide some insights into ill-health in the population [50]. 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.

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 [50]. 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.

The Council of Australian Governments (COAG) targets for closing the gap involve strategic areas for action and one of these is early childhood development for which monitoring early childhood hospitalisations is an indicator [10]. As there is information available, specific information about hospitalisation for children aged 0-4 years is included below.

Separation rates

Of the more than 10 million hospital separations in Australia¹⁰ during 2014-15, 443,097 (4.4%) were identified as Aboriginal and Torres Strait Islander (Table 12) [51]. Around 93% of Indigenous hospital separations were of Aboriginal people, 3.8% were of Torres Strait Islander people, and 3.6% were of people who identified as being of both Aboriginal and Torres Strait Islander descent.

In 2014-15, the overall age-standardised separation rate of 950 separations per 1,000 population for Aboriginal and Torres Strait Islander people was 2.4 times that for non-Indigenous people (Table 12) [51]. The highest age-standardised separation rate was for Aboriginal and Torres Strait Islander people living in the NT (2,004 per 1,000), more than six times the rate for non-Indigenous people.

Table 12. Numbers of hospital separations and age-standardised separation rates, by Indigenous status and jurisdiction, and Indigenous: non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2014-15

Jurisdiction	Aboriginal and Torres Strait Islander		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	90,184	587	2,908,353	361	1.6
Vic	23,172	698	2,574,116	413	1.7
Qld	107,870	836	2,127,885	442	1.9
WA	94,844	1,650	986,619	386	4.3
SA	24,385	921	713,766	378	2.4
NT	94,136	2,004	38,146	319	6.3
Australia	443,097	950	9,707,270	393	2.4

- Notes:
- 1 Rates per 1,000 population
 - 2 Non-Indigenous rates and numbers include separations for which Indigenous status was not stated
 - 3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
 - 4 Numbers and rates for the NT are for public hospitals only; separate numbers and rates are not included for Tas or the ACT, but included in totals where applicable
 - 5 The incomplete identification of Indigenous status means that these figures probably underestimate the true difference between Indigenous and non-Indigenous rates

Source: AIHW, 2016 [51]

In 2014-15, 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). For non-Indigenous children, the rates decreased slightly as remoteness increased (from 240 per 1,000 to 208 per 1,000) [10].

¹⁰ All hospitalisation data for the NT include only public hospitals.

Age-specific separation rates

The most recent national information available for all age-groups is from 2011-12 to 2012-13 when hospital separation rates were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people in all age-groups except for 65 years and over (Table 13) [52].

Table 13. Age-specific hospital separation rates (excluding dialysis), by sex and Indigenous status, and Indigenous: non-Indigenous rate ratios, Australia, 2011-12 to 2012-13

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

Notes: 1 Rates per 1,000 population 2 Non-Indigenous includes separations for which Indigenous status was not stated 3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate.

Source: AIHW, 2015 [52]

More recent information for 2014-15 is available for children aged 0-4 years. There were 310 per 1,000 Aboriginal and Torres Strait Islander children hospitalised nationally compared with 237 per 1,000 non-Indigenous children [10].

Causes of hospitalisation

In 2014-15, the most common reason for the hospitalisation of Aboriginal and Torres Strait Islander people in Australia was for 'Factors influencing health status and contact with health services' (mostly for care involving dialysis), responsible for 50% of Aboriginal and Torres Strait Islander separations (223,264 separations) [51]. Many of these separations involved repeat admissions for the same people, some on an almost daily basis. ICD 'Injury, poisoning and certain other consequences of external causes' (including motor vehicle accidents, assaults, self-inflicted harm and falls) was the next most common cause of hospitalisation for Aboriginal and Torres Strait Islander people, responsible for 29,237 separations (6.6% of all separations). Excluding separations for pregnancy-related conditions (most of which involved normal deliveries), the next leading cause of hospitalisation for Aboriginal and Torres Strait Islander people were respiratory conditions (responsible for 22,960 separations) (Table 14).

Table 14. Numbers, proportions (%), age-standardised rates, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios for leading causes of hospital separations, Australia, 2014-15

Principal diagnosis (ICD)	Number of separations	Proportion of separations (%)	Age-standardised separation rate	Rate ratio
Injury, poisoning and certain other consequences of external causes	29,237	6.6	47	1.8
Pregnancy, childbirth and the puerperium	23,831	5.4	30	1.4
Diseases of the respiratory system	22,960	5.2	41	2.4
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	21,644	4.9	42	1.4
Diseases of the digestive system	21,441	4.8	39	1.0
Mental and behavioural disorders	16,941	3.8	28	1.7
Diseases of the circulatory system	12,520	2.8	32	1.8
Diseases of the genitourinary system	12,038	2.7	24	1.2
Diseases of the skin and subcutaneous tissue	8,750	2.0	14	2.2
Diseases of the musculoskeletal system and connective tissue	8,398	1.9	18	0.8
Certain infectious and parasitic diseases	7,326	1.7	12	2.0
Endocrine, nutritional and metabolic diseases	6,920	1.6	15	2.3
Neoplasms	6,632	1.5	17	0.7
Diseases of the nervous system	5,843	1.3	11	0.9
Factors including health status and contact with health services	223,264	50.4	552	5.5
All causes	443,097	100	947	2.4

Notes: 1 Information for the NT is for public hospitals only
2 Some principal diagnoses have been excluded
3 Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate

Source: AIHW, 2016 [51]

In 2014-15, for Aboriginal and Torres Islander and non-Indigenous children aged 0-4 years nationally, the most common cause of hospitalisation was diseases of the respiratory system (1 in 4 and 1 in 5 hospitalisations respectively) [10]. Hospitalisation of Aboriginal and Torres Strait Islander children has decreased since 2004-05, but they were twice as likely as other children to be hospitalised due to infectious and parasitic diseases in 2014-15.

Potentially preventable hospitalisations

Potentially preventable hospitalisations are admissions which 'could have been avoided with access to quality primary care and preventive care' [53]. 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 [51].

In 2014-15, the rate of overall potentially preventable hospitalisations was around three times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people [51]. The highest rates for potentially preventable hospitalisations of Aboriginal and Torres Strait Islander people were for chronic conditions (35 per 1,000) (Table 15). The age-standardised rate for vaccine-preventable conditions was almost six times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Table 15. Age-standardised separation rates, by Indigenous status, and Aboriginal and Torres Strait Islander: non-Indigenous rate ratios for potentially preventable hospitalisations, Australia, 2014-15

	Aboriginal and Torres Strait Islander rate	Non-Indigenous rate	Rate ratio
Vaccine-preventable conditions	9.4	1.6	5.9
Acute conditions	28	12	2.4
Total chronic conditions	35	11	3.2
Diabetes complications	6.7	1.6	4.2
Chronic conditions (excluding diabetes)	28	9.4	3.0
Total	71	24	2.9

Note: Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate

Source: AIHW, 2016 [51]

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 higher than the rate for non-Indigenous children (161 per 1,000 compared with 100 per 1,000 respectively) [10]. The rate of hospitalisation of Aboriginal and Torres Strait Islander children was almost twice as high in remote areas (306 per 1,000).

Selected health conditions

Cardiovascular disease

Cardiovascular disease (CVD) includes all diseases and conditions that affect the heart and blood vessels [54]. CVD presents a significant burden for Aboriginal and Torres Strait Islander people in terms of prevalence, hospitalisation, and mortality [55]. This is evident for a range of CVDs including CHD (or ischaemic heart disease), cerebrovascular disease (including stroke), hypertension (high blood pressure), and rheumatic heart disease (RHD).

Most types of CVD (excluding RHD) are subject to the same set of modifiable or non-modifiable risk factors [56]. Modifiable behavioural factors for CVD include tobacco use, physical inactivity, poor dietary behaviour and excessive alcohol consumption [56, 57]. 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. Non-modifiable risk factors that can influence the risk of CVD include, age, sex, family history of cardiovascular disease, and ethnicity.

Unlike other types of CVD, RHD occurs when acute rheumatic fever (ARF)—an illness that affects the heart, joints, brain and skin—leads to permanent damage to the heart valves [58, 59]. 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 [58-60].

Extent of cardiovascular disease among Aboriginal and Torres Strait Islander people

Prevalence of cardiovascular disease

It was reported in the 2012-2013 *Aboriginal and Torres Strait Islander health survey* (AATSIHS) that around 13% of Aboriginal and Torres Strait Islander people aged 2 years and over had some form of CVD¹¹ [55]. When the data for Aboriginal people¹² and Torres Strait Islander people¹³ were analysed separately, the levels of CVD were similar (13% and 12% respectively) [61].

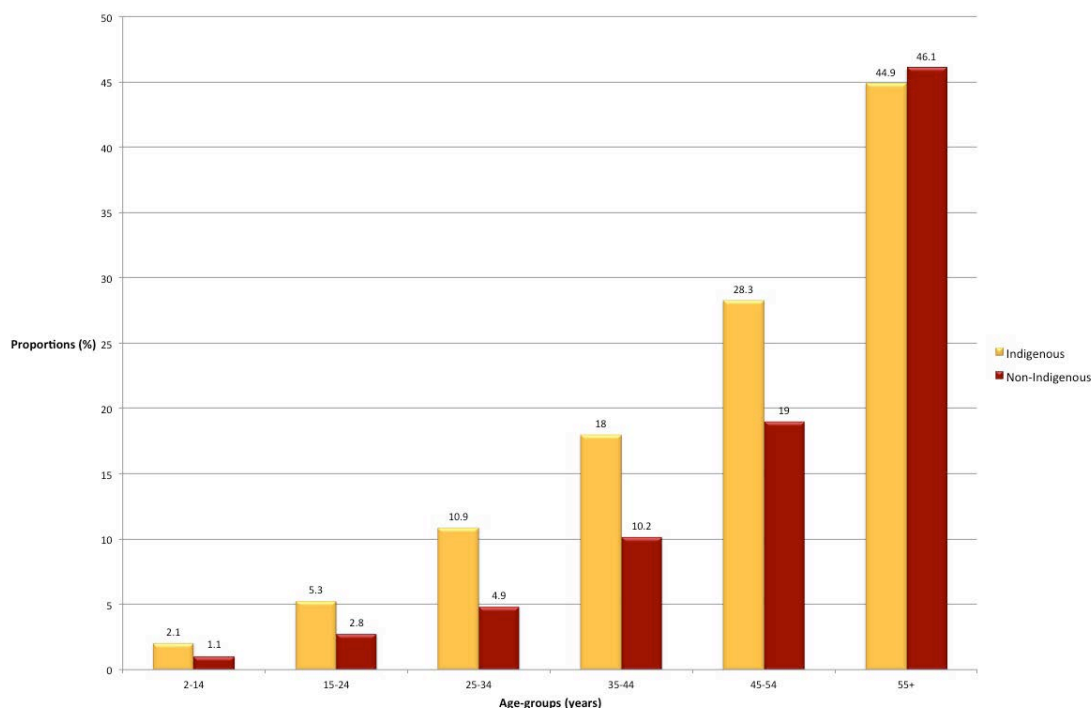
¹¹ Includes hypertensive disease; ischaemic heart diseases; other heart diseases; tachycardia; cerebrovascular diseases; oedema; diseases of the arteries; arterioles and capillaries; diseases of the veins, lymphatic vessels, etc; other diseases of the circulatory system; and symptoms and signs involving the circulatory system.

¹² People of Aboriginal origin only.

¹³ People of Torres Strait Islander origin only or both Aboriginal and Torres Strait Islander origin.

CVD was reported more frequently by Aboriginal and Torres Strait Islander females (14%) than by Aboriginal and Torres Strait Islander males (11%) [62]. 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) [63]. 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) [64].

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 [63]

Hypertensive heart disease was the form of CVD most commonly reported by Aboriginal and Torres Strait Islander people (5.8%) in 2012-2013 [62]. 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 16). The greatest disparities in prevalence between Aboriginal and Torres Strait Islander and non-Indigenous males and females were for 'Heart, stroke and vascular diseases'¹⁴ (age-adjusted ratios of 1.5 for males and 1.7 for females).

Table 16. Prevalence (%) of cardiovascular disease, Indigenous people by sex and type, and Indigenous: non-Indigenous age-adjusted rate ratios, Australia, 2012-2013

Cardiovascular disease type	Males		Females	
	Prevalence	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: Prevalence expressed as percentages

Source: ABS, 2014 [62]

Around 4% of Aboriginal and Torres Strait Islander people reported that they had 'Heart, stroke and/or vascular diseases' in 2012-2013 [55]. 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) [62]. 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 [63].

Around 6% of Aboriginal and Torres Strait Islander people (5.8% of Aboriginal people and 5.3% of Torres Strait Islander people [61]) reported that they had hypertensive heart disease [55]. 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) [62]. Hypertensive disease increased in prevalence

¹⁴ Which include ischaemic heart disease, stroke and other cerebrovascular disease, odema, heart failure, and disease of the arteries, arterioles and capillaries.

from about 25 years of age onwards; 12% of Aboriginal and Torres Strait Islander people aged 25 years and over reported hypertensive heart disease [55] with proportions ranging from 4.1% of those aged 25-34 years to 25% of those aged 55 years and over [63].

The 2012-2013 AATSIHS also provided data for selected risk factors for CVD [55]. 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 [65]. The self-reported [55] and biomedical results [65] show that some CVD risk factors are more prevalent among Aboriginal and Torres Strait Islander people than among their non-Indigenous counterparts, including: daily smoking (rate ratio 2.6¹⁵); obesity (rate ratio 1.6¹⁵); inadequate daily fruit and vegetable intake (rate ratios 0.9¹⁵ and 0.8¹⁵ respectively for meeting the guidelines); high blood pressure (rate ratio 1.2¹⁶); abnormal high density lipoprotein (HDL) cholesterol (rate ratio 1.8¹⁶); high triglycerides (rate ratio 1.9¹⁶); and dyslipidaemia [1] (a number of different lipid disorders that may contribute to hardening or narrowing of the arteries taking blood to the heart) (rate ratio 1.1¹⁶) [65].

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 [66]. It is not possible to directly compare data from these registers¹⁷ 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 946 new or recurrent episodes of ARF in Qld, WA, SA and the NT combined in the period 2011-2014 of which 889 (94%) occurred in patients who identified as Aboriginal and/or Torres Strait Islander (Derived from [66]). The rate¹⁸ for ARF for Aboriginal and Torres Strait Islander people in these jurisdictions was 59 per 100,000 population, compared with 0.2 per 100,000 for non-Indigenous people [66]. The rate for Aboriginal and Torres Strait Islander Australians in Qld, WA and the NT combined was highest for those aged 5-14 and then decreased with age.

Combined jurisdictional data is not available for RHD cases¹⁹. In Qld, there were 1,035 cases of RHD on the Qld RHD Register at 1 July 2014, 89% identified as Aboriginal and/or Torres Strait Islander (Derived from [67]). The prevalence of RHD among Aboriginal and Torres Strait Islander people in Qld was 4.5 per 1,000 population; after age-standardisation, this was 205.7 times the prevalence among non-Indigenous people [67].

In the NT, there were 1,573 cases of RHD on the NT RHD Register at 31 December 2013 of which, 94% identified as Aboriginal and/or Torres Strait Islander (Derived from [67]). The prevalence of RHD among Aboriginal and Torres Strait Islander people in NT was 21 per 1,000; after age-standardisation, this was 40 times the prevalence among non-Indigenous people [67].

In WA, there were 305 patients on the WA RHD Register at 31 December 2013 who identified as Aboriginal and/or Torres Strait Islander [67]. (Data are currently not available for the non-Indigenous RHD cases.) The prevalence of RHD among Aboriginal and Torres Strait Islander people in WA was 3.3 per 1,000.

In SA, there were 208 cases of RHD and/or ARF on the SA RHD Register as at 31 December 2015 of which 94% identified as Aboriginal [68].

At the respective times of reporting, approximately two-thirds of patients on the registers in Qld, SA and NT were female [67, 68].

A recent study aimed to compare regional differences in the prevalence of RHD detected by echocardiographic screening in high-risk Indigenous Australian children (n=3,946) in four regions of northern and central Australia [69]. It found that the prevalence of definite RHD among Indigenous children aged 5-15 years differed between regions, from 4.7 per 1,000 in Far North Qld to 15.0 per 1,000 in the Top End of the NT. The study uncovered a substantial level of previously undetected disease.

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 [70]. 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.

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

¹⁶ For Aboriginal and Torres Strait Islander people aged 18 years and over.

¹⁷ 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.

¹⁸ ARF rates are crude rates, since the necessary data to calculate age-standardised rates are not available due to the small numbers of episodes, particularly for the non-Indigenous population.

¹⁹ The NHMRC-funded END RHD CRE is currently working on a comprehensive data linkage strategy to establish a replicable overview of national ARF and RHD burden.

Hospitalisation

There were 12,520 hospital separations for diseases of the circulatory system among Aboriginal and Torres Strait Islander people in 2014-15 [51], representing 5.7% of all Aboriginal and Torres Strait Islander hospital separations (excluding dialysis) (Derived from [51]). After age-adjustment, Aboriginal and Torres Strait Islander people were hospitalised with a primary diagnosis of a disease of the circulatory system at 1.8 times the rate of non-Indigenous people (Derived from [51]): 32 per 1,000 compared with 18 per 1,000 population [51]. In 2013-14, the gap was highest in the 35-44 years and 45-54 years age-groups, with Aboriginal and Torres Strait Islander people hospitalised at three times the rate of non-Indigenous people after age-standardisation [71].

Hospitalisation rates²⁰ for diseases of the circulatory system 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 [10]).

The disease responsible for the greatest proportion of CVD hospitalisations of Aboriginal and Torres Strait Islander people in 2013-14 was CHD (40%) [71]. Other causes of CVD hospitalisation included heart failure and cardiomyopathy (15%), stroke (7%), peripheral vascular disease (4%), ARF and RHD (4%) and hypertensive heart disease (3%).

Mortality

Of all causes of death including non-circulatory diseases, ischaemic heart disease was the leading cause of both Aboriginal and Torres Strait Islander and non-Indigenous deaths in 2015 [42]. Other cardiovascular diseases among the primary causes of Aboriginal and Torres Strait Islander death included cerebrovascular diseases (ranked 8th among Aboriginal and Torres Strait Islander causes and 3rd among non-Indigenous causes), heart failure (18th/9th respectively) and hypertensive diseases (20th/16th respectively). After age-adjustment, the death rate due to ischaemic heart disease for Aboriginal and Torres Strait Islander people was twice the rate for non-Indigenous people (143 per 100,000 and 72 per 100,000 population respectively). Deaths from cerebrovascular diseases occurred at similar rates for both populations (45 per 100,000 and 40 per 100,000 population respectively).

About a quarter of all deaths of Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT combined were caused by diseases of the circulatory system in 2010-2014 [10]. In 2009-2013, after age-adjustment, the death rate due to all circulatory diseases for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT combined was 1.5 times the rate for non-Indigenous people (282 per 100,000 and 183 per 100,000 population respectively).

The gap in CVD mortality rates between Aboriginal and Torres Strait Islander and non-Indigenous people narrowed between 1998 and 2014 [10]. After adjusting for age, the gap narrowed from 169 deaths per 100,000 to 88 deaths per 100,000 population.

In 2010-2014, of all avoidable deaths of Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT aged 0-74 years, 22% were caused by IHD, 5% by cerebrovascular disease and 2% by rheumatic (and other valvular) heart disease [10].

The striking difference between Aboriginal and Torres Strait Islander people and non-Indigenous people in CVD mortality is the much greater impact among young and middle-aged Aboriginal and Torres Strait Islander adults. In 2010-12 in NSW, Qld, WA, SA and the NT, the death rate for CHD (the leading cause of CVD-related deaths) was 10 times higher for Aboriginal and Torres Strait Islander men and women in the 35-44 years age-group than for their non-Indigenous counterparts [71].

Cancer

Cancer is the term used for a variety of diseases that cause damage to the DNA (genetic blueprint) of the cells resulting in uncontrolled growth (cells normally grow and multiply in a controlled manner) [72, 73]. If damaged, cells spread into surrounding areas, or to different parts of the body (metastasis) and they are known as malignant. Cancerous cells can arise from almost any cell, so cancer can occur almost anywhere in the body.

There is limited evidence available on cancer to inform initiatives to improve outcomes for Aboriginal and Torres Strait Islander peoples [74]. Inconsistent Indigenous identification in cancer notifications in several jurisdictions is an issue [75]. The *National Aboriginal and Torres Strait Islander cancer framework* highlights the need for improved Indigenous identification, including on pathology requests and reports [74]. It also expresses a need for routine national data collection, access and linkage, to allow national monitoring, reporting and informing strategies to improve cancer outcomes.

²⁰ These hospitalisation rates are crude rates.

Extent of cancer among Aboriginal and Torres Strait Islander people

Incidence

For 2006-2010, an average of 934 Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT were diagnosed with cancer each year [76]. After age-adjustment, the cancer incidence rate for all cancers combined was slightly lower for Aboriginal and Torres Strait Islander people than for non-Indigenous people (446 per 100,000 and 450 per 100,000 people respectively), however incidence and rate ratios differ depending on the type of cancer. For example, after age-adjustment, the incidence rates were higher for Aboriginal and Torres Strait Islander people than non-Indigenous people for: liver cancer (rate ratio 2.7); gynaecological cancer (females) (rate ratio 2.0); cancer of unknown primary site (rate ratio 1.8); lung cancer (rate ratio 1.8); head and neck cancer (rate ratio 1.8) and uterine cancer (females) (rate ratio 1.7). After age-adjustment, cancer incidence rates were lower for Aboriginal and Torres Strait Islander people than non-Indigenous people for: colorectal (bowel) cancer (rate ratio 0.8); breast cancer in females (rate ratio 0.8); lymphoma (rate ratio 0.7); and prostate cancer (males) (rate ratio 0.6) (Table 17).

Table 17. Age-standardised incidence rates for selected cancers, by Indigenous status, and Aboriginal and Torres Strait Islander: non-Indigenous rate ratios, NSW, Qld, WA and the NT, 2006-2010

Primary site	Aboriginal and Torres Strait Islander age-standardised rates	Non-Indigenous age-standardised rates	Rate ratio
Lung	77	44	1.8
Breast (females)	86	110	0.8
Colorectal (bowel)	47	60	0.8
Gynaecological cancer (females)	51	26	2.0
Prostate (males)	98	161	0.6
Head and neck	28	16	1.8
Uterine (females)	27	16	1.7
Unknown primary site	19	11	1.8
Lymphoma	14	19	0.7
Liver	16	5.7	2.7
All cancers	446	450	1.0

Notes: 1 Cancers are ordered by numbers among Aboriginal and Torres Strait Islander people (not shown in table)

2 Rates per 100,000 population, age-standardised to the Australian population at 30 June 2001

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

4 Due to the incomplete identification of Aboriginal and Torres Strait Islander status, these figures probably 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, 2016 [76]

For 2006-2010, detailed information is available for the incidence of cervical and breast cancers for Aboriginal and Torres Strait Islander females living in NSW, Qld, WA and NT. After age-adjustment, the rate for cervical cancer for Aboriginal and Torres Strait Islander females aged 20-69 was almost 2.4 times higher than for non-Indigenous females of the same age (21 per 100,000 and 8.8 per 100,000 respectively) [77]. For breast cancer, the age-adjusted-rate was lower than for non-Indigenous females aged 50-69 (214 per 100,000 and 278 per 100,000 respectively) [78]. Despite this, breast cancer is still the most common cancer diagnosed for Aboriginal and Torres Strait Islander females in NSW, Qld, WA and NT [79].

For 2006-2010, detailed information for cancer incidence is available for Aboriginal and Torres Strait Islander males and females living in NSW, Qld, WA and the NT. For all cancers combined, the number of new cases were slightly higher for females (2,366 new cases) than for males (2,303 new cases) [76]. After age-adjustment, the rates for Aboriginal and Torres Strait Islander males were lower than those for non-Indigenous males (508 per 100,000 and 543 per 100,000 respectively) and higher for Aboriginal and Torres Strait Islander females than non-Indigenous females (401 per 100,000 and 373 per 100,000 respectively).

Hospitalisation

There were 6,632 hospital separations with a principal diagnosis of neoplasms²¹ among Aboriginal and Torres Strait Islander people in 2014-15 [51], representing 3% of all separations among Aboriginal and Torres Strait Islander people (excluding dialysis) (Derived from [51]). After age-adjustment, Aboriginal and Torres Strait Islander people were less likely to be hospitalised for neoplasms than non-Indigenous people (17 per 1,000 and 25 per 1,000 respectively) [51].

In terms of specific cancers, the age-standardised hospitalisation rates for lung cancer and cervical cancer for Aboriginal and Torres Strait Islander people in 2014-15 were 2.0 and 3.0 times higher respectively than for their non-Indigenous counterparts [10]. 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), but higher for non-Indigenous males than females (0.8 per 1,000 and 0.5 per 1,000 respectively).

²¹ Neoplasms are an abnormal tissue growth that may be either malignant (cancerous) or benign (non-cancerous) [70].

Mortality

In 2015, cancers of the trachea, bronchus and lung were the fourth leading cause of death for Aboriginal and Torres Strait Islander people (154 deaths: 88 males and 66 females) living in NSW, Qld, WA, SA and the NT, with the overall age-adjusted death rate 1.8 times higher than for non-Indigenous people [42].

In the five-year period 2009-2013, cancer was responsible for the deaths of 2,417 Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT [76]. After age-adjustment, the mortality rate for all cancers combined for Aboriginal and Torres Strait Islander people was 1.3 times higher than for non-Indigenous people (221 per 100,000 and 170 deaths per 100,000 respectively). The age-standardised mortality rates were higher for Aboriginal and Torres Strait Islander people than non-Indigenous people for cancers of the head and neck (rate ratio 3.5); liver (rate ratio 2.8); oesophagus (rate ratio 1.8); lung (rate ratio 1.7); gynaecological cancers (rate ratio 1.6); unknown primary sites (rate ratio 1.5) and pancreas (rate ratio 1.2). Rates were about the same or lower for breast (rate ratio 1.0) and bowel cancer and prostate cancer (rate ratio 0.8) (Table 18).

Table 18. Age-standardised death rates for selected cancers, by Indigenous status, and Aboriginal and Torres Strait Islander: non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2009-2013

Primary cancer	Aboriginal and Torres Strait Islander age-standardised rates	Non-Indigenous standardised rates	Rate ratio
Lung	57	33	1.7
Head and neck	14	4.0	3.5
Liver	16	5.6	2.8
Unknown primary site	17	11	1.5
Breast (female)	22	21	1.0
Gynaecological (female)	19	12	1.6
Bowel (colorectal)	13	16	0.8
Pancreas	12	9.5	1.2
Oesophagus	8.4	4.7	1.8
Prostate (male)	25	29	0.8
All cancers	221	170	1.3

Notes: 1 Cancers are ordered by numbers among Aboriginal and Torres Strait Islander people (not shown in table)

2 Rates per 100,000 population, age-standardised to the Australian population at 30 June 2001

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

4 Due to the incomplete identification of Aboriginal and Torres Strait Islander status, these figures probably 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, 2016 [76]

In 2009-2013, the age-standardised Aboriginal and Torres Strait Islander: non-Indigenous cancer mortality rate was 1.4 times higher for females (193 per 100,000 and 134 per 100,000 respectively) and 1.2 higher for males (260 per 100,000 and 217 per 100,000 respectively) [76]. The age-standardised mortality rates were higher for Aboriginal and Torres Strait Islander people in all age-groups 20-79 years, compared with non-Indigenous people. The biggest disparity in the mortality rates between the populations occurred in the 40-44 years age-group (rate ratio 1.9) followed by the 50-54 years age-group (rate ratio 1.8). Aboriginal and Torres Strait Islander children and adolescents 0-19 years had age-standardised mortality rates lower than those for non-Indigenous people rate ratios ranging from 0.3 (10-14 years) to 0.9 (5-9 years).

Burden of disease

Cancer and other neoplasms²² 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 [70]. Lung (24%), bowel (8%), liver (7%), breast (7%) and mouth and pharyngeal (throat) (6%) cancers contributed to over half (51%) of this cancer burden.

The patterns of Aboriginal and Torres Strait Islander cancer incidence and mortality can be explained by the higher level of risk factors, most notably tobacco use [80]. For example, high rates of smoking are the likely cause of a high incidence of cancers of the lung and oral cavity (lip, mouth and tongue). High incidence rates of liver cancer are consistent with heavy alcohol consumption.

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

- they are more likely to have cancers that have a poor prognosis
- they are usually diagnosed with cancer at a later stage (reportedly due to a combination of later presentation for health care and lower participation in screening programs)

²² Cancer and other neoplasms include malignant neoplasms (cancer) and benign and uncertain neoplasms [70].

- they are more likely to present with higher rates of co-morbidities (that may lead to poorer treatment outcomes)
- they are less likely to receive optimal treatment [81-84].

Diabetes

Diabetes is a group of disorders marked by high levels of glucose in the blood and caused by either or both of the following [85]:

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

There are several types of diabetes, of which the most frequently occurring are type 1, type 2 and gestational diabetes mellitus (GDM). Aboriginal and Torres Strait Islander people have a lower incidence of type 1 diabetes compared with non-Indigenous people [86]. Type 1 diabetes is most common form of diabetes in children and young people but can occur at any age [71]. Type 2 diabetes however, represents a serious health problem for many Aboriginal and Torres Strait Islander people who tend to develop it at earlier ages than other Australians, and often die from it at younger ages [71, 87]. GDM develops in some women during pregnancy [88] and is more common among Aboriginal and Torres Strait Islander women than among non-Indigenous women [89].

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 [71]. These complications may occur within months of diagnosis while others may develop over several years [90]. Aboriginal and Torres Strait Islander people with diabetes may also show signs of other chronic conditions, including chronic kidney disease, cardiovascular disease, liver disease and anaemia [91].

Extent of diabetes among Aboriginal and Torres Strait Islander people

Incidence and prevalence

In 2011-13, an estimated 5% of Aboriginal and Torres Strait Islander adults had impaired fasting glycaemia (IFG) compared with 3% of non-Indigenous adults [71]. Aboriginal and Torres Strait Islanders in the 18-44 years age-group had a higher prevalence of IFG (4.2%) compared with non-Indigenous adults in the same age-group (1%). There were no other significant differences between Aboriginal and Torres Strait Islander and non-Indigenous age-groups.

Results from the 2012-2013 *National Aboriginal and Torres Strait Islander health measures survey* (NATSIHMS) indicate that 13% of Aboriginal and Torres Strait Islander adults had diabetes, based on self-report and measured results [71]. About 2% of these adults did not self-report that they had diabetes, which may indicate that they were unaware they had the condition, however, 11% did self-report that they were aware of their diabetes. Of those with diabetes, there was a larger proportion of females (56%) than males (44%). 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 [71].

In remote areas, Aboriginal and Torres Strait Islander adults were twice as likely to have diabetes compared with those living in non-remote areas (21% and 10% 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) [71].

In 2014, according to the National (insulin treated) Diabetes Register (NDR), Aboriginal and Torres Strait Islander people accounted for 3% of new cases of type 1 diabetes and 3% of new cases of insulin treated type 2 diabetes [92]. For type 1 diabetes, there were 9 new cases per 100,000 for Aboriginal and Torres Strait Islander people compared with an incidence rate of 11 per 100,000 for non-Indigenous people. For type 2 diabetes, there were 121 new cases per 100,000 for Aboriginal and Torres Strait Islander people compared with 42 per 100,000 for non-Indigenous people. For type 1 diabetes, the incidence rate among Aboriginal and Torres Strait Islander adults was higher (7 cases per 100,000) than for non-Indigenous adults (5 per 100,000). For Aboriginal and Torres Strait Islander children (0-14 years) and young people (15-24 years), the incidence rates of type 1 diabetes were lower than for non-Indigenous children and young people, 15 per 100,000 and 24 cases per 100,000 children respectively and 11 per 100,000 and 15 cases per 100,000 young people respectively. However, estimates may be understated as Indigenous status may not be reported.

In 2011²³, the incidence rates for insulin treated GDM were similar for Aboriginal and Torres Strait Islander and non-Indigenous women (60 per 100,000 and 59 per 100,000 respectively) [93]. The most recent national estimates of the prevalence of GDM are for 2005-2007 when almost 7% of Aboriginal and Torres Strait Islander women who gave birth in NSW, Vic, Qld, WA, SA and the NT²⁴ had diabetes during pregnancy: 1.5% had pre-existing diabetes and 5.1% had GDM [89]. 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.

There is growing concern regarding the emergence of type 2 diabetes in Aboriginal and Torres Strait Islander children and adolescents, although data are limited [94]. Between 2006 and 2011, 252 new cases of diabetes were reported among Aboriginal and Torres Strait

²³ The 2014 Incidence of insulin-treated diabetes in Australia report excluded updated information due to concerns with data comparability [92].

²⁴ Data from the NT are for public hospitals only [89].

Islander youth aged 10-19 years at diagnosis²⁵ [95]. Of these, 55% were type 2 and 43% were type 1 diabetes. The age-specific rates of type 2 diabetes for young Aboriginal and Torres Strait Islander people were much higher than for their non-Indigenous counterparts (8.3 times as high among 10-14 year-olds and 3.6 times as high for 15-19 year-olds).

Burden of disease

Diabetes accounted for 4% of the total burden of disease among Aboriginal and Torres Strait Islander people in 2011 [70].

General practice attendances and hospitalisation

Survey results from the period April 2008-March 2013 of general practitioners (GPs) found that 5% of all problems managed by GPs among Aboriginal and Torres Strait Islander patients were for diabetes [52]. Type 2 diabetes accounted for 94% of all diabetes problems managed for Aboriginal and Torres Strait Islander people. After age-adjustment, diabetes was managed 2.8 times more frequently among Aboriginal and Torres Strait Islander patients than among other patients. This was due mainly to type 2 diabetes (77 per 1,000 encounters). For type 1 diabetes, encounters occurred less frequently than for type 2 diabetes (4.2 per 1,000 encounters) with a rate ratio of 1.8 after age-adjustment when compared with the non-Indigenous rate. GP encounters with Aboriginal and Torres Strait Islander women for GDM also occurred more frequently (1.1 per 1,000 encounters) than for non-Indigenous patients (rate ratio 2.7 after age-adjustment).

Hospital services are typically required to treat the advanced stages of complications of diabetes or acute episodes of poor glycaemic control [71, 96]. In 2013-14, there were 52,048 Aboriginal and Torres Strait Islander hospitalisations where the principal or additional diagnosis was diabetes. Of these, 90% were for type 2 diabetes, 4% for type 1 diabetes, 4%, for GDM and 2% for other unspecified diabetes related hospitalisations.

For type 2 diabetes as a principal or additional diagnosis, there were 46,975 Aboriginal and Torres Strait Islander hospitalisations in 2013-14 [71]. Rates were 4 times higher than for non-Indigenous people (124 per 1,000 and 29 per 1,000 respectively). There were more female hospitalisations (27,607) than male hospitalisations (19,368). Aboriginal and Torres Strait Islander females were almost six times more likely than non-Indigenous females to be hospitalised (136 per 1,000 and 24 per 1,000 respectively) and Aboriginal and Torres Strait Islander males were three times more likely than non-Indigenous males to be hospitalised (113 per 1,000 and 35 per 1,000 respectively).

In 2013-14, rates of hospitalisations for type 2 diabetes increased with age for Aboriginal and Torres Strait Islanders; for all age-groups, they were hospitalised at higher rates than non-Indigenous people [71]. The gap between the hospitalisation rates for the two populations was larger at younger ages, 14 times higher for 25-34 years (24 per 1,000 and 1.7 per 1,000 respectively) and for 35-44 years (87 per 1,000 and 6.3 per 1,000 respectively), this declined to twice as high for age 75 years and over (398 per 1,000 compared with 202 per 1,000).

For type 1 diabetes as a principal or additional diagnosis in 2013-14, Aboriginal and Torres Strait Islander people were hospitalised at twice the rate of non-Indigenous people (4.0 per 1,000 and 2.2 per 1,000 respectively) [71]. Aboriginal and Torres Strait Islander people were hospitalised at higher rates than non-Indigenous people across most ages [71]. The rates were three times higher in the 55-64 years age-group (9.5 per 1,000 compared with 3.0 per 1,000). Rates were similar in the under 25 years and 75 years and over age-groups.

In 2013-14, the rate of hospitalisation for Type 2 diabetes as a principal or additional diagnosis in remote areas and very remote areas was more than twice as high (220 per 1,000) as the rates in major cities and inner and outer regional areas (both around 100 per 1,000) [71]. In both major cities and in inner and outer regional areas, the rates of hospitalisation were three times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people. In remote and very remote areas, the rate was eight times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (220 per 1,000 and 26 per 1,000 respectively).

In both major cities and in the inner and outer regional areas, hospitalisation rates for type 1 diabetes as a principal or additional diagnosis for Aboriginal and Torres Strait Islander people were similar (4.5 per 1,000 and 4.9 per 1,000) [71]. The rate in remote and very remote areas (1.7 per 1,000) was less than half the rate in major cities and in outer regional areas. When compared with the non-Indigenous population, in major cities and in inner and outer regional areas, Aboriginal and Torres Strait Islander people were more likely to be hospitalised for type 1 diabetes than non-Indigenous people (2.2 times higher in major cities and 1.9 times higher in inner and outer regional areas). Type 1 diabetes hospitalisation rates were similar for Aboriginal and Torres Strait Islander people living in remote and very remote areas compared with non-Indigenous people.

Hospitalisations for various chronic conditions, including complications of diabetes, are considered potentially preventable [10, 18]. 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.

²⁵ Based on combined data from the National diabetes services scheme (NDSS) and the Australasian Paediatric Endocrine Group (APEG) [95].

Mortality

In 2015, diabetes (underlying cause and/or associated cause) was the second leading cause of death among Aboriginal and Torres Strait Islander people, with an age-adjusted death rate 4.7 times higher than for non-Indigenous people [97]. Diabetes was responsible for 6.7% of deaths (194 deaths) among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA, and the NT. There were more deaths from diabetes among Aboriginal and Torres Strait Islander females (99 deaths) than among males (95 deaths). After age-adjustment, Aboriginal and Torres Strait Islander females and males were both more likely to die from diabetes than their non-Indigenous counterparts (six and four times respectively).

For 2011-2015, the age-specific death rates for diabetes for the 45-54 years age-group for Aboriginal and Torres Strait Islander people were 62 per 100,000 for males and 52 per 100,000 for females with rate ratios of 12.0 for males and 20.2 for females when compared with non-Indigenous males and females [97].

From 2010-2012, diabetes was the underlying or associated cause of death for 1,474 Aboriginal and Torres Strait Islander people (21% of all Aboriginal and Torres Strait Islander deaths compared with 10% among non-Indigenous people). Diabetes as the underlying cause of death was responsible for 564 deaths of Aboriginal and Torres Strait Islander people (8% of all Aboriginal and Torres Strait Islander deaths) in NSW, Qld, SA, WA and the NT [71]. Of these deaths, the underlying cause of death was recorded as: type 1 diabetes (5.0% of deaths); type 2 diabetes (46% of deaths); or the type of diabetes was unspecified (49% of deaths).

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 [9, 98]. While the term SEWB has been used interchangeably with 'mental health' and 'mental illness', Gee et al. argue that these latter terms should be positioned 'within' a broader understanding of SEWB rather than 'equated with SEWB' [9]. 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' [9]. Understanding SEWB and mental health as cultural constructions enhances the capacity for culturally responsive, strengths based approaches to managing emerging issues for individuals and communities. Colonisation has had a systematically profound impact on Aboriginal and Torres Strait Islander peoples' traditional cultural practices and by implication on their SEWB [8, 14]. 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 [8]. Gee et al., also identify [99] a number of important factors that enhance SEWB such as connection to country, spirituality and ancestry; kinship; and self-determination, community governance and cultural continuity.

The World Health Organization (WHO) defines mental health as a state of social and emotional wellbeing in which individuals can cope with the normal stresses of life and realise their potential [100, 101]. Like SEWB, mental health is influenced by a complex interplay of biological, psychological, social, environmental, and economic factors [102, 103]. 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 [100, 102]. Mental illness is a psychological disorder that significantly interferes with an individual's cognitive, emotional, or social abilities, and is generally determined according to the classification system of the *Diagnostic and statistical manual of mental disorders* (DSM) or the ICD. Severe mental illness, while evident in the anthropological or ethnographic records, was relatively rare in traditional Aboriginal societies [99].

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 [99].

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

Prevalence

The 2012-2013 AATSIHS found that the SEWB of many Aboriginal and Torres Strait Islander people was compromised: 30% of respondents aged 18 years and over reported high or very high levels of psychological distress in the four weeks prior to the interview [104]. After age-adjustment, the proportion of Aboriginal and Torres Strait Islander people reporting high or very high distress levels in 2012-2013 was more than 2.7 times that of non-Indigenous people reported in 2011-2012 [104].

The 2012-2013 AATSIHS found a relationship between education level and employment status, and the level of psychological distress for Aboriginal and Torres Strait Islander people [37]. Thirty-four percent of Aboriginal and Torres Strait Islander people who were educated to year 9 level experienced high/very high levels of psychological distress, whereas for those who were educated to year 12, the figure was 26%. Similarly, 42% of unemployed Aboriginal and Torres Strait Islander people experienced high/very high levels of psychological distress, compared with 22% of 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 stressors in the previous 12 months [105]. According to the 2014-2015 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 for Aboriginal and Torres Strait Islander people 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%). Among Aboriginal and Torres Strait Islander people, 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 than those with no long-term health condition: 84% and 60% respectively [24].

Psychological distress and the contributing life stressors are just one aspect of SEWB. Also providing an indication of a person's state of SEWB, is the degree to which they experience positive feelings. In the 2012-2013 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 [18]. However, concerning proportions responded 'a little/none of the time' to questions relating to having 'lots of energy' (21%), a sense of calmness and peacefulness (18%) and fullness of life (19%). The absence of comparable data precludes definitive statements about the relative positive wellbeing of Aboriginal and Torres Strait Islander and non-Indigenous people, but the greater frequency of psychological distress in the Aboriginal and Torres Strait Islander population, together with the types and numbers of stressors reported, suggests Aboriginal and Torres Strait Islander people experience lower levels of SEWB than non-Indigenous people. The 2008 *Household income and labour dynamics in Australia survey* (HILDA) offers mixed support for this suggestion. It found that holding a wide range of other factors constant, overall life satisfaction was significantly higher for Aboriginal and Torres Strait Islander people, compared with non-Indigenous Australians [106].

The 2014-2015 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 females and 52% of males), where 0 is completely unsatisfied and 10 is completely satisfied. (Derived from [107]). Of those that experienced low range (0-4 out of 10) satisfaction ratings, a clear association was found with relative disadvantage. In particular, low scores were associated with unemployment and those who had not finished year 12.

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%) [24].

SEWB is influenced by the support a person receives from their social networks [108]. Information collected in the 2013-2014 NATSISS showed that 92% of Aboriginal and Torres Strait Islander people aged 15 years and over were able to obtain emotional, physical, or financial help from someone else during a time of crisis (Derived from [107]). For the general population, people experience similar levels of social support: in the 2010 *General social survey* (GSS) it was found that 94% were able to access support at a time of crisis [109].

Removal from one's natural family also has significant implications for a person's mental health. The 2014-2015 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%). Additionally, those with a mental health condition were more likely to have had an unfair experience because they were an Aboriginal and /or Torres Strait Islander person (44%) than those with no long-term health condition (28%) [24].

In terms of the SEWB of Aboriginal children, the *Western Australian Aboriginal child health survey* (WAACHS), 2001-2002, remains the most recent and detailed source of information. It reported that 24% of WA Aboriginal children and young people aged 4-17 years were rated by their carers (parent or guardian) as being at high risk of clinically significant emotional or behavioural difficulties compared with 15% of those in the general WA population [110]. Children of Aboriginal carers who had been forcibly separated from their families were more than twice as likely to be at high risk of incurring clinically significant emotional and behavioural difficulties, and had twice the rates of alcohol and other drug use than children of Aboriginal carers who had not been forcibly separated from their families. Around 77% of Aboriginal children were living in families that had experienced up to six major life stress events (such as death of a close family member, illness, family break-up, financial difficulties or arrest) in the 12 months prior to the survey, and 23% had experienced seven or more such events (Derived from [110]).

The *Footprints in time: longitudinal study of Indigenous children* found that Indigenous boys had higher average behavioural and emotional difficulties scores than Indigenous girls, (scores of 13 and 11 respectively) [111]. Differences between boys and girls were statistically significant on the hyperactivity, prosocial and total difficulties scales.

Hospitalisation

Reflecting the continuing high levels of distress experienced by many Aboriginal and Torres Strait Islander people, 16,941 of the hospital separations in 2014-15 with a principal diagnosis of ICD 'Mental and behavioural disorders' were identified as Aboriginal and Torres Strait Islander [51].²⁶

²⁶ The ICD chapter 'Mental and behavioural disorders', used for the classification of both hospitalisation and mortality, is very broad. As well as mental illness and mental health problems, it includes mental retardation and a broad sub-category for disorders relating to the use of psychoactive substances (including alcohol, tobacco, other drugs and volatile substances). The chapter doesn't include, however, the results of intentional self-harm, which are classified within the ICD chapter 'External causes of morbidity and mortality'.

Information about hospitalisation for the specific sub-categories within the ICD chapter 'Mental and behavioural disorders' are not available for 2014-15, but data from 2011-13 show hospitalisation rates for each sub-category were generally higher for Aboriginal and Torres Strait Islander people than for other Australians [52]. For this period, the age-adjusted separation rates for mental and behavioural disorders due to ICD 'Psychoactive substance use disorders' were 3.7 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people. Similarly, the rate for Aboriginal and Torres Strait Islander people for ICD 'Schizophrenia, schizotypal, and delusional disorders' was 3.1 times higher than the rate for non-Indigenous people.

Intentional self-harm categorised as a principal diagnosis chapter within the ICD, was responsible for 2,215 (0.5%) of all hospital separations for Aboriginal and Torres Strait Islander people in 2014-15 (Derived from [51]). In 2011-13, Aboriginal and Torres Strait Islander people were 2.5 times more likely to be admitted for intentional self-harm than non-Indigenous people [52]. After age-adjustment, separation rates for self-harm were 2.9 and 2.3 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 about Aboriginal and Torres Strait Islander mortality as a result of mental health related conditions is for those living in NSW, Qld, WA, SA and the NT in 2008-2012; there were 347 deaths of Aboriginal and Torres Strait Islander people, 153 males and 194 females (Table 19) [52]²⁷. After age-adjustment, death rates were 1.3 and 1.2 times higher for Aboriginal and Torres Strait Islander males and females respectively, than for non-Indigenous males and females.

Table 19. Numbers and rates of deaths from mental health related conditions, excluding intentional self-harm, by sex and condition, and Aboriginal and Torres Strait Islander: non-Indigenous rate ratios, NSW, Qld, WA, SA, and the NT, 2008-2012

Cause of death	Males			Females		
	Number	Rate	Rate ratio	Number	Rate	Rate ratio
Mental disorders due to substance use	77	12	5.0	32	3.7	4.7
Organic mental disorders	63	27	1.3	124	37	1.2
Other mental disorders	13	n.p.	n.p.	38	11	0.8
All mental disorders	153	43	1.3	194	52	1.2

- Notes:
- 1 Rates are deaths per 100,000, rounded to the nearest whole number, standardised using the Australian 2001 ERP
 - 2 Details of death from intentional self-harm are not included in this table; see Tables 20 and 21
 - 3 n.p. not published
 - 4 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

Source: AIHW, 2015 [52]

In 2015, the death rate for ICD 'Intentional self-harm' for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA, and the NT was 2.0 times the rate reported for non-Indigenous people [42]. It was the fifth leading specific cause of death among Aboriginal and Torres Strait Islander people.

For the period 2011-2015, deaths from intentional self-harm were much higher for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT than those for non-Indigenous people, with age-standardised death rates ranging from 14 per 100,000 (NSW) to 41 per 100,000 (WA) [42]. Death rates were higher for Aboriginal and Torres Strait Islander males than females (in those jurisdictions for which details for females were available) (Table 20).

Table 20. Age-standardised death rates for intentional self-harm, Aboriginal and Torres Strait Islander people by sex and jurisdiction, and Aboriginal and Torres Strait Islander: non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2011-2015

Jurisdiction	Aboriginal and Torres Strait Islander people			Rate ratios		
	Persons	Males	Females	Persons	Males	Females
NSW	14	22	n.p.	1.4	1.5	n.p.
Qld	23	37	10	1.7	1.8	1.6
WA	41	57	24	3.4	3.2	3.9
SA	25	32	n.p.	2.1	1.7	n.p.
NT	28	35	22	2.1	1.6	n.p.

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

Source: ABS, 2016 [42]

These overall death rates conceal the very high rates of suicide among young Aboriginal and Torres Strait Islander people who die from suicide at much younger ages than non-Indigenous people [42]. Combined data for NSW, Qld, WA, SA and the NT in 2011-2015 show the highest death rates for intentional self-harm were among Aboriginal and Torres Strait Islander people aged 15-24 years and 25-34 years

²⁷ Under the ICD, intentional self-harm is classified under 'External causes of morbidity and mortality' (codes X60-X84); details are provided separately.

(40 and 43 deaths per 100,000 respectively) (Table 21). The burden of death by intentional self-harm was highest among Aboriginal and Torres Strait Islander males aged 25-34 and 35-44 years (rates of 64 and 55 per 100,000 respectively), but was also very high among young Aboriginal and Torres Strait Islander females. The suicide rates for females in the 1-14 years to 15-24 years age-groups were 7.3 and 4.3 times higher respectively, than for non-Indigenous females.

Table 21. Age-standardised death rates for intentional self-harm, Aboriginal and Torres Strait Islander people by sex and age-group, and Aboriginal and Torres Strait Islander: non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2011-2015

Age-group (years)	Aboriginal and Torres Strait Islander people			Rate ratios		
	Persons	Males	Females	Persons	Males	Females
1-14	2.6	2.6	2.7	7.6	7.8	7.3
15-24	40	54	25	3.9	3.7	4.3
25-34	43	64	22	3.2	3.0	3.7
35-44	38	55	21	2.2	2.1	2.6
45+	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.
All ages	22	32	n.p.	1.9	1.8	n.p.

Notes: 1 Rate per 100,000 population, rounded to the nearest whole number, standardised to the Australian 2011 ERP

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

3 n.p.: not published

4 Due to the incomplete identification of Aboriginal and Torres Strait Islander status, these figures probably underestimate the true differences between Aboriginal and Torres Strait Islander and non-Indigenous people

Source: ABS, 2016 [42]

Research in NSW, Qld, WA, SA, the ACT and the NT has highlighted the increasing impact of suicide among young Indigenous people, and a trend among young Indigenous males [18, 112-114]. Recent research in the Kimberley region of WA in 2005-2014 found the age-adjusted rate of suicide per year in this region to be 74 per 100,000, and of these, 68% of people were less than 30 years old and 71% were male [115]. It has been suggested that suicide and attempted suicide among Indigenous young people (at least in NSW and the ACT) are not the result of mental illness 'in the strict pathological sense' [116, p.88], but it is certainly a manifestation of mental health problems. The level of intentional self-harm has been recognised as a key indicator of Indigenous disadvantage [18].

Kidney health (renal disease)

Kidney disease, renal and urologic disease, and renal disorder are terms that refer to a variety of different disease processes involving damage to the filtering units of the kidneys (nephrons) which affect the kidneys ability to eliminate wastes and excess fluids [117]. 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 [118]. CKD is inclusive of different conditions, including diabetic nephropathy, hypertensive renal disease, glomerular disease, chronic renal failure, and end-stage renal disease (ESRD) [119]. If left untreated, kidney function can decrease to the point where kidney replacement therapy, in the form of dialysis (mechanical filtering of the blood to help maintain functions normally performed by the kidneys) or transplantation (implantation of a kidney from either a living or recently deceased donor) is necessary to survive [120]. ESRD, where the kidneys are operating at less than 15% of capacity and dialysis or transplant are required [117], is expensive to treat [121] 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 [122].

A number of risk factors are associated with kidney disease, including obesity, hypertension, diabetes mellitus, tobacco use, established cardiovascular disease, age, family history, severe socio-economic disadvantage and LBW [123-125]. These factors are particularly common among Aboriginal and Torres Strait Islander people and contribute to high rates of CKD [120, 126].

Extent of kidney disease among Aboriginal and Torres Strait Islander people

Prevalence/incidence

Around 1.8% of Aboriginal and Torres Strait Islander people reported that they had kidney disease as a long-term health condition in the 2012-2013 AATSIHS [55]. After age-adjustment, the prevalence of kidney disease as a long-term health condition was 3.7 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people. The proportions of Aboriginal and Torres Strait Islander people reporting kidney disease were similar for males and females, but the age-adjusted Aboriginal and Torres Strait Islander: non-Indigenous rate ratio was slightly higher for males (3.9) than for females (3.6). The reported prevalence of kidney disease among Aboriginal and Torres Strait Islander people was less than 2% for all age-groups under 45 years, increasing to 4.0% for persons aged 45-54 years and 7.7% for persons 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 [127]. 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 2010-2014 reveal that the age-standardised notification rate of ESRD for Aboriginal and Torres Strait Islander people was 615 per 1,000,000 population, 6.6 times the rate for non-Indigenous people (Derived from [25, 128-130]).

Notification rates of ESRD were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people in all states and territories, with the highest rates recorded for Aboriginal and Torres Strait Islander people living in the NT (1,696 per 1,000,000), WA (1,008 per 1,000,000), and SA (676 per 1,000,000) (Table 22). (Derived from [25, 128-130]).

Table 22. 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, 2010-2014

Jurisdiction	Aboriginal and Torres Strait Islander		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	180	313	3,727	93	3.4
Vic	58	438	3,099	101	4.3
Qld	276	490	2,060	87	5.6
WA	261	1,008	1,090	90	11.3
SA	77	676	826	87	7.8
NT	381	1,696	64	84	20.2
Australia	1,243	615	11,386	94	6.6

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

Sources: Derived from ANZDATA, 2015 [130], ABS, 2013 [128], ABS, 2003 [129], ABS, 2014 [25]

Of people newly registered with the ANZDATA in 2010-2014, 59% of Aboriginal and Torres Strait Islander people were aged less than 55 years, compared with 31% of non-Indigenous people. Notification rates were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people across all age-groups (except for the 0-14 years age-group) (Table 23) (Derived from [25, 128-130]). Rate ratios were particularly high for people aged 45-54 years (11.5).

Table 23. 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, 2010-2014

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

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

Sources: Derived from ANZDATA, 2015 [130], ABS, 2013 [128], ABS, 2003 [129], ABS, 2014 [25]

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 [70].

Hospitalisation including dialysis

Detailed information from ANZDATA is available for 2014 when a total of 251 Aboriginal and Torres Strait Islander people commenced dialysis, representing a decrease from 2013 [127]. In 2014, there were 41 new transplant operations for Aboriginal and Torres Strait Islander recipients, compared with 873 operations performed for non-Indigenous recipients. At 31 December 2014, 32 (3%) of the 1,123 patients on the waiting list for a transplantation were Aboriginal and/or Torres Strait Islander people.

Haemodialysis (HD), conducted in urban or regional clinics and hospitals, is the most common form of dialysis treatment for Aboriginal and Torres Strait Islander people with ESRD [120, 127, 131, 132]. In 2014, HD accounted for the majority of treatment (91%) with only 9% of Aboriginal and Torres Strait Islander dialysis patients receiving peritoneal dialysis (PD) (Derived from [127]). The majority of non-Indigenous dialysis patients also received HD, but 22% of non-Indigenous dialysis patients received PD. In 2014, there were 1,551 prevalent dialysis patients in Australia (including both PD and HD) identified as Aboriginal and Torres Strait Islander, a rate of 2,172 per 1,000,000 compared with the total population rate of 515 per 1,000,000.

In 2013-14 hospitalisation rates for CKD were nearly five times higher among Aboriginal and Torres Strait Islander people (52 per 1,000) than for non-Indigenous people (11 per 1,000) where CKD was the principal and/or additional diagnosis (excluding regular dialysis) [71]. For Aboriginal and Torres Strait Islander males, rates were 3.6 times higher than for non-Indigenous males for hospitalisation for CKD as the principal and/or an additional diagnosis (48 per 1,000 and 13 per 1,000 respectively). For Aboriginal and Torres Strait Islander females, rates were 6.5 times higher than for non-Indigenous females for hospitalisation for CKD as the principal and/or an additional diagnosis (56 per 1,000 and 8.6 per 1,000 respectively).

There were 207,605 hospital separations for ESRD among Aboriginal and Torres Strait Islander people in 2014-15 [10]. 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.²⁸ Contributing factors to the higher rates for Aboriginal and Torres Strait Islander females include the higher prevalence of type 2 diabetes among Aboriginal and Torres Strait Islander females and the large proportion of females carrying high levels of body fat around their abdomen; both factors place them at higher risk for CKD [133].

In 2014-15 after age-adjustment, hospitalisation rates for ESRD for Aboriginal and Torres Strait Islander people increased with remoteness [10]. 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 almost three times the rate of Aboriginal and Torres Strait Islander people living in major cities.

In 2014-15, there were 950 separations per 1,000 for Aboriginal and Torres Strait Islander people for all conditions [51]. The same-day acute separation rate for Aboriginal and Torres Strait Islander people was three times the rate for non-Indigenous people with 'care involving dialysis' accounting for a large proportion of these admissions.

Hospitalisation rates for regular dialysis as the principal diagnosis were 10 times higher for Aboriginal and Torres Strait Islander people (451 per 1,000) than for non-Indigenous people (44 per 1,000) [71]. For Aboriginal and Torres Strait Islander males, hospitalisation rates were 6.9 times higher than for non-Indigenous males for regular dialysis (390 per 1,000 and 57 per 1,000 respectively). For females, hospitalisation rates were almost 16 times higher than for non-Indigenous females for regular dialysis (509 per 1,000 and 33 per 1,000 respectively).

Mortality

There were 68 deaths from disease of the urinary system among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT in 2015 [42].²⁹ After age-adjustment, the death rate for Aboriginal and Torres Strait Islander people was 2.5 times that for non-Indigenous people.

During the period 2010-2014, after age-adjustment, the death rate for kidney disease for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and NT (26 per 100,000) was 2.7 times the rate for non-Indigenous people (9.6 per 100,000) [10].

More detailed information is available for people living in NSW, Qld, WA, SA and the NT for 2010-2012. During this period, CKD was the underlying cause of death of 260 Aboriginal and Torres Strait Islander people and the underlying or associated cause of death of 1,166 Aboriginal and Torres Strait Islander people [71]. After age-adjustment, the death rate for CKD as an underlying or associated cause of death for Aboriginal and Torres Strait Islander people was 3.2 times higher than the rate for non-Indigenous people. The Aboriginal and Torres Strait Islander: non-Indigenous rate ratios were higher for females (3.9) than for males (2.6).

Injury, including family violence

Injury includes both physical harm to a person's body and non-physical harm, including grief, loss and suffering [134], but in public health practice attention is almost entirely confined to physical harm [135]. 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 [136].

The classification of injury has generally followed the WHO's ICD, which includes particular attention to the external cause and intention of the injury [137].³⁰ Understanding injury for Aboriginal and Torres Strait Islander people, needs to take into consideration a diverse range of issues, including low socio-economic contexts with a higher risk of injury because of unsafe environments [136], alcohol and other drug use, intimate partner violence, disruption to culture [134], 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 2012-2013 AATSIHS reported that 2.5% of Aboriginal and Torres Strait Islander people had a long-term condition caused by injury with the highest reported levels in the 35-44 years and 45-54 years age-groups [139, 140]. Long-term conditions caused by injury were

²⁸ 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.

²⁹ Disease of the urinary system includes disorders of the bladder and urethra, as well as those specifically of the kidneys and ureters.

³⁰ This system is followed in this section, but it has its limitations (for more details, see [138]).

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 [139]. 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) [140].

In relation to violence, in the 2014-2015 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 [141]. 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 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 2014-2015 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 [141]. 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 29,237 hospital separations for injuries for Aboriginal and Torres Strait Islander people in 2014-15, representing 13% of all Aboriginal and Torres Strait Islander separations (excluding those for dialysis) [51]. The leading external causes of injury-related hospitalisations were falls (20%), assault (19%), exposure to mechanical forces (17%) 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 (47 per 1,000 and 26 per 1,000 respectively).

More detailed information for 2012-13 shows that in terms of age, the greatest disparity between Aboriginal and Torres Strait Islander and non-Indigenous people was in the 30-34 years age-group, where the rate of hospitalised injury was 3.6 times higher for Aboriginal and Torres Strait Islander people [142]. The highest proportion of injury for Aboriginal and Torres Strait Islander people however, was in the 25-44 years age-group (42% for females, and 36% for males). Rates of hospitalised injury are consistently higher for Aboriginal and Torres Strait Islander people in the middle years, however from about 65+ years, the rates are high for both Aboriginal and Torres Strait Islander people and non-Indigenous people.

In terms of remoteness, hospitalisation rates for injury for Aboriginal and Torres Strait Islander people increased with remoteness in 2014-15 [10]. 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 2014-15, 19% of injury-related hospitalisations among Aboriginal and Torres Strait Islander people were for assaults compared with 2% among other Australians [51].

Rates of hospitalisations due to family violence-related assaults among Aboriginal and Torres Strait Islander people were higher than for non-Indigenous people in 2014-15 [10]. 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 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 in 2015 were intentional self-harm (152 deaths, 5.3% of all Aboriginal and Torres Strait Islander deaths), land transport accidents (84 deaths, 2.9% of all Aboriginal and Torres Strait Islander deaths), accidental poisoning (60 deaths, 2.1% of all Aboriginal and Torres Strait Islander deaths) and assault (48 deaths, 1.7% of all Aboriginal and Torres Strait Islander deaths) [97]. After age-adjustment, deaths from intentional self-harm were twice as common for Aboriginal and Torres Strait Islander people than for non-Indigenous people, and those from land transport accidents 2.9 times as common. After age-adjustment, the death rate for injury from assault was 8.2 times higher.

The most recent detailed information for death from injury is available for the five-year period 2008-2012. In this period, there were 1,766 Aboriginal and Torres Strait Islander deaths from injury in NSW, Qld, WA, SA and the NT, representing 15% of all Aboriginal and Torres Strait Islander deaths [67]. After age-adjustment, Aboriginal and Torres Strait Islander people died from injury at twice the rate of

non-Indigenous people. Death rates for injury were particularly high among Aboriginal and Torres Strait Islander people aged 25-34 years (107 per 100,000), 35-44 years (103 per 100,000) and 75+ years (171 per 100,000 respectively).

Leading causes of injury-related death of Aboriginal and Torres Strait Islander people for 2008-2012 in NSW, Qld, WA, SA and the NT, as a percentage of total deaths were for intentional self-harm (6.4% for males and 2.9% for females), land transport accidents (4.8% for males and 2.8% for females), accidental poisoning by and exposure to noxious substances (2.0% for males and 1.4 for females) and assault (1.8% for males and 1.4 for females) [52].

Respiratory disease

'Respiratory disease' refers to a number of conditions that affect the lungs or respiratory tract; this diverse group of conditions impair the process of breathing and oxygen delivery [143]. They range from acute respiratory infections to chronic respiratory conditions [70].

Respiratory disease is associated with a number of contributing factors, including: risky behaviours (particularly cigarette smoking); environmental conditions; occupational exposures and hazards [70, 144]; family history and previous medical conditions [144]. Infants and children are particularly susceptible to developing respiratory conditions due to factors like exposure to tobacco smoke, poor environmental conditions, poor nutrition and limited access to medical care [145, 146].

Extent of respiratory disease among Aboriginal and Torres Strait Islander people

Prevalence

Long-term diseases of the respiratory system³¹ were reported by 31% of Aboriginal and Torres Strait Islander people who participated in the 2012-2013 AATSIHS³² [140]. 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 45-64 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 2012-2013 AATSIHS; it was the most commonly reported long-term respiratory condition and the second most commonly reported long-term condition overall [140]. After age-adjustment, the rate of asthma was 1.9 times higher among Aboriginal and Torres Strait Islander people than among non-Indigenous people. Asthma was reported more commonly by females (20%) than by males (15%). Asthma was more commonly reported by people living in non-remote areas (20%) than those in remote areas (10%) [147].

Other long-term respiratory conditions reported in the 2012-2013 AATSIHS were chronic sinusitis (8.3%) and chronic obstructive pulmonary disease (COPD)³³ (4.1%) [140].

Burden of disease

Respiratory diseases include chronic conditions such as COPD, asthma, upper respiratory diseases and bronchiectasis which were responsible for 7.9% of the total burden of disease among Aboriginal and Torres Strait Islander people in 2011. Most of the burden from respiratory disease was attributed to asthma (particularly affecting people aged 10-24 years) and COPD (peaking in the 60-64 years age-group) [70].

Hospitalisation

There were 22,960 hospital separations with a principal diagnosis of respiratory disease among Aboriginal and Torres Strait Islander people in 2014-15 [51], representing 10% of all separations identified as Aboriginal and Torres Strait Islander (excluding dialysis) (Derived from [51]). After age-adjustment, the hospitalisation rate for respiratory disease was 2.4 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people [51]. For selected respiratory diseases, age-standardised hospitalisation rates were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people, particularly in the middle adult years (Table 24) [10].

31 Individuals who reported a current respiratory condition that had lasted, or was expected to last, for six months or more [140].

32 The 2014-2015 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 [141].

33 COPD relates to a progressive lung disease for which the symptoms are not fully reversible, and includes chronic bronchitis and emphysema [148].

Table 24. Aboriginal and Torres Strait Islander:non-Indigenous hospitalisation rate ratios, by selected respiratory condition and age-group, all jurisdictions, 2014-15

	0-14 years	15-24 years	25-44 years	45-64 years	65 and older	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 [10]

In 2014-15, hospitalisation rates for COPD, influenza and pneumonia, acute upper respiratory infections, and asthma all increased with remoteness [10]. 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).

Mortality

In 2015, chronic lower respiratory disease (which includes asthma, bronchitis, bronchiectasis, emphysema, and other COPD) was the leading cause of death from respiratory disease and 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 175 deaths) [97]. After age-adjustment the death rate for chronic lower respiratory disease among Aboriginal and Torres Strait Islander people was 2.6 times higher than among non-Indigenous people. Influenza and pneumonia were responsible for 42 Aboriginal and Torres Strait Islander deaths, with an age-adjusted death rate 1.4 times higher than for non-Indigenous people.

For the period 2009-2013, the rate of respiratory disease as a major cause of death was twice as high after age-adjustment for Aboriginal and Torres Strait Islander people than for non-Indigenous people (99 per 100,000 and 49 per 100,000 respectively) in NSW, Qld, WA, SA and the NT [149].

More detailed information is available for Aboriginal and Torres Strait Islander people living in NSW, Qld, SA, WA and the NT for the period 2011-2015 [97]. The highest rate ratio for deaths from chronic lower respiratory diseases was in the 45-54 years age-group where the death rate was 8.9 times higher for Aboriginal and Torres Strait people (36 per 100,000) than for non-Indigenous people. 'Influenza and pneumonia' was a leading cause of respiratory related deaths for Aboriginal and Torres Strait Islander infants under one year of age (14 per 100,000) at a rate 10.4 times higher than for non-Indigenous infants.

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

Eye health

Eye health can be affected by a number of factors, including genetics, ageing, premature birth, diseases (such as diabetes), injuries, ultraviolet (UV) exposure, nutrition and tobacco use [108, 150]. 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 [151, 152]. Even partial loss of vision can reduce an individual's ability to live independently and increase the risk of mortality [151, 153].

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 [70]. The burden of vision loss³⁴ was estimated to be three times greater for Aboriginal and Torres Strait Islander people than for non-Indigenous people. However, evidence suggests that Indigenous children, particularly those living in remote areas, experience generally better vision than non-Indigenous children [154].

It is estimated that 90% of vision impairment (VI) and blindness³⁵ among both Indigenous and non-Indigenous people is preventable or treatable [155]. The *Roadmap to close the gap for vision* is currently guiding national efforts to increase the accessibility and uptake of culturally appropriate eye care services among Indigenous people [156].

³⁴ Vision loss refers specifically to loss due to refractive error, cataract, glaucoma and age-related macular degeneration [70]. It does not include vision loss due to trachoma or diabetes.

³⁵ This calculation is based on figures for age-related macular degeneration, cataract, diabetic retinopathy, glaucoma and uncorrected refractive error [155].

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 surveys³⁶ and surveillance activities that rely on eye examinations or self-report³⁷.

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

The *National eye health survey* (NEHS) was conducted between March 2015 and April 2016 [155]. It provides the latest evidence about the prevalence, causes and treatment of VI³⁸ and blindness³⁹ among Indigenous adults in Australia. The NEHS examined the eyes of 1,738 Indigenous people aged 40 years or older and 3,098 non-Indigenous people aged 50 years or older. After age-adjustment, it found that the prevalence of both bilateral VI and bilateral blindness were significantly higher among Indigenous participants (14% and 0.4% respectively) than among non-Indigenous participants (4.6% and 0.1% respectively). There was no significant difference in the prevalence of VI or blindness between males and females among either Indigenous or non-Indigenous participants. After age-adjustment, VI and blindness in Indigenous adults were both three times higher than in non-Indigenous adults. It was estimated that in 2016 up to 18,300 Indigenous people aged 40 years or older were living with VI or blindness.

There has been a reduction in the prevalence of blindness in Indigenous adults, from six times higher than that experienced by non-Indigenous adults in 2008 [154] to three times higher in 2016 [155].

According to the NEHS, the main causes of VI in Indigenous and non-Indigenous adults were uncorrected refractive error (63% and 62% respectively) and cataract (20% and 14% respectively) [155]. Diabetic retinopathy 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). VI increased with age in both groups. The prevalence of VI among Indigenous adults was significantly higher in outer regional areas than in other areas, but remoteness did not affect the prevalence of VI among non-Indigenous adults.

The NEHS identified five Indigenous participants with bilateral blindness, the main causes of which were cataract (two people), diabetic retinopathy (one person), optic atrophy (one person) and a combination of mechanisms (one person) [155]. 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

Eye and sight problems⁴⁰ (also referred to as diseases of the eye and associated structures such as the eyelids, eyebrows and tear ducts known as adnexa) [159] were reported in the 2012-2013 AATSIHS by one-third (33%) of Aboriginal and Torres Strait Islander people (33% of Aboriginal people and 34% of Torres Strait Islander people) [158], making it the most commonly reported long-term health condition [160]. Eye and sight problems were reported by 38% of females and by 29% of males [161]. After age-adjustment, Aboriginal and Torres Strait Islander people were slightly less likely to report eye and sight problems than their non-Indigenous people (ratios of 0.9 for: males; females; and total persons) [140].

In the 2012-2013 AATSIHS, self-reported eye and sight problems increased with age for both Aboriginal and Torres Strait Islander people and non-Indigenous people [139]. Age-specific proportions ranged from 9% for Aboriginal and Torres Strait Islander people in the 0-14 years age-groups to 92% for those aged 55 years and over and 11% to 95% for non-Indigenous people in the comparable age-groups. The proportions of eye and sight problems reported by Aboriginal and Torres Strait Islander people were lower than those reported by non-Indigenous people in all age-groups, apart from those reported for the 35-44 and 45-54 years age-groups in which the proportions were slightly higher among Aboriginal and Torres Strait Islander people. The proportions of Aboriginal and Torres Strait Islander people reporting eye or sight problems were similar in non-remote areas⁴¹ and remote areas (both 35%), but lower among those living in very remote areas (25%) [147].

The most common eye conditions reported by Aboriginal and Torres Strait Islander people in the 2012-2013 AATSIHS were: hyperopia (long sightedness: 19%), myopia (short sightedness: 13%), other diseases of the eye and adnexa⁴² (5.6%), blindness (3.0%), and cataract (1.1%) (Table 25) [140]. After age-adjustment, Aboriginal and Torres Strait Islander people were more likely to report hyperopia, cataract and blindness than non-Indigenous people (ratios of 1.1, 1.4 and 7.4 respectively), but were less likely to report myopia (ratio: 0.8) and other diseases of the eye and adnexa (ratio: 0.5). Blindness showed the greatest disparities in Indigenous: non-Indigenous ratios, with Aboriginal and Torres Strait Islander males and females both more likely to report blindness than non-Indigenous males and females (ratios: 6.3 for males and 8.8 for females) [140].

36 Survey findings may not be directly comparable due to differing ways of defining and assessing vision loss [157].

37 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].

38 The NEHS defines vision impairment as 'presenting distance visual acuity <6/12 in the better eye' [155].

39 The NEHS defines blindness as 'presenting distance visual acuity <6/60 in the better eye' [155].

40 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 [158].

41 Non-remote areas include major cities and inner and outer regional areas [147].

42 Other diseases of the eye and adnexa include: glaucoma, macular degeneration, astigmatism and presbyopia [140].

Table 25. Proportions (%) of people reporting specific diseases of the eye and adnexa as long-term health conditions, by sex and Indigenous status, and Indigenous:non-Indigenous ratios, Australia, 2012-2013

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

- Notes:
- 1 Proportions are not age-standardised
 - 2 A long-term health conditions is one that has lasted, or is expected to last, for 6 months or more
 - 3 Data for non-Indigenous people are for 2011-12
 - 4 Ratios are age-standardised with the Indigenous proportion divided by the non-Indigenous proportion and based on the 2001 Australian estimated resident population (ERP)
 - 5 Blindness includes complete and partial blindness
 - 6 Other diseases of the eye and adnexa include: glaucoma, macular degeneration, astigmatism and presbyopia

Source: ABS, 2014 [140]

Among Aboriginal and Torres Strait Islander people who reported having diabetes, 29% reported having sight problems due to this condition [52]. After age-adjustment, this proportion was 2.6 times greater than the proportion reported by non-Indigenous people with diabetes.

The 2012-2013 AATSIHS provided some age-specific data for selected eye diseases [139]. The proportions of Aboriginal and Torres Strait Islander people reporting myopia or other diseases of the eye and adnexa are less in each age-group than those reported by their non-Indigenous people. Hyperopia is also less common among young Aboriginal and Torres Strait Islander people aged 0-14 and 15-24 years of age than among non-Indigenous young people in the same age-groups, but more common among Aboriginal and Torres Strait Islander people from 25 years of age onwards. Cataract and blindness are more common among Aboriginal and Torres Strait Islander people than among non-Indigenous people in all age-groups for which data are available.

Prevalence estimates of trachoma and trichiasis based on surveillance

The National Trachoma Surveillance and Reporting Unit provides prevalence data for trachoma detected through screening [162]. Preliminary data for trachoma are available for 2015, when screening and treatment was undertaken in at-risk communities in WA, SA and the NT. The estimated prevalence of active trachoma among children aged 5-9 years (using projected data) was 4.6%. Cases that were detected included 17 in WA, 51 in SA, and 52 in the NT. If left untreated, trachoma can cause scarring and in-turned eyelashes that lead to blindness (trichiasis) [154]. The most recent data for trichiasis are from 2014, when at risk communities in WA, SA and the NT were screened and the condition was detected in 0.05% of adults aged 15 years and over and 0.9% of those aged 40 years and over [163]. A total of 50 cases of trichiasis were detected (11 in WA, 12 in SA, and 27 in the NT).

General practice attendances and hospitalisation

Among Aboriginal and Torres Strait Islander patients, 1.1% of all problems that were managed by GPs in the period April 2008 to March 2013 were related to eye health [52, 67]. After age-adjustment, eye health problems among Aboriginal and Torres Strait Islander patients were managed by GPs at a similar rate as that for other patients (rate ratio: 1.0). However they were 3.5 times more likely than other patients to see GPs for the management of cataracts.

In 2014-15, there were 3,373 hospital separations for diseases of the eye and adnexa among Aboriginal and Torres Strait Islander people in Australia, accounting for 1.5% of separations, excluding dialysis, identified as Indigenous [51]. A more detailed analysis of hospitalisation data is available for the period 2011-12 to 2012-13. In this period, there were 5,674 hospitalisations for diseases of the eye and adnexa among Aboriginal and Torres Strait Islander people, the majority of which (58%) were for cataracts [52]. 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 0.7 and 0.8 respectively) [67]. Aboriginal and Torres Strait Islander people were less likely to be hospitalised for these eye conditions in non-remote areas than non-Indigenous people (rate ratio 0.7), but they were more likely to be hospitalised for them in remote and very remote areas (rate ratios of 1.2 and 1.5 respectively).

Ear health and hearing

There are three main parts of the ear (external, middle and inner ear) and diseases of the ear are classified according to the part where the disorder occurs [164]. Inflammation and infection of the middle ear, which are nearly always associated with fluid in the middle ear space, are referred to as otitis media (OM) [165].

OM can be caused by viruses or bacteria or both, and often occurs as a result of another illness such as a cold [164]. It can cause intermittent or persistent hearing impairment and the risk of permanent hearing loss increases if OM becomes chronic and is not

adequately treated and followed up. Persistent ear discharge through a perforation (hole) in the tympanic membrane (eardrum) is referred to as chronic suppurative otitis media (CSOM) [165].

The association of OM, particularly in suppurative forms, with impairment of hearing has major implications for language development, learning, behaviour and social skills [141, 166-169] and possibly contributes to poor education outcomes and unemployment [166, 170]. 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 [167].

As with many other areas of Aboriginal and Torres Strait Islander health, high rates of recurring ear infections are associated with poverty, crowded housing conditions, inadequate access to clean water and functional sewerage systems, nutritional problems, and poor access to health care [10]. A reduced risk of OM is associated with breastfeeding [10, 171].

Extent of ear disease among Aboriginal and Torres Strait Islander people

Prevalence

Exceptionally high levels of ear disease and hearing loss have been reported for many years in Aboriginal and Torres Strait Islander communities, particularly in remote areas [164, 166, 172-174]. The levels described among children living in some remote communities in northern and central Australia have been such that they would be classified by the WHO as being 'a massive public health problem' requiring 'urgent attention' [175, p.2]. Between September 2008 and August 2013, 90% of children under three years of age living in remote communities in the Top End region of Australia had some form of OM [176, 177] however, changes in vaccination schedules in the NT have been associated with a sustained improvement in the severity of OM seen in these children [178].

Diseases of the ear and mastoid and/or hearing problems were reported as a long-term health condition by 12% of Aboriginal and Torres Strait Islander people who participated in the 2012-2013 AATSIHS [179]. Ear/hearing problems were reported by the same proportion of those in non-remote areas and remote areas (both 12%). Ear/hearing problems were reported by 13% of males and by 12% of females. After age-adjustment, rates for ear and mastoid and/or hearing problems for Aboriginal and Torres Strait Islander people were higher than for non-Indigenous people, rate ratio: 1.3 (rate ratio for males: 1.2 and rate ratio for females: 1.5) in all age-groups under 55 years.

The proportion of Aboriginal and Torres Strait Islander people with ear/hearing problems increased with age, ranging from 7% of children aged 0-14 years, to 28% of those aged 55 years and over [179]. The same proportions of Aboriginal and Torres Strait Islander children aged 0-14 years were reported to have hearing loss (3%) and OM (3%). Hearing loss was the most commonly reported ear/hearing problem in all other age-groups, affecting between 7% of Aboriginal and Torres Strait Islander people aged 15-24 years and 26% of those aged 55 years and over.

Hearing health services funded by the Australian Government and implemented by the NT Government provided information for 2015-16 on audiology outreach services to 1,981 children and young people and 1,011 ear, nose and throat (ENT) services to 936 children and young people [180]. In 2015-16, of 2,010 children and young people aged 20 years and under who received an audiology or ENT service, 1,330 (66%) were diagnosed with at least one type of ear condition, the most common being otitis media with effusion (OME) (23%) followed by eustachian tube dysfunction (16%) and foreign body (16%). The prevalence of ear conditions ranged from 78% of those aged 3-5 years to 50% of those aged 16-20 years. Of those diagnosed with at least one ear condition, 66% experienced hearing loss. Rates of hearing loss were highest among those with CSOM with discharge (87%), OME (78%) and CSOM without discharge (77%). It was found that levels of hearing loss have recently improved slightly: in 2015-16, 49% of Aboriginal and Torres Strait Islander children had some type of hearing loss, compared with 52% in 2012-13, and 32% had a hearing impairment, compared with 37% in 2012-13.

Burden of hearing disorders

Hearing and vision disorders, which includes 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 [70].

General practice attendances and hospitalisation

According to Bettering the Evaluation of Care and Health (BEACH) survey data, the rates of GP attendance for the period from April 2008 to March 2013 were about the same for Aboriginal and Torres Strait Islander and non-Indigenous children aged 0-14 years for OM (70 per 1,000 encounters compared with 67 per 1,000 encounters), and similar for total diseases of the ear (107 per 1,000 encounters compared with 101 per 1,000 encounters) [67].

There were 2,657 hospital separations with principal diagnosis of diseases of the ear and mastoid process among Aboriginal and Torres Strait people in 2014-15 [51], representing 1.2% of all separations, excluding dialysis, among Aboriginal and Torres Strait Islander people (Derived from [51]). After age-adjustment, the hospitalisation rate for middle ear and mastoid conditions was 1.1 times higher for Aboriginal and Torres Strait Islander people than that for non-Indigenous people [51].

In 2014-15, the hospitalisation rate for middle ear and mastoid conditions for Aboriginal and Torres Strait Islander children aged 0-3 years was 9.5 per 1,000, slightly lower, 0.7 times, than the rate for non-Indigenous children (13 per 1,000) [10]. 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 and very remote area it was over twice as high (14 per 1,000 and 6.2 per 1,000 respectively) [10].

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' [181]. The two most common oral diseases are dental caries (tooth decay) and periodontal disease (gum disease) [182]. Caries is caused when bacteria in the mouth interact with sugars in foods to produce acids that degrade tooth enamel. Caries is reversible in its early stages, but, if untreated, can cause pain, abscesses and eventually lead to tooth loss. Periodontal disease is caused by bacterial infection associated with poor oral hygiene, infrequent dental visits, age, and smoking, and is related to health conditions including diabetes and CVD. Gingivitis, an inflammation of the gums, is an early reversible form of periodontal disease. Untreated gingivitis may lead to periodontitis, a serious gum infection.

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

Prevalence of self-reported oral health problems

The 2014-15 NATSISS collected data about the self-reported tooth or gum problems of Aboriginal and Torres Strait Islander children. The proportion of 4-14 year old children with reported tooth or gum problems was 34%, a decrease from 39% in 2008 [141].

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. In 2012-2013, 49% of adults reported no tooth loss; 47% had lost one or more teeth; and 4.7% reported complete tooth loss [52].

Prevalence of caries

A person's experience of caries is measured by the 'decayed missing and filled teeth' index (dmft) for deciduous (baby) teeth, and by the DMFT index for permanent (adult) teeth [183]. Both indices measure how many teeth (t/T) are decayed (d/D), missing (m/M) or filled (f/F), based on a clinical examination [184, 185]. Mean (average) dmft/DMFT is one indicator of caries severity.

Recent information about caries prevalence and severity among Aboriginal and Torres Strait Islander children undergoing school dental examinations is available for Qld, WA, SA, Tas, ACT and the NT [52]. In 2010, the proportion of Aboriginal and Torres Strait Islander children aged 5-10 years with no decayed, missing or filled deciduous teeth was 24%, compared with 45% of non-Indigenous children. The proportion of Aboriginal and Torres Strait Islander children aged 6-15 years with no decayed, missing or filled permanent teeth was 48%, compared with 63% of non-Indigenous children. The mean dmft for Aboriginal and Torres Strait Islander children aged 5-10 years was 3.8, compared with 2.2 for non-Indigenous children. The mean DMFT for Aboriginal and Torres Strait Islander children aged 6-15 years was 1.9, compared with 1.1 for non-Indigenous children.

National clinical data about caries among Aboriginal and Torres Strait Islander adults has not been collected for some time. The *National survey of adult oral health* (NSAOH), which includes a dental examination component, was last conducted in 2004-2006⁴³. In 2004-2006, Aboriginal and Torres Strait Islander people aged 15 years or older had 2.3 times more untreated caries than their non-Indigenous counterparts: 57% of Aboriginal and Torres Strait Islander adults and 25% of non-Indigenous adults had one or more teeth with untreated caries [187]. Aboriginal and Torres Strait Islander adults had more than three times the number of decayed tooth surfaces than non-Indigenous adults. Those aged 35-54 years had five times more decayed tooth surfaces than their non-Indigenous counterparts. A recent study of evidence published in peer-reviewed journals about the prevalence of clinically measured caries in Indigenous adults in Australia found that caries prevalence ranged from 46% to 93% [188].

Prevalence of periodontal diseases

Children are unlikely to develop severe periodontal disease but gingivitis is relatively common among Indigenous children, particularly older children [186]. The *National child oral health survey 2012-2014*, to be published shortly, should give a national picture of gingivitis levels among Aboriginal and Torres Strait Islander and non-Indigenous children. Early results from Queensland estimate gingivitis to be almost twice as prevalent among Aboriginal and Torres Strait Islander children aged 5-14 years (34%) as among non-Indigenous children of the same age (18%) [189].

As with caries, national clinical data about periodontal disease among Aboriginal and Torres Strait Islander adults has not been collected for some time. The 2004-2006 NSAOH found that 27% of Aboriginal and Torres Strait Islander people aged 15 years and older had

⁴³ Indigenous data from the 2004-2006 NSAOH should be interpreted with caution due to the very small number of Indigenous people sampled (n=87) and the method of sampling used [186].

gingivitis [187]. The prevalence of moderate or severe periodontitis was about 1.3 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people. A recent review of evidence published in peer-reviewed journals about the prevalence of clinically measured periodontal disease in Aboriginal and Torres Strait Islander people adults in Australia found that almost all rural-dwelling Aboriginal and Torres Strait Islander adults had periodontal disease [188].

Dentist visits and hospitalisation

In the 2012-2013 AATSIHS, around 4.8% of all Aboriginal and Torres Strait Islander people and 4.6% of children aged 2-14 years reported visiting a dental professional in the two weeks prior to the survey [190]. In the 2004-2006 NSAOH, 51% of Aboriginal and Torres Strait Islander adults reported visiting a dentist in the previous 12 months, and 43% reported usually visiting a dentist at least once per year [187].

National potentially 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 [10]. The hospitalisation rate for Aboriginal and Torres Strait Islander people living in remote areas was more than twice as high as for those in major cities [10]. 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 26).

Table 26. Age-specific hospital separation rates for dental conditions for children aged 0-14 years, by Indigenous status, and Indigenous: 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 Indigenous rate divided by the non-Indigenous rate

Source: Steering Committee for the Review of Government Service Provision, 2016 [10]

Aboriginal and Torres Strait Islander people undergo more intensive hospital dental treatments at younger ages than the general population [191]. In 2013-14, for all Australians, dental procedures requiring a general anaesthetic were most common in people 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 (11 per 1,000 people) [183].

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 [192]. It can be considered in terms of the nature of the impairment in body structure or function, a limitation in activities (such as mobility and communication), a restriction in participation (involvement in life situations, such as work, education and social interaction), and the affected person's physical and social environment [193, 194]. 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) [141].

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), which collects information about the prevalence of disability and also data about individuals' need for assistance with core activities [192]. Information about disability at a population level is also collected in Australia's five-yearly censuses [15] and information about disability among Aboriginal and Torres Strait Islander people is collected in surveys such as the 2014-2015 NATSISS [141]. Being based on self-reported information, each of these sources has limitations in capturing precise estimates of disability. This is particularly true for Aboriginal and Torres Strait Islander people, whose level of participation in surveys and censuses is lower than that of non-Indigenous people. Also, some Aboriginal and Torres Strait Islander people may perceive the concept of disability differently [195].

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 [193].

Extent of disability among Aboriginal and Torres Strait Islander people

Prevalence

In 2014-2015, 45% of Aboriginal and Torres Strait Islander people aged 15 years and over reported having experienced a disability (43% males and 47% females) [10, 141]. Needing most assistance, were the 8% of Aboriginal and Torres Strait Islander people reporting a profound or severe core activity restriction as result of their disability or a restrictive long-term condition. 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%) [141].

In 2012, the overall rate of disability among Aboriginal and Torres Strait Islander people was 23%, a slight change from 21% in 2009 [10]. In both 2009 and 2012, the rate of disability after age-adjustment for Aboriginal and Torres Strait Islander people was 1.7 times the rate for non-Indigenous people.

Services

Increasing the access to disability services for the Aboriginal and Torres Strait Islander population is one of the priority areas identified by the National disability agreement (NDA), developed by COAG to improve the outcomes for Aboriginal and Torres Strait Islander people with disability [196, 197]. 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 [198]. NDA services include accommodation support, community support, community access, respite and employment services [199].

As is the case with all health and related services, not all people who could benefit from the use of disability support services actually access them. To assess the level of use of disability services by Aboriginal and Torres Strait Islander people (and other 'special needs' groups), attention is directed to the 'potential population' of users: 'the number of people with the potential to require disability support services, including individuals who meet the service eligibility criteria but who do not demand these services' [200].

In 2014-15, 6% of service users were Aboriginal and Torres Strait Islander people, with most of these aged under 50 (84%) (Table 27) [201].

Table 27. Numbers and proportions (%) of disability services used, by Indigenous status, Australia, 2012-13 to 2014-15

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

Source: AIHW, 2016 [201]

In 2014-15, 40% of Aboriginal and Torres Strait Islander service users lived in major cities, compared with 68% of non-Indigenous service users [201]. A further 28% lived in an inner regional area, 20% lived in an outer regional area, and 13% lived in a remote or very remote area, these were higher proportions than for non-Indigenous service users (23%, 9%, and 1% respectively).

Education and employment

Aboriginal and Torres Strait Islander people with a disability tend to have poorer education, employment and income outcomes than Aboriginal and Torres Strait Islander people without a disability [10]. In 2014-15:

- 44% of Aboriginal and Torres Strait Islander people aged 20-24 years who had a profound or severe core activity limitation had attained at least a year 12 or equivalent or certificate level II or above, lower than the proportion without disability at 63%.
- 44% of Aboriginal and Torres Strait Islander people aged 15 years and over who had a profound or severe core activity limitation had left school at year 9 or below, twice the proportion of those without disability at 19%.
- Aboriginal and Torres Strait Islanders in the working age population (15-64 years of age) who had a profound or severe core activity restriction had a lower labour force participation rate (31%), and employment rate (19%) than those without disability (68% and 55% respectively).

A higher proportion of Aboriginal and Torres Strait Islander people aged 15 years and over with disability reported an equivalised household income in the lowest quintile (43%) compared with those without disability (33%) [10].

In 2014-15, around one-third (33%) of Aboriginal and Torres Strait Islander disability support service users aged 15 years and over were not in the labour force; this is consistent with non-Indigenous service users [201]. However, service users in the labour force (employed or looking for employment) were less likely to be employed than non-Indigenous people, 22% of those aged 15 and over who were in the labour force were employed, compared with 33% of non-Indigenous service users aged 15 and over who were in the labour force.

Communicable diseases

Communicable (infectious) diseases of particular relevance to Aboriginal and Torres Strait Islander people and discussed below include: tuberculosis, hepatitis (A, B, and C), sexually transmissible infections (STIs), human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS), *Haemophilus influenzae type b* (Hib), pneumococcal disease, meningococcal disease and skin infections [202]. Communicable diseases can be caused by bacteria (e.g. pertussis-whooping cough and tuberculosis), viruses (e.g. influenza and HIV), fungi (e.g. tinea), protozoan parasites (e.g. malaria) and larger parasites (e.g. head lice) [203]. Risk factors for communicable diseases vary according to the type of disease [202]. Improvements to sanitation, and the increased use of vaccination and antibiotics (for bacterial infections), have markedly reduced some infectious diseases in Australia [193, 204].

Information regarding specific communicable diseases comes from a variety of sources, including individual studies and the state and territory notifiable disease collections [205]. Data from state and territory collections are collected and published by the National Notifiable Disease Surveillance System (NNDSS) [205], but Indigenous status is often not reported for large proportions of notifications [206]. Information about some communicable diseases, of particular importance to Aboriginal and Torres Strait Islander people, is analysed and published by specialised external agencies, including the Kirby Institute, for STIs, hepatitis and HIV/AIDS [207] and the National Centre for Immunisation Research & Surveillance (NCIRS) for vaccine-preventable diseases [208].

Tuberculosis

Tuberculosis (TB) is primarily a lung infection caused by the inhalation of *Mycobacterium tuberculosis* bacteria [209]. The bacteria can penetrate the lungs and multiply, potentially causing a variety of symptoms including: coughing; weight loss; loss of appetite; fever; chills; and the coughing up of blood or sputum. The main risk factors for TB are: physical contact with another person with TB; overcrowding; malnutrition; tobacco use and alcohol use [210, 211]. People who are immune-compromised due to chronic diseases (e.g. diabetes and renal failure) are more at risk. Some of these risk factors are common in many Aboriginal and Torres Strait Islander communities. Another risk factor for TB is HIV infection.

Incidence

The most recent information available about TB among Indigenous people is for 2009-2013, when 158 (21%) of the 761 notifications of TB among Australian-born people in Australia were identified as Indigenous [212-215]. Around one-third (35%) of the new cases among Indigenous people were reported in the NT (56 cases), and around another one-third (32%) in Qld (51 cases) (Table 28).

Table 28. Numbers of new cases and crude notification rates of tuberculosis among Indigenous people, by jurisdiction, Australia, 2009-2013

Jurisdiction	Number	Rate
NSW	33	3.9
Vic	3	1.6
Qld	51	6.2
WA	9	2.3
SA	5	3.2
Tas	1	1.0
ACT	0	0.0
NT	56	16
Australia	158	5.5

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

2 Rates are crude incidence rates per 100,000 population

Source: Derived from Barry, 2012 [212], Bareja, 2014 [213], Bareja, 2014 [214], Toms, 2015 [215], ABS, 2009 [216], ABS, 2011 [217]

Australia-wide, the crude notification rate for TB in 2009-2013 was 5.5 cases per 100,000 population for Indigenous people; the crude notification rate was highest for the NT (16 cases per 100,000 population) (Derived from [212-217]). After age-adjustment, the notification rate for Indigenous people was 11.3 times higher than for Australian-born non-Indigenous people (Table 29).⁴⁴ 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 [212-217]).

⁴⁴ Reflecting the fact that the vast majority of new cases of TB in Australia are among people born overseas, particularly relatively recent arrivals from India, Vietnam, the Philippines and China, the analysis here compares the notification rates of Indigenous people with those of Australian-born non-Indigenous people.

Table 29. Numbers of new cases and notification rates of tuberculosis, by Indigenous status and age-group, and Indigenous: non-Indigenous rate ratios, Australia, 2009-2013

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-4	4	1.1	70	1.0	1.2
5-14	10	1.5	31	0.2	7.0
15-24	13	2.2	87	0.6	4.0
25-34	21	5.2	69	0.4	12.3
35-44	29	8.3	56	0.4	23.7
45-54	45	17	64	0.4	40.3
55-64	22	14	57	0.4	31.1
65+	14	14	169	1.1	12.9
All ages	158	5.5	603	0.5	11.3

Notes: 1 Rates are per 100,000 population
 2 Any discrepancy between the figures shown for 'All ages' and the sum of the number for the specific age-groups is due to age not being stated in the notification
 3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
 4 The rate ratio for 'All ages' is the standardised notification ratio, which is the number of Indigenous cases reported divided by the number expected if the Indigenous population had the same age-specific rates as the non-Indigenous population

Source: Derived from Barry, 2012 [212], Bareja, 2014 [213], Bareja, 2014 [214], Toms, 2015 [215], ABS, 2009 [216], ABS, 2011 [217]

Hospitalisation

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 [10]. This rate was over four times the hospitalisation rate for TB for non-Indigenous Australians (0.06 per 1,000), after age-adjustment. Hospitalisation rates for TB 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).

Hepatitis

Hepatitis is an inflammation of the liver, most commonly caused by a viral infection [218]. The hepatitis viruses identified most frequently are referred to as types A, B, C⁴⁵.

Hepatitis A

The hepatitis A virus (HAV) is an infection of the liver predominantly transmitted by the faecal-oral route, either through ingesting contaminated food or water or by direct contact with an infected person [219, 220], including sexual contact, particularly between men [219]. HAV is often asymptomatic among young children, but symptoms among older people may include fever, fatigue, nausea, diarrhoea, jaundice, and vomiting [220]. The mortality rate due to HAV is low.

The impact of HAV among Aboriginal and Torres Strait Islander people has declined markedly since 2000, particularly after the introduction in 2005 of HAV vaccination into the national childhood vaccination schedule for Aboriginal and Torres Strait Islander children living in Qld, WA, SA and the NT [208, 221]. Previously, HAV infections were much more common among Aboriginal and Torres Strait Islander children than among non-Indigenous children, particularly for those living in northern Qld, WA, SA and the NT [221]. Children aged 0-4 years were at greatest risk of HAV infection [221]. The vaccine has been shown to be at least 89% effective among Aboriginal and Torres Strait Islander people in the NT (compared with 72% effectiveness among non-Indigenous people) [220]. The decline in HAV among Aboriginal and Torres Strait Islander people is reflected in notification figures for the three-year period 2011-2013 when of the 498 notifications of HAV for people living in Australia, five were identified as Aboriginal and/or Torres Strait Islander (Derived from [222-224]).

Hepatitis B

Transmission of hepatitis B virus (HBV) is from contact with blood and other body fluids (semen, vaginal fluids and a low risk from saliva) from an infected individual, commonly through sexual contact or use of contaminated injecting equipment [225]. A mother may also transmit HBV to the fetus during pregnancy or to the infant during birth. Only 30-50% of people acutely infected with HBV will experience obvious symptoms, including jaundice, nausea, vomiting, and mild flu-like symptoms, but the virus can cause a more prolonged illness in which a person may look and feel well, but slowly develop chronic liver disease, cirrhosis, or liver cancer [219, 225].

In 2015, of the 6,502 people with newly acquired HBV in Australia⁴⁶, 221 (3%) were identified as Aboriginal and Torres Strait Islander⁴⁷ [207]. The age-standardised notification rate for Aboriginal and Torres Strait Islander people was three times higher than for non-Indigenous people (66 per 100,000 and 22 per 100,000 respectively). Over the five year period 2011-2015, there was a 22% decline in the notification rates for Aboriginal and Torres Strait Islander people from 85 per 100,000 in 2011 to 66 per 100,000 in 2015. It is suggested that this reduction is due to immunisation programs for HBV.

⁴⁵ There is little information about Hepatitis D and E for Aboriginal and Torres Strait Islander people.

⁴⁶ For 2011-2015, Aboriginal and Torres Strait Islander status was reported in ≥50% of HBV notifications per year in WA, SA, Tas, ACT and the NT [207].

⁴⁷ There were 4,070 (63%) notifications for which Indigenous status was not reported.

In 2015, the rates of newly diagnosed HBV among Aboriginal and Torres Strait Islander people were higher for males than females across most age-groups, particularly among males 30-39 years and 40-49 years [207]. Rates among Aboriginal and Torres Strait Islander males were higher than for non-Indigenous males (72 per 100,000 and 22 per 100,000 respectively). Rates for Aboriginal and Torres Strait Islander females were also higher than for non-Indigenous females (59 per 100,000 and 21 per 100,000 respectively).

In 2015, for Aboriginal and Torres Strait Islander people living in major cities and inner regional areas in WA, SA, Tas, ACT and the NT, rates of newly diagnosed HBV infection were similar or lower than for non-Indigenous people [207]. In outer regional, remote and very remote areas, Aboriginal and Torres Strait Islander rates of newly diagnosed HBV infection were 5, 10 and 28 times higher respectively than for non-Indigenous people.

Hepatitis C

Transmission of hepatitis C virus (HCV) typically occurs via blood-to-blood contact [207]. Injecting drug use and sharing unsterile injecting equipment are the most common reasons for contracting the virus [226]. The likelihood of transmission of HCV via sexual contact is generally very low [219]. Many people who are infected with HCV do not have symptoms [226, 227] and in many cases the virus is detected through blood tests for other medical matters [227]. Some people with HCV can live relatively normal lives, largely unaffected by the virus [228], but others may develop cirrhosis, liver cancer, or liver failure [226] [228]. New treatment for HCV is now available, direct-acting antiviral therapies have been found to be highly effective [226]. There is no vaccine to protect people against HCV [219].

In 2015, of the 10,790 people diagnosed with HCV in Australia, 929 (9%) were identified as Aboriginal and Torres Strait Islander⁴⁸ [207]. The age-standardised notification rate for HCV was almost five times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (167 per 100,000 and 36 per 100,000 respectively). For Aboriginal and Torres Strait Islander people, there was an increase in rates between 2011-2015 (2011: 117 per 100,000; 2015: 167 per 100,000), compared with a 10% decrease for non-Indigenous people (2011: 40 per 100,000; 2015: 36 per 100,000).

In 2015, the greatest disparities in age-specific rates of newly acquired HCV between Aboriginal and Torres Strait Islander males and non-Indigenous males were in the 15-19 and 20-29 years age-groups, 14 and 9 times higher respectively for Aboriginal and Torres Strait Islander males [207]. For females, differences in rates were greatest in the 20-29 age-group and 30-39 years age-group, these were both six times higher for Aboriginal and Torres Strait Islander females compared with non-Indigenous females.

The rates of newly diagnosed HCV infection for Aboriginal and Torres Strait Islander people in 2015 were highest for those living in major cities and inner regional areas, 14 and 7 times higher respectively than the rates reported for non-Indigenous people [207].

Haemophilus influenzae type b

Haemophilus influenzae type b (Hib) is a bacterium that can cause meningitis, epiglottitis, pneumonia, bacteraemia, cellulitis, osteomyelitis, pericarditis, and septic arthritis [208, 229]. Infants and children are particularly susceptible to Hib, which is serious in its invasive form [230, 231]. High rates of Hib carriage in the upper respiratory tract have been noted prior to cases of invasive disease [231]. Higher rates in Indigenous populations worldwide suggest socio-economic disadvantage, high rates of tobacco use and crowded living conditions, as probable causes [208].

Notifications of invasive Hib disease in Australia decreased by more than 95% following the commencement of nationally funded infant vaccination in 1993 [229]. The decline has been markedly evident in Aboriginal and Torres Strait Islander children, but they continue to be at higher risk of contracting Hib than non-Indigenous children [229, 232].

In 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 [233-235]). In this period, the average notification rate for the Aboriginal and Torres Strait Islander population was 5.3 times the rate in the total population (0.5 per 100,000 and 0.09 per 100,000 respectively).

In the period 2012-2014, infants (Indigenous and non-Indigenous) aged less than 12 months accounted for 16 (30%) of all cases (Derived from [233-235]). The highest notification rate for Hib was consistently in the 0-4 years age-group, which had an average rate of 0.5 per 100,000 in 2012-2014.

There were four deaths associated with Hib reported between 2012 and 2014. Two deaths were of adults over 60 years of age and two were of infants. Of these, one death was an Aboriginal and Torres Strait Islander infant who was unvaccinated [233-235].

Pneumococcal disease

Pneumococcal disease results from infection by the bacterium *Streptococcus pneumoniae* (also known as pneumococcus), which may cause pneumonia, OM or sinusitis when in the respiratory tract [236]. Invasive pneumococcal disease (IPD) occurs when the bacterium infects other normally sterile sites, such as blood and cerebrospinal fluid, causing bacteraemia and meningitis [229, 236]. Rates of IPD are highest in infants and older people [229]. Recognised risk factors for pneumococcal disease include: diabetes; chronic respiratory

48 For 2011-2015, Aboriginal and Torres Strait Islander status was reported in ≥50% of HCV notifications per year in WA, SA, Tas and the NT [207].

and cardiac diseases; other immune-compromised conditions; tobacco use; and high levels of alcohol consumption [208, 237-239]. In children, asthma, previous pneumonia, exposure to smoke and attendance at childcare increases susceptibility to IPD [238].

Nationally-funded vaccination for pneumococcal disease was made available in 1999 to Aboriginal and Torres Strait Islander adults aged 50 years and older and to Aboriginal and Torres Strait Islander people aged 15-49 years at high risk [208, 229]. In 2001, vaccination was funded for Aboriginal and Torres Strait Islander infants and young children and for all Australian children medically at risk. From 2005, nationally-funded vaccination was made available to all Australian infants and to all people aged 65 years and older, in addition to those eligible since 1999.

Detailed data are available for IPD because it has been a notifiable disease in Australia since 2001 [238]. Aboriginal and Torres Strait Islander people have a significantly higher incidence of IPD than non-Indigenous people, however the rate of IPD for Aboriginal and Torres Strait Islander people has decreased between 2011 and 2014 (Table 30) [233-235, 240].

Table 30. Age-adjusted notification rates for invasive pneumococcal disease, Aboriginal and Torres Strait Islander: non-Indigenous rate ratios, Australia, 2011-2014

Year	Aboriginal and Torres Strait Islander rate	Non-Indigenous rate	Rate ratio
2014	31	5.3	5.9
2013	32	5.2	6.2
2012	41	6.0	6.8
2011	53	6.7	8.0

Notes: 1 Rates are per 100,000 population

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

Sources: Derived from National Notifiable Diseases Surveillance System (NNDSS), 2016 [233], NNDSS, 2015 [234], NNDSS, 2015 [235], NNDSS, 2013 [240]

In 2013, the notification rate for IPD in Aboriginal and Torres Strait Islander children aged under five years (36 per 100,000) reached its lowest rate since 2005 [234].

Age-specific rates for IPD among Aboriginal and Torres Strait Islander people in 2007-2010, were highest in the 50 years and older age-group (53 per 100,000), followed by the 0-4 years age-group (51 per 100,000) [208]. Importantly, age-specific rates for Aboriginal and Torres Strait Islander people aged 25-49 years (45 per 100,000) were almost 12 times higher than for their non-Indigenous counterparts. To some degree, the high rate ratio in this age-group corresponds to the difference in the prevalence of adult risk factors between Aboriginal and Torres Strait Islander and non-Indigenous people.

After age-adjustment, the IPD hospitalisation rate for Aboriginal and Torres Strait Islander people living in NSW, Vic, Qld, WA, SA and the NT between 2005 and 2010 was 6.0 times higher than the rate for non-Indigenous people [208]. Among Aboriginal and Torres Strait Islander people, age-specific rates of hospitalisations for IPD were highest in the 0-4 years age-group (27 per 100,000), followed by the 25-49 years age-group (25 per 100,000) and the 50 years and older age-groups (24 per 100,000). Aboriginal and Torres Strait Islander people aged 25-49 years were hospitalised at a rate 14.2 times higher than for non-Indigenous people. Hospitalisation rates for pneumococcal pneumonia (not identified as IPD) were higher than those for IPD for Aboriginal and Torres Strait Islander adults and the elderly.

In 2006-2010, of the 575 reported deaths from IPD for people living in NSW, Qld, WA, SA and the NT, 34 (6%) were identified as Aboriginal and Torres Strait Islander [208]. In children under five years of age, there were 30 deaths notified; five (17%) of which were of Aboriginal and Torres Strait Islander children.

The most recent national mortality numbers for IPD among Aboriginal and Torres Strait Islander people is for 2011 and 2012 when there were 14 and 9 deaths respectively, attributed to IPD [238].

Meningococcal disease

Meningococcal disease is caused by the bacterium *Neisseria meningitidis* (also known as meningococcus) [229]. The most common clinical presentation of meningococcal disease is acute bacterial meningitis [208], other possible presentations are septicaemia (with or without meningitis), pneumonia, arthritis and conjunctivitis [208, 229]. Meningococcal infections can progress quickly, resulting in serious disease or deaths in otherwise healthy people [229].

Meningococcal disease is more common in infants, young children, adolescents and adults aged over 45 years [241]. Possible risk factors for the disease include: immuno-compromising diseases, living in crowded housing conditions, exposure to smokers, a recent respiratory illness and multiple kissing partners [229].

The most common groups of meningococcus found in Australia are serogroups⁴⁹ B, C, W and Y [241] with B responsible for most disease in both Aboriginal and Torres Strait Islander and non-Indigenous people [208]. Vaccination has reduced the burden of serogroup C in Australia and has been funded nationally for all infants since 2003 [241]. Although there is a vaccine for serogroup B, it is only available by private purchase and not available under the National Immunisation Program (NIP) [241].

⁴⁹ A serogroup is a group of bacteria containing a common antigen.

In 2015, there were 174 cases of invasive meningococcal disease notified in Australia (Indigenous status not specified) [241]. In 2014, there were 170 cases of invasive meningococcal disease notified in Australia with 21 cases (12%) identified as Aboriginal [233]; an increase from 2013 where 13 cases (8.7%) were identified as Aboriginal and one identified as Torres Strait Islander (0.7%) [234].

More detailed information is available for 2007-2010, where 104 (9.6%) of the 1,079 cases of meningococcal disease notified in Australia were identified as Aboriginal and Torres Strait Islander [208]. Around one-third (36%) of all cases were children (0-4 years); 60% of all cases identified as Aboriginal and Torres Strait Islander occurred among children aged 0-4 years. Rates generally decreased with age for both Aboriginal and Torres Strait Islander and non-Indigenous people. The average annual age-specific rate of 23 per 100,000 for Aboriginal and Torres Strait Islander children aged 0-4 years was 3.8 times that for non-Indigenous children aged 0-4 years; the rate for Aboriginal and Torres Strait Islander children aged 5-14 years was 4.1 times higher than for non-Indigenous children. After age-adjustment, the overall rate for Aboriginal and Torres Strait Islander people was 2.7 times that of other Australians.

In 2005-2010, of the 2,230 recorded hospitalisations for meningococcal disease for people living in NSW, Vic, Qld, WA, SA and NT, 189 (8.4%) were identified as Aboriginal and Torres Strait Islander [208]. Over one-third (37%) of cases were children (0-4 years), and 67% of all cases identified as Aboriginal and Torres Strait Islander occurred among children aged 0-4 years. After age-adjustment, the hospitalisation rate for meningococcal disease was 2.2 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people. Average annual age-specific rates for Aboriginal and Torres Strait Islander people were highest in the 0-4 years age-group (41 per 100,000); a rate 3.5 times higher than for non-Indigenous children.

In 2006-2010, there were 42 deaths from meningococcal infection for people living in NSW, Qld, WA, SA and the NT [208]. Among Aboriginal and Torres Strait Islander people, one to four deaths⁵⁰ were for children under five years and one to four deaths were for those aged 5-49 years; no deaths were recorded for those aged 50 years and older.

Sexually transmitted infections

Sexually transmissible infections (STIs) are spread primarily by heterosexual or homosexual contact with an infected person [202]. STIs are caused by microorganisms that are transmitted from one person to another through semen, fluid from the vagina, anal or throat secretions, and blood [242]. Some STIs can also be transmitted under some circumstances via skin to skin contact, or from mother to baby during pregnancy and/or birth. Young people under the age of 30 are particularly vulnerable to STI infections [243]. The use of condoms is regarded as fundamental in preventing STI transmission.

Many STIs are asymptomatic and at-risk individuals may not be diagnosed and treated unless they are tested frequently [244]. Early detection of STIs can ensure appropriate management to limit further transmission and prevent the development of complications. Contact tracing and partner notification enable diagnosis and treatment for people who may not realise that they have an STI and have the potential of reducing re-infection rates.

Many factors have been identified as contributing to the development of STIs. Factors that are particularly relevant to the Aboriginal and Torres Strait Islander population include: a younger more mobile population; socio-economic disadvantage; poor access to health services; and the lack of clinical staff who are experienced in sensitively managing sexual health issues [245, 246].

Variations in notification rates over time may reflect real changes in incidence, but can also be due to the introduction of easier and more sensitive testing procedures, changes in screening programs and public awareness campaigns [233]. The high level of screening in some Aboriginal and Torres Strait Islander communities probably contributes to the higher STI rates reported for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Gonorrhoea

Gonorrhoea is caused by the bacterium *Neisseria gonorrhoea* [207]. In females, gonorrhoea can affect the urethra, cervix, and rectum, and in males it can affect the urethra and rectum [247]. Gonorrhoea can also infect the throat. It is highly contagious and, if left untreated, the infection can cause pelvic inflammatory disease in females and may cause damage to the testes in males. Untreated gonorrhoea can also lead to infertility in both females and males.

In 2015, there were 3,518 gonorrhoea notifications for Aboriginal and Torres Strait Islander people accounting for 19% of the notifications in Australia (Indigenous status was not reported for 36% of notifications) [207]. The notification rate⁵¹ was 10 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (626 per 100,000 and 62 per 100,000 respectively).

In 2015, the majority (72%) of gonorrhoea notifications for the Aboriginal and Torres Strait Islander population occurred in the 15-29 years age-group, compared with 53% in the same age-group in the non-Indigenous population [207]. Since 2011, notification rates for gonorrhoea among Aboriginal and Torres Strait Islander people declined by 22%, whereas the rates among non-Indigenous people increased by 94% during the same period.

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

⁵⁰ The ABS only provides a range for numbers of deaths when actual numbers are low [208].

⁵¹ 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 per year for 2011-2015 [207].

four times the number reported for females [207]. 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.

Notification rates were substantially higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people in major cities (twice as high), and especially higher in outer regional, remote and very remote areas of Australia (20 times, 72 times and 32 times higher respectively) [207].

Syphilis

Syphilis, caused by the organism *Treponema pallidum*, is a complex infection that has four identified stages: primary, secondary, latent, and tertiary [248]. In the initial stage of the infection, syphilis causes painless ulcers or sores around the mouth or genital area. If detected early, syphilis can be easily treated but, if left untreated, the infection can be very serious causing damage to the central nervous system, heart, blood vessels, skin and bones [207]. For pregnant women, untreated syphilis poses further serious health threats as the infection can be passed on to the child, possibly resulting in physical deformities and brain damage [249].

In 2015, there were 433 syphilis notifications for Aboriginal and Torres Strait Islander people accounting for 16% of the notifications in Australia (Indigenous status was not reported for 8% of notifications) [207]. The syphilis notification rate⁵² for Aboriginal and Torres Strait Islander people was over six times higher than for non-Indigenous people (61 per 100,000 and 10 per 100,000 respectively).

In 2015, the syphilis notification rate for Aboriginal and Torres Strait Islander people was highest in the 20-29 years age-group (164 per 100,000 in males and 166 per 100,000 for females); and for non-Indigenous people, it was highest for the 30-39 years age-group for males (39 per 100,000), and the 20-29 years age-group for females (1.5 per 100,000) [207].

In 2015, the percentage of infectious syphilis notifications for Aboriginal and Torres Strait Islander people was slightly higher for males (55%) than for females (45%) [207]. A different pattern was observed for the non-Indigenous people with males accounting for 96% of diagnoses. This indicates that transmission of infectious syphilis is mainly through heterosexual contact in the Aboriginal and Torres Strait Islander population and through sex between males in the non-Indigenous population.

Notification rates for Aboriginal and Torres Strait Islander people were highest among remote, outer regional and very remote areas, with notification rates ranging from twice the rate in major cities up to 132 times the rate in remote areas for non-Indigenous people in the same areas [207].

Chlamydia

Chlamydia is an infection caused by *Chlamydia trachomatis* bacteria and is asymptomatic in about 80% of cases [207]. If symptoms do occur, they can include inflammation of the urethra causing pain and penile discharge in males. In females, the main symptoms are intermenstrual bleeding and dysuria (discomfort when urinating).

In 2015, there were 6,532 notifications of chlamydia for Aboriginal and Torres Strait Islander people accounting for 9% of the notifications in Australia (Indigenous status was not reported for 51% of notifications) [207]. Chlamydia was the second most reported notifiable disease in Australia. The notification rate⁵³ for chlamydia was more than three times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (1,325 per 100,000 compared with 391 per 100,000).

Chlamydia is typically diagnosed among young people in both the Aboriginal and Torres Strait Islander and non-Indigenous populations [207]. In 2015, people aged 15-29 years accounted for 82% of chlamydia notifications in the Aboriginal and Torres Strait Islander population and 78% 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 rate of chlamydia notifications in Aboriginal and Torres Strait Islander females aged 15-19 and the 20-29 years age-groups was four and three 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.

Notifications for chlamydia were twice as high in major cities for the Aboriginal and Torres Strait Islander population compared with the non-Indigenous population, also twice as high in inner regional areas, five times higher in outer regional areas, eight times higher in remote areas and six times higher in very remote areas [207].

Human papillomavirus and genital herpes

Human papillomavirus (HPV) and genital herpes (HSV-2) are common STIs in Australia, but they are not notifiable diseases so information is limited [243].

⁵² For 2006-2015, Aboriginal and Torres Strait Islander status was $\geq 50\%$ complete per year for syphilis notifications for all jurisdictions in Australia [207].

⁵³ Chlamydia notifications were based on data from Qld, WA, SA and the NT where Aboriginal and Torres Strait Islander status was $\geq 50\%$ complete per year for 2011-2015 [207].

HIV/AIDS

The human immunodeficiency virus (HIV) is a retrovirus that infects cells in the body's immune system [250]. The immune system becomes severely compromised if HIV is left untreated. This late stage of HIV is referred to as acquired immune deficiency syndrome (AIDS) and is life-threatening. Anti-retroviral therapy is a significant prevention approach to prevent the transmission of HIV.

HIV can be transmitted in three ways: unprotected sexual contact with an infected person; infected blood passing into another person's bloodstream; and an infected mother can pass HIV on to her child either during birth or through breast-feeding [251]. Unprotected anal sex presents the greatest risk of exposure to HIV. Other behaviours that can put people at high risk of HIV include: unprotected vaginal sex; unprotected oral sex; and sharing injecting equipment (such as syringes and needles).

To date, Australia has successfully prevented an uncontrolled spread of HIV, and the overall rates of HIV are low in comparison with other countries [87]. However, Aboriginal and Torres Strait Islander people are regarded as being at particular risk of HIV infection due to their higher rates of STIs in many remote and very remote communities, sharing of injecting equipment and over-representation in prisons and juvenile detention [252].

In 2015, there were 1,025 cases of newly diagnosed HIV infection in Australia of which 38 (4%) were among Aboriginal and Torres Strait Islander people [207]. Age-standardised rates of HIV diagnosis were 2.2 times higher for Aboriginal and Torres Strait Islander people than non-Indigenous people (6.8 per 100,000 and 3.1 per 100,000 respectively). Recent changes in the age-adjusted notification rates of newly diagnosed HIV infection in the Aboriginal and Torres Strait Islander population show that in 2006 the rate was 4.2 per 100,000, then rates mostly remained stable until 2011 increasing afterwards to reach 6.8 per 100,000 in 2015. In the same period, the rate remained relatively stable for the non-Indigenous population at 3.8 per 100,000 in 2006 and 3.1 per 100,000 in 2015.

In 2015, the median age of diagnosis among Aboriginal and Torres Strait Islander people was 38 years, and males accounted for 89% of new HIV cases (Derived from [207]). Rates among Aboriginal and Torres Strait Islander males were 12 per 100,000, and among non-Indigenous males 5.8 per 100,000. Rates among Aboriginal and Torres Strait Islander females and non-Indigenous females were lower than for the male populations, 1.4 per 100,000 and 0.5 per 100,000 respectively.

One-third of all new HIV infections among the Aboriginal and Torres Strait Islander population in 2015 were reported in Qld (34%) followed by Vic (18%) and WA (18%) (Derived from [207]). In the non-Indigenous population, of all new HIV infections, 35% were reported in NSW, followed by 28% in Vic and 19% in Qld (Derived from [207, 253]).

The highest rates of new HIV diagnoses for Aboriginal and Torres Strait Islander people were among those living in remote areas (9.5 per 100,000) (previously higher in urban areas), while for non-Indigenous people rates were highest in urban areas (2.9 per 100,000) [207]. The lowest rates among Aboriginal and Torres Strait Islander people were found in regional areas (7.4 per 100,000) and for non-Indigenous people rates were lowest in remote areas (1.0 per 100,000).

In terms of exposure to HIV, men who have sex with men accounted for 55% of new HIV cases among Aboriginal and Torres Strait Islander people in 2015 [207]. Heterosexual contact was also identified as a common form of exposure to HIV among Aboriginal and Torres Strait Islander people (18%). For the non-Indigenous population, 70% of all new HIV cases were attributed to the categories 'men who have sex with men' and 20% were attributed to 'heterosexual contact'.

The proportion of new HIV cases attributed to injecting drug use (excluding 'men who have sex with men') among Aboriginal and Torres Strait Islander people increased from 6% in 2012 to 23% in 2013 to 27% in 2014 followed by a drop to 16% in 2015 [207]. For the total population in 2015, illicit drug use was the exposure category responsible for 3% of new cases (excluding 'men who have sex with men') [253].

Information about the occurrence of AIDS among Aboriginal and Torres Strait Islander people in 2015 is not available, but the number of new AIDS cases for the total population in 2009 was 90 [254]. In 2009, there were nine deaths from AIDS in Australia.

Skin diseases, infections and infestations

While resource-poor environments are associated with an increased burden of skin infections and infestations [255-259], preventative, focused and collaborative programs based within remote Aboriginal communities have had positive outcomes [260-263].

Risk factors for impetigo include poverty, overcrowding, lack of water, poor hygiene, tropical climate, scabies and other conditions affecting skin integrity [255, 257, 261, 264, 265]. The Remote Aboriginal Swimming Pool (RASP) program in WA [266] addresses some of the risk factors of skin infections by providing clean water and promoting good hygiene.

Scabies is a skin disease caused by the mite *Sarcoptes scabiei* that produces skin inflammation and itching [267]. Scratching in response to a scabies infestation can result in impetigo⁵⁴, a bacterial infection of the skin [258, 267] and recent research suggests that scabies mites could also spread bacterial infection and promote bacterial growth [259, 269]. Impetigo in Aboriginal and Torres Strait Islander communities commonly involves GAS, which brings a risk of severe effects, including kidney disease and, probably, ARF and heart disease [257, 259, 261, 269-271].

⁵⁴ Impetigo is also referred to as skin sores, or the broader term, pyoderma, and these terms are commonly used interchangeably [268].

Prevalence

The most common skin infections affecting Aboriginal and Torres Strait Islander children are scabies and impetigo [259]. Scabies is endemic in some remote central and northern Aboriginal and Torres Strait Islander communities, affecting both adults and children. Most prevalence information is available about children [272, 273] and research indicates that the significant public health problem posed by skin infections afflicts infants within a few months of birth [264, 273, 274]. Aboriginal and Torres Strait Islander people, particularly those living in the high-rainfall, humid areas of northern Australia, are also vulnerable to a variety of fungal and related organisms [261]. The average monthly prevalence for pyoderma was 35% and for scabies 13% for Aboriginal and Torres Strait Islander children under 15 years of age screened between September 2004 and August 2007 in five remote NT communities for the East Arnhem Regional Healthy Skin Program (EARHSP) [263]. For children under three years of age, scabies prevalence was 23%, representing double that of children aged 3-14 years (11%). Nearly all children (92%) had presented with pyoderma and 35% with scabies once or more. A study of medical records for children born between 2001-2006 participating in the EARHSP found that 69% of children had presented with scabies and 82% had presented with skin sores during their first year of life [274]. Skin sores were seven times more likely to be present at the same time as scabies than it was if scabies was not evident [274]. Secondarily infected scabies was detected in almost 17% of Aboriginal and Torres Strait Islander children screened between November 2009 and November 2012 for the Skin Sore Trial, conducted in seven remote NT communities [257, 259].

Burden of disease

Skin disorders, which includes chronic and acute conditions, skin infections and scabies, was responsible for 1.3% of the total burden of disease among Aboriginal and Torres Strait Islander people in 2011, with the fatal burden comprising 7.7% of the total burden due to skin disorders, and skin infections making up 70% of this fatal burden [70].

Hospitalisation

There were 8,750 hospital separations with a principal diagnosis of 'diseases of the skin and subcutaneous tissue' among Aboriginal and Torres Strait Islander people in 2014-15 [51], representing 4.0% of all separations among Aboriginal and Torres Strait people (excluding dialysis) (Derived from [51]). After age-adjustment, the hospitalisation rate was 2.2 times higher for Aboriginal and Torres Strait Islander people than that for non-Indigenous people [51].

Between May 2011 and May 2013 in the NT, the annualised incidence of invasive GAS disease, with 96% of cases resulting in hospital admissions, was nearly eight times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (70 per 100,000 compared with 8.8 per 100,000) [275]. The site of first infection was most commonly the skin. In 2005-2009, 67% of cases of GAS bacteraemia determined from Royal Darwin Hospital admissions were in Aboriginal and Torres Strait Islander people, with recent or current scabies a risk factor in 30% of cases, and recent or current pyoderma in 66% of cases [276]. In 2006-2010, 10% of medical admissions to Mt Isa Hospital (Qld) for children aged under five years, were due to scabies or pyoderma, and all were Aboriginal and Torres Strait Islander children [277].

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 [193, 278-280]. The WHO describes the social determinants of health as the conditions in which people are born, grow, live, work and age [281]. A life course approach to ill-health, 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 [282]. The determinants of health, some of which are discussed in the *Historical context and social determinants of Aboriginal and Torres Strait Islander health* section, are shaped by a wider set of forces and systems, including policies, political systems and social norms [278, 281].

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 [283]. 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 [193]. It is important to note that risk is based on probability, or likelihood [284]. 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 [193, 285]. Recent research undertaken in WA emphasised the importance of having a strong cultural identity in enabling Aboriginal people to make healthy choices [286].

Environmental health

Environmental health refers to the physical, chemical and biological factors that may affect people in particular surroundings or settings [287]. Environmental factors can be associated with ill health conditions including intestinal and skin infections and some chronic diseases, for example, acute rheumatic fever, respiratory issues such as asthma and some cancers [288]. Aboriginal and Torres Strait Islander people are disproportionately affected by the diseases associated with environmental health due to: the remoteness of some communities; poor infrastructure; lack of access to tradespeople and repairs; and the cost of maintenance [288, 289].

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 acute rheumatic fever, 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 diseases, infections and infestations section*.

Housing

Housing issues such as overcrowding and poor infrastructure contribute significantly to the ill health of some Aboriginal and Torres Strait Islander people [141].

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 sharing⁵⁵ [290].

There have been some small decreases in overcrowding in Aboriginal and Torres Strait Islander households in recent years. The proportion of Aboriginal and Torres Strait Islander people living in overcrowded households in 2014-15 was 21%, this compares with 23% in 2012-13 and 28% in 2008 [10]. Overcrowding was significantly higher in remote and very remote areas, in 2014-15, 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 2004-05, 63% of Aboriginal and Torres Strait Islander people were living in an overcrowded household, decreasing to 49% in 2014-15. 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 2014-15 (18% and 5% respectively) [141].

The proportion of Aboriginal and Torres Strait Islander people reporting overcrowding as a stressor has also decreased over time. In 2014-15, 6.5% of Aboriginal and Torres Strait Islander people reported overcrowding as a stressor, which was a decrease from 21% in 2002 [10]. This decrease was consistent across both remote and non-remote areas, but particularly so for remote areas, which dropped from 42% in 2002, to 9.2% in 2014-15.

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 [291].

In 2014-15, 82% of Aboriginal and Torres Strait Islander households were living in houses of an acceptable standard⁵⁶ [10]. This proportion has remained relatively stable, with 78% of households living in houses of an acceptable standard in 2012-13, and 83% in 2008. In 2014-15, there was a substantial proportion of Aboriginal and Torres Strait Islander households living in a house with major structural problems, over one in four households (26%) reported structural issues within their dwelling. Dwellings with major structural problems increased with remoteness. 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 issue for Aboriginal and Torres Strait Islander dwellings was major cracks in the walls/floors (11%), walls or windows not straight (6.1%), and major plumbing problems (5.7%). The proportion of Aboriginal and Torres Strait Islander people living in a house with major structural problems has decreased in recent years, from 35% in 2012-13 to 26% in 2014-15.

In terms of access to household facilities, the majority of Aboriginal and Torres Strait Islander households across Australia in 2014-15 had access to working facilities, with over nine in ten households reporting functioning facilities [10]. This includes access to: working facilities for washing people (97%); working facilities for washing clothes and bedding (91%); working facilities for preparing food (92%) and working sewerage facilities (97%). Access to working facilities in remote and very remote areas was lower than in non-remote areas. These results have remained relatively stable since 2008. More national detailed data about access to clean water, working sewerage and electricity services are not available.

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 [10]. In remote and very remote areas, this increased to 4.0 times

⁵⁵ Demand sharing is mainly where resources and money are shared within an extended family group [290].

⁵⁶ Housing of an acceptable standard includes two components: working household facilities; and major structural components [10].

the rate of non-Indigenous people. Hospitalisation for scabies and acute rheumatic fever are 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 in recent years, with the rate for Aboriginal and Torres Strait Islander people 2.2 times higher than for non-Indigenous people in 2013-13.

Mortality

For 2010-2014, in NSW, Qld, WA, SA and the NT, 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 [10]. This is a decrease compared with 2003-2007, where Aboriginal and Torres Strait Islander people died at 1.8 times the rate of non-Indigenous people⁵⁷.

Nutrition

The nutritional status of Aboriginal and Torres Strait Islander people is influenced by many factors such as socio-economic disadvantage, and geographical, environmental, and social factors [292, 293]. Poor nutrition is an important factor contributing to overweight and obesity, malnutrition, CVD, type 2 diabetes, and tooth decay [293, 294]. The National Health and Medical Research Council (NHMRC) guidelines recommend that adults eat fruit and plenty of vegetables every day, selected from a wide variety of types and colours [295]. 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'⁵⁸ foods and drinks.

Fruit consumption

According to the 2012-2013 *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 [296]. 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 [297]. 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 (ratio 0.9) [55]. 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) [298]; 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 [297].

Vegetable consumption

According to the 2012-2013 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 [296]. 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 [297]. 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) [299]. 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) [55]. 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) [298].

Fruit and vegetable dietary behaviour and labour force

The 2012-2013 AATSIHS examined associations between dietary behaviour and labour force status and educational attainment [55]. After age-adjustment, unemployed Aboriginal and Torres Strait Islander people were more likely to have an inadequate daily fruit intake (63%) and inadequate vegetable intake (98%) than those who were employed (54% and 94% respectively) or not in the labour force (60% and 95% respectively). When considering educational levels, Aboriginal and Torres Strait Islander people who had completed year 10 or below were more likely to consume inadequate amounts of fruit (59%) and vegetables (95%) than those who had completed year 12 or equivalent (54% and 93% respectively).

Dairy food consumption

According to the 2012-2013 NATSINPAS, Aboriginal and Torres Strait Islander people averaged 1.2 serves per day of milk, yoghurt, cheese and alternatives [296]. 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, which was similar to the proportion of non-Indigenous people who consumed dairy foods (85%) [298]. 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).

⁵⁷ Due to 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.

⁵⁸ Foods that are energy dense but do not provide many/any nutrients [295].

Discretionary foods

According to the 2012-2013 NATSINPAS, discretionary foods⁵⁹ 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%) [298]. 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) [297]. 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) [298]. People in non-remote areas were more likely to consume all discretionary foods types than those in remote areas, except for non-alcoholic beverages.

Sugar consumption

The WHO recommends that both adults and children consume less than 10% of daily dietary energy from free sugars [301]. According to the 2012-2013 NATSINPAS, Aboriginal and Torres Strait Islander people consumed 111 grams (g) of total sugars per day on average [300]. Around two-thirds of this (75 g or 18 teaspoons of white sugar) was free sugars⁶⁰, which equated to an average of 14% of daily dietary energy from free sugars. Ninety-one percent (91%) of the free sugars were added⁶¹ sugars (Derived from [300]). 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 2012-2013 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) [297]. 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.

Almost half of Aboriginal and Torres Strait Islander people did not use salt in household cooking or preparing food (47%) [302]. This proportion was slightly higher for females than males (50% and 45% respectively), and higher for people living in non-remote areas compared with those in remote areas (48% and 44% respectively) and for children aged 2-18 years compared with people aged 19 years or older (51% and 44% respectively). For those who used salt in household cooking or preparing food, fewer people used iodised salt than non-iodised salt (21% and 24% respectively).

The average daily sodium intake was similar for Aboriginal and Torres Strait Islander people and non-Indigenous people (2,379 mg and 2,408 mg respectively) [297]. Males recorded a higher consumption of sodium than females in both populations.

Bush foods

Participants in the 2012-2013 NATSINPAS were asked about their consumption of foods that were naturally harvested or wild-caught, such as fish and seafood, wild harvested fruit and vegetables, reptiles and insects [298]. Aboriginal and Torres Strait Islander people in remote areas were more likely than their non-remote counterparts to eat non-commercially caught fin fish (7.8% and 1.8% respectively), crustacea and molluscs (1.2% and 0.3% respectively), wild harvested meat (7.7% and 0% respectively) and reptiles (3.9% and 0.1% respectively).

Biomarkers of nutrition

The 2012-2013 NATSIHMS collected information on biomarkers of nutrition, including vitamin D, anaemia and iodine [65]. It was found that:

- More than a quarter of Aboriginal and Torres Strait Islander adults (27%) had a vitamin D deficiency. After age-adjustment, Aboriginal and Torres Strait Islander people were only slightly more likely to have a vitamin D deficiency than non-Indigenous people (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 (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 [65].

59 Discretionary foods are energy dense, nutrient-poor foods that typically contain high levels of sugar, salt and fat [300].

60 Free sugars are added sugars plus those naturally occurring in honey, fruit juice and fruit concentrate [300].

61 Added sugars are added to foods during manufacture or by the consumer during food preparation or consumption [300].

Food security

The 2012-2013 NATSINPAS addressed the issue of food security by asking respondents if they had run out of food and couldn't afford to buy more in the last 12 months [303]. 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).

Burden of disease

Burden of disease analysis measures the impacts of diseases, injuries and risk factors on a population [70]. 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. 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. Around half of the health gap between Aboriginal and Torres Strait Islander people and non-Indigenous people (51%) is attributable to the 29 selected risk factors, with combined dietary factors contributing 27% of the gap.

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 [295, 304]. Breastfeeding promotes sensory and cognitive development and protects the infant against sudden infant death syndrome (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'. The WHO recommends exclusive breastfeeding for six months followed by complementary feeding with continued breastfeeding for up to two years or beyond. Breastfeeding contributes to the health of the mother by reducing the risk of ovarian and breast cancers.

According to the 2012-2013 AATSIHS, 83% of Aboriginal and Torres Strait Islander children aged 0-3 years had been breastfed, compared with 93% of non-Indigenous children [52]. Aboriginal and Torres Strait Islander children aged 0-3 years were 2.3 times more likely than non-Indigenous infants to have never been breastfed (17% compared with 7% respectively). Of those who had been breastfed, Aboriginal and Torres Strait Islander infants were more likely than non-Indigenous infants to have been breastfed for less than 1 month (16% compared with 10% respectively). Aboriginal and Torres Strait Islander infants were less likely than non-Indigenous infants to have been breastfed for 12 months or more (12% compared with 21% respectively). Breastfeeding rates of Aboriginal and Torres Strait Islander children aged 0-3 years did not vary significantly by remoteness, 82% in non-remote areas and 84% in remote areas were breastfed.

According to the 2010 *Australian national infant feeding survey*, breastfeeding initiation levels were similar among Indigenous and non-Indigenous mothers (87% and 90% respectively), but levels of exclusive breastfeeding declined more rapidly among Indigenous mothers (Derived from [305]). At 5 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 [306].

Commencing in 2008, the *Footprints in time – the longitudinal study of Indigenous children* collects data annually from 11 sites (rural, remote and urban) and up to 1,700 Aboriginal and Torres Strait Islander children and their families around Australia [307]. Data on breastfeeding from this study showed that 80% of Aboriginal and Torres Strait Islander children had been breastfed at some time during their early years, and 22% of infants had been breastfed for at least 12 months. This study found that children living in more remote areas had been breastfed for a slightly longer period of time than those living in other areas [308].

Physical activity

Physical activity is important for maintaining good overall health and wellbeing [309]. 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 [310]. However, doing any physical activity is better than doing none and the health benefits of physical activity are continuous, starting with any activity above zero. The benefits of regular physical activity include reductions in the risk of health conditions such as heart disease, type 2 diabetes, certain cancers, depression and some injuries [310, 311].

According to the 2012-2013 AATSIHS, 47% of Aboriginal and Torres Strait Islander people aged 18 years and over living in non-remote areas had met the target of 30 minutes of moderate intensity physical activity on most days (or a total of 150 minutes per week) [179]. A smaller proportion (41%) of Aboriginal and Torres Strait Islander adults had exercised for at least 150 minutes over five sessions in

the previous week. Over one-quarter (29%) of Aboriginal and Torres Strait Islander adults had exercised at a moderate level and 10% at a high level; these levels of physical activity were 0.9 and 0.6 times those of 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 [309].

Among Aboriginal and Torres Strait Islander adults living in non-remote areas, more males than females met the target of 150 minutes of moderate intensity exercise per week (52% compared with 42%) and had exercised for at least 150 minutes over five sessions in the previous week (45% compared with 38%) [179]. Aboriginal and Torres Strait Islander males in non-remote areas were significantly more likely than Aboriginal and Torres Strait Islander females to have exercised at moderate intensity (32% compared with 25%) and were twice as likely to have exercised at high intensity (14% compared with 7%) in the previous week [179, 309]. In remote areas, 55% of Aboriginal and Torres Strait Islander adults exceeded the recommended 30 minutes of physical activity and 21% did not participate in any physical activity on the day prior to the interview [309]. 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 [309].

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 [179]. A higher proportion of Aboriginal and Torres Strait Islander females than Aboriginal and Torres Strait Islander males were physically inactive (68% compared with 53%); this pattern was evident for all age-groups. 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 [309].

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) [309].

Aboriginal and Torres Strait Islander children aged 5-17 years living in non-remote areas spent an average of two hours per day participating in physical activity (exceeding the recommendation of one hour per day); this was 25 minutes more than their non-Indigenous counterparts [309]. 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 [309]. 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 aged 2-4 years (3.5 hours compared with 2.8 hours) [309]. 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 standard measure for classifying a person's weight status is body mass index (BMI) (BMI: weight in kilograms divided by height in metres squared) [312]. Being overweight (BMI 25 to 29) or obese (BMI of 30 or more) increases a person's risk for CVD, type 2 diabetes, certain cancers, and some musculoskeletal conditions. A high BMI can be a result of many factors, alone or in combination, such as poor nutrition, physical inactivity, socio-economic disadvantage, genetic predisposition, increased age, and alcohol use [193, 295, 312, 313]. Being underweight (BMI less than 18.5) [193] can also have adverse health consequences, including lower immunity (leading to increased susceptibility to some infectious diseases) and osteoporosis (bone loss) [295].

Abdominal obesity, a risk factor for the development of the metabolic syndrome, can be measured by waist circumference (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) [314].

Obesity and abdominal obesity, as measured by BMI and WC, have been shown to be risk factors for hypertension [315] and type 2 diabetes in Aboriginal and Torres Strait Islander people [316]. 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 [317-319]. It has been suggested that a BMI of 22 might be more appropriate than 25 as a measure of acceptable BMI for Aboriginal people [319]. There is also evidence that measuring the WHR in Indigenous people is more accurate and easier to measure than BMI. More recently, Hughes and colleagues have developed an equation for calculating fat free mass in Aboriginal

and Torres Strait Islander adults using the easily acquired variables of resistance⁶², height, weight, age and sex for use in the clinical assessment and management of obesity [320].

Nationally in 2012-13, 69% of Aboriginal and Torres Strait Islander people aged over 18 years were considered to be overweight (29%) or obese (40%) [10]. A further 28% were normal weight and 3% were underweight. More Aboriginal and Torres Strait Islander males than Aboriginal and Torres Strait Islander 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 non-Indigenous people (rate ratio 1.2). Aboriginal and Torres Strait Islander people were 1.6 times as likely as non-Indigenous people to be obese (rate ratio 1.4 for males and 1.7 for females) [321].

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 [321]. 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 2012-2013 AATSIHS (not collected in the previous health survey) to help determine levels of risk for developing certain chronic diseases [322]. 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 2012-2013 AATSIHS, based on BMI information, around 30% of Aboriginal and Torres Strait Islander children aged 2-14 years were overweight (20%) or obese (10%), 62% were in the normal weight range, and 8% were underweight [55]. 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 boys and girls: boys 10% compared with 6% respectively; and girls 11% compared with 7% respectively).

Similar to this, a study of a child health program in remote central Australia in 2010 found that 21% of the Aboriginal children aged 3-17 years were overweight and 5.4% were obese (there was no difference in the prevalence between boys and girls) [323].

A 2003 study of 277 Indigenous children aged 5-17 years in the Torres Strait found that 46% were overweight or obese and 35% had abdominal obesity [324]. Girls had higher levels of abdominal obesity (50%) than boys (18%). The study also found a consistent association between overweight/obesity and low levels of physical activity.

From 1997 to 2010, overweight/obesity and WHR increased more rapidly in Aboriginal children aged 5-16 years than in non-Aboriginal children in the same age-group in NSW [325]. It was identified that a lack of daily breakfast, excessive screen time and soft drink consumption were major risk factors and suggested that encouraging strategies to limit screen time held promise.

Immunisation

In recent decades, vaccination has been very successful in contributing to improvements in Aboriginal and Torres Strait Islander health and child survival [229]. 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 [326]. The NIP schedule for the Australian population recommends vaccinations at different stages of life and additional recommendations for specific high risk populations, these include: hepatitis A; hepatitis B; diphtheria; tetanus; whooping cough; *Haemophilus influenzae type b*; polio; pneumococcal conjugate; rotavirus; meningococcal C; measles; mumps and rubella (MMR); varicella (chickenpox); HPV and influenza [229]. Due to some vaccine-preventable diseases still being experienced at higher rates among Aboriginal and Torres Strait Islander people, other supplementary vaccines⁶³ are also specifically prescribed depending on age, location and health risk factors.

Childhood vaccination

Nationally, in late 2014 it was agreed by the Australian Chief Medical Officer and other chief health officers to set a goal of having 95% of children fully immunised in line with the schedule's recommendations relevant to their age [327]. The NIP for all children includes vaccines for hepatitis B, diphtheria-tetanus-pertussis (DTP), Hib, MMR, pneumococcal disease, meningococcal C, varicella (chickenpox), rotavirus, HPV, and influenza [229]. Across primary health networks in 2014-15, percentages for Aboriginal and Torres Strait Islander children fully immunised were highest among five years old children when compared to one and two year-olds [327].

⁶² 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.

⁶³ These include vaccinations for Bacille Calmette-Guérin (BCG) for newly born babies living in areas of high TB incidence, hepatitis A for children living in Qld, WA, SA and the NT, hepatitis B for adults not previously vaccinated against hepatitis B, influenza for all persons aged 6 months or over, pneumococcal conjugate for children living in Qld, WA, SA and the NT and pneumococcal polysaccharide for persons aged 15-49 years old with underlying conditions increasing the risk of invasive pneumococcal disease (IPD) and all persons aged 50 years and older [229].

Data from the Australia Childhood Immunisation Register (ACIR) for December 2015 and March, June and September 2016, showed that coverage estimates for fully immunised Aboriginal and Torres Strait Islander children were [229]:

- 91% by 12 months
- 88% by 24 months
- 95% by 60 months.

According to the to the ACIR, the national coverage for fully immunised Aboriginal and Torres Strait Islander children has increased for the following age-groups; the 12 month cohort by 0.7%, the 24 month cohort by 0.8% and the 60 month cohort by 0.5%.

Adult vaccination

Vaccinations for hepatitis B, influenza and pneumococcal disease are recommended for Aboriginal and Torres Strait Islander adults. Due to the high rates of mortality and morbidity associated with hepatitis B in Aboriginal and Torres Strait Islander people, it is important that they are tested for hepatitis B infection, and be offered vaccination if they are not immune. Vaccination for influenza and pneumonia is recommended for Aboriginal and Torres Strait Islander people aged 50 years and over and for non-Indigenous people aged 65 years and over [18]. The 2012-2013 AATSIHS found that for Aboriginal and Torres Strait Islander adults aged 50 years and older, influenza vaccination in the previous 12 months was reported by: 51% of adults aged between 50-64 years old, 74% of adults aged 65 years and above, and overall 57% of adults aged 50 years and older. 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 [37]. Tobacco use is also a risk factor for complications during pregnancy and is associated with preterm birth, LBW, and perinatal death. Environmental tobacco smoke (passive smoking) is of concern to health, with children particularly susceptible to resultant problems that include middle ear infections, asthma, and SIDS.

Extent of tobacco use among Aboriginal and Torres Strait Islander people

The 2014-2015 NATSISS found that 39% of Aboriginal and Torres Strait Islander people aged 15 years and over reported that they were current daily smokers [141]. This represents a significant reduction from levels reported in the 2008 NATSISS (45%) and 2002 (49%).

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%) [141]. 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 terms of age, the group with the highest proportion of current daily smokers was the 35-44 years age-group (47%). When comparing by sex, 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).

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%) [141]. 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 2014-2015 NATSISS and the 2008 NATSISS, the highest reductions have been found in the younger age-groups [141]. In 2008, the proportion of 15-24 year-olds smoking 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.

This drop in smoking among these age-groups is reflected in the increased prevalence of young people who have 'never smoked'. The 2014-2015 NATSISS found that 36% of Aboriginal and Torres Strait Islander people had never smoked, compared with 34% in 2008 and 33% in 2002 [141, 328].

High rates of smoking have been reported for Aboriginal and Torres Strait Islander mothers [35]. In 2014, almost half of Aboriginal and Torres Strait Islander mothers (45%) reported smoking during pregnancy, compared with 13% of non-Indigenous mothers. The proportion of smoking cessation for Aboriginal and Torres Strait Islander women during the second 20 weeks of pregnancy was 12%, compared with 24% 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) [141]. For those children living with a daily smoker, 13% were living in households where people smoked indoors.

Burden of disease

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 [70]. 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

Alcohol-related harm includes chronic diseases, accidents and injury, and is not limited to the user but extends to families and the broader community [329]. Consumption of alcohol in pregnancy can affect the unborn child 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 [330, 331].

Surveys have consistently shown that Aboriginal and Torres Strait Islander people are less likely to drink alcohol than non-Indigenous people, but those who do drink are more likely to consume it at harmful levels [37, 332, 333].

Extent of alcohol use among Aboriginal and Torres Strait Islander people

Assessing risks from use of alcohol

In 2009, the NHMRC introduced revised guidelines that depart from specifying 'risky' and 'high risk' levels of drinking [329]. The revised guidelines seek to estimate the overall risk of alcohol-related harm over a lifetime and to reduce the level of risk to one death for every 100 people. For males and females:

- guideline one states that to reduce the risk of alcohol-related harm over a lifetime, no more than two standard drinks should be consumed on any day
- guideline two states that to reduce the risk of injury on a single occasion of drinking, no more than four standard drinks should be consumed
- guideline three recommends that the safest option is not drinking alcohol for those aged under 15 years and delaying alcohol use for as long as possible for those aged 15 to 17 years
- guideline four recommends that the safest option for pregnant and breastfeeding women is not to drink alcohol.

Abstinence or no consumption of alcohol in the last 12 months

In the 2012-2013 AATSIHS, 23% of Aboriginal and Torres Strait Islander people aged 18 years or older had never consumed alcohol or had not done so for more than 12 months [334]. After age-adjustment, abstinence was 1.6 times more common among Aboriginal and Torres Strait Islander people than among non-Indigenous people. The abstinence difference was mostly attributed to those Aboriginal and Torres Strait Islander people who had stopped drinking for at least 12 months (16% of Aboriginal and Torres Strait Islander people and 7% of non-Indigenous people). Similar proportions of Aboriginal and Torres Strait Islander and non-Indigenous people have never consumed alcohol (10% and 8.9% respectively).

The 2012-2013 AATSIHS found that 17% of Aboriginal and Torres Strait Islander males and 28% of Aboriginal and Torres Strait Islander females aged 18 years or older had never consumed alcohol or had not done so in the previous 12 months [334]. After age-adjustment, abstinence was 1.7 times and 1.5 times more common among Aboriginal and Torres Strait Islander males and females than among non-Indigenous males and females (20% and 32% compared with 12% and 21% respectively). Again, this difference in abstinence between Aboriginal and Torres Strait Islander males and females and non-Indigenous males and females is mostly attributable to those who consumed alcohol 12 months or more ago (15% and 17% compared with 6.0% and 8.7% respectively).

Short-term and single occasion risk

The 2012-2013 AATSIHS reported that 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) [334].

Similar proportions of Aboriginal and Torres Strait Islander and non-Indigenous people exceeded the 2009 guidelines for drinking at short-term/single occasion risk (52% and 45% respectively after age-adjustment) [334]. 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).

The proportion of Aboriginal and Torres Strait people exceeding the guidelines for single occasion risk was lower in very remote areas compared with other areas [18].

Lifetime risk

According to the 2013 *National drug household survey* (NDSHS), between 2010 and 2013 there was a significant decline for risky drinking in the proportion (from 32% to 23%) of Indigenous people 14 years and older exceeding the 2009 NHMRC guidelines for lifetime risk⁶⁴ [333]. Findings from the 2012-2013 AATSIHS show that among Aboriginal and Torres Strait Islander people aged 18 years and over who consumed alcohol, 20% drank at levels exceeding the 2009 guidelines for long-term/lifetime drinking risk [335]. After age-adjustment, lifetime drinking risk was similar for both Aboriginal and Torres Strait Islander people and non-Indigenous people (ratio 1.0). Aboriginal

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

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 in very remote areas has been found to exceed the guidelines for lifetime risk when compared with proportions in other areas (specifically inner regional and remote areas) [18].

Alcohol and pregnancy

According to the 2008 NATSISS, 80% of mothers of Indigenous children aged 0-3 years did not drink during pregnancy, 16% drank less alcohol than usual, and 3.3% drank the same or more alcohol during pregnancy [336]. The proportion of mothers who drank the same or more alcohol during pregnancy was greatest in Tas/ACT (6.0%), followed by Vic (5.4%), and WA (5.0%).

Burden of disease

In 2011, alcohol use was responsible for 8.3% of the total burden of disease among Aboriginal and Torres Strait Islander people [70]. The highest levels of disease burden attributable to alcohol use among Aboriginal and Torres Strait Islander people were for mental and substance use disorders (22%), injury (19%), and gastrointestinal diseases (15%).

Hospitalisation

For 2011-12 to 2012-13, there were 9,995 hospitalisations of Aboriginal and Torres Strait Islander people for alcohol-related diagnoses, after age-adjustment, the rate was 9.3 per 1,000, which was 4.1 times the rate for non-Indigenous people [52]. Aboriginal and Torres Strait Islander males were hospitalised at 4.5 times the rate for non-Indigenous males and Aboriginal and Torres Strait Islander females were hospitalised at 3.6 times the rate for non-Indigenous females.

For 2011-12 to 2012-13, in inner regional areas, Aboriginal and Torres Strait Islander people were hospitalised for alcohol-related diagnoses at 2.9 times the rate for non-Indigenous people [52]. In remote areas, Aboriginal and Torres Strait Islander people were hospitalised for alcohol-related diagnoses at 9.3 times the rate for non-Indigenous people.

Among Aboriginal and Torres Strait Islander people living in NSW, Vic, Qld, WA, SA and the NT, between 2004-2005 and 2012-2013, age-adjusted hospital separations due to acute intoxication increased from 2.1 per 1,000 to 5.4 per 1,000 [18]. This was an increase from 5.7 to 12 times the rates for non-Indigenous people. In 2012-13, the highest rate of hospital separations related to alcohol use for Aboriginal and Torres Strait Islander people was for mental/behavioural disorders (8.3 per 1,000) which was 4.2 times the rate of non-Indigenous people.

Hospital separation rates related to alcohol use due to acute intoxication for Aboriginal and Torres Strait Islander people in 2012-13 varied by level of remoteness [18]. Aboriginal and Torres Strait Islander people living in remote and very remote areas had the highest rate of hospitalisation due to acute intoxication (9.9 per 1,000) while Aboriginal and Torres Strait Islander people in inner and outer regional areas had the lowest (3.4 per 1,000).

Mortality

From 2008-2012, after age-adjustment, the Aboriginal and Torres Strait Islander death rate due to alcohol was 4.9 times greater than that for non-Indigenous people (22 per 100,000 in NSW, Qld, WA, SA and NT combined compared with 4.5 per 100,000 for non-Indigenous people) [18, 337]. Aboriginal and Torres Strait Islander males were 2.5 times more likely to die due to alcohol use compared with Aboriginal and Torres Strait Islander females. The NT had the highest Aboriginal and Torres Strait Islander death rate from alcohol (37 per 100,000) which was 5.1 times the rate for non-Indigenous people in the NT.

Illicit substance use

Illicit substance use describes the use of drugs that are illegal to possess (e.g. cannabis, heroin, ecstasy, and methamphetamine), and the non-medical use of prescribed drugs such as painkillers [10, 338]. Illicit substance use is associated with an increased risk of mental illness, poisoning, self-harm, infection with blood borne viruses from unsafe injection practices and death [339] [10].

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

Surveys consistently show that most Aboriginal and Torres Strait Islander people do not use illicit drugs [141, 340]. The two most recent national surveys to collect this data, the 2014-2015 NATSISS and the 2012-2013 AATSIHS, found that 69% and 52% respectively of Aboriginal and Torres Strait Islander people aged 15 years and older had never used illicit substances.

The 2014-2015 NATSISS found that 30% of Aboriginal and Torres Strait Islander people reported using substances in the last 12 months, an increase from 23% in the 2008 NATSISS [141, 341].

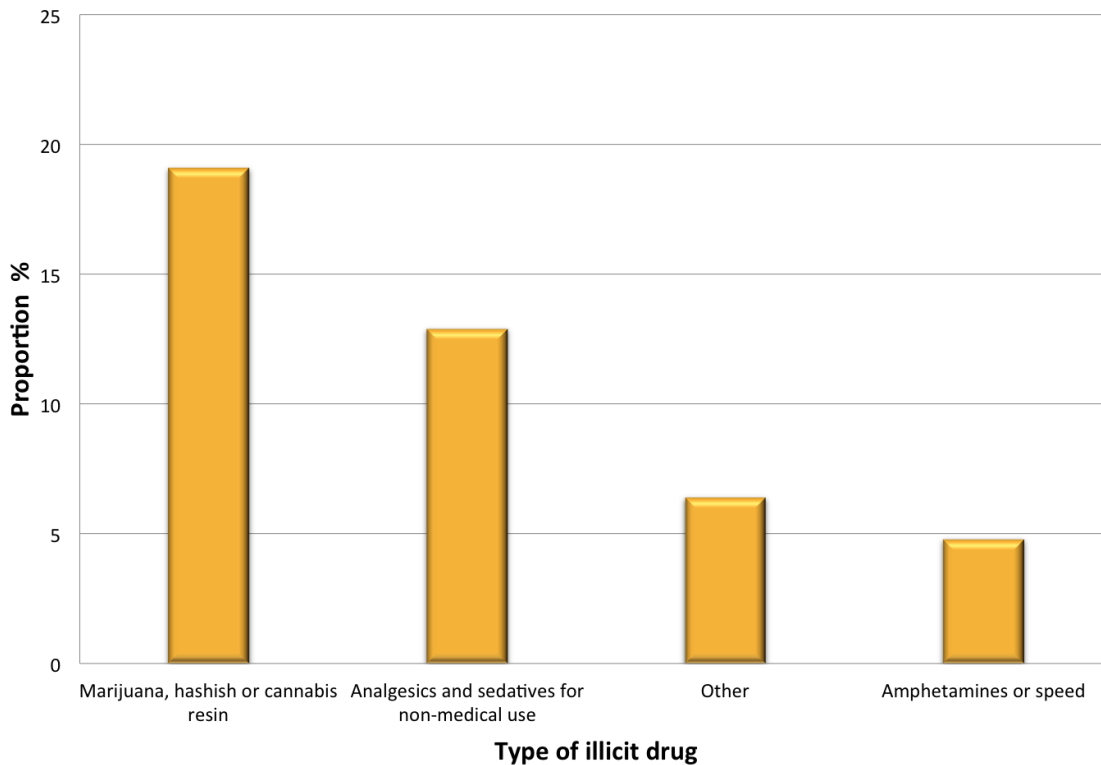
The 2012-2013 AATSIHS reported that 22% of Aboriginal and Torres Strait Islander people aged 15 years and over had used an illicit substance in the previous 12 months [340]. Similarly, after age-adjustment, the 2013 NDSHS found that 23% of Aboriginal and Torres Strait Islander people aged 14 years and older had 'recently used' an illicit substance, compared with 15% of non-Indigenous people [333].⁶⁵

⁶⁵ Because of the small sample size, comparison of data between Aboriginal and Torres Strait Islander people and non-Indigenous people should be viewed with caution.

When comparing different age cohorts, the 2012-2013 AATSIHS found that the level of illicit substance use in the previous 12 months was highest among younger age-groups and decreased as people aged: 28% in the 15-24 years age-group; 27% in the 25-34 years age-group; 23% in the 35-44 age-group, 19% in the 45-54 years age-group; and 7.0% in the 55 years and older age-group [340].

The 2014-2015 NATSISS found that marijuana (marijuana, hashish or cannabis resin) was the most commonly used illicit substance, used by 19% of Aboriginal and Torres Strait Islander people aged 15 years and over in the previous 12 months (Figure 3) [141]. This was followed by analgesics and sedatives for non-medical use (13%), and 'other' drugs (heroin, cocaine, petrol, LSD/synthetic hallucinogens, naturally occurring hallucinogens, ecstasy/designer drugs, methadone and kava) (6.4%). In addition, 4.8% of Aboriginal and Torres Strait Islander people reported using amphetamines compared with 4.0% in the 2008 NATSISS [341].

Figure 3. Proportion of Aboriginal and Torres Strait Islander people who reported substance 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 [141]

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) [141]. 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 10% 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 (9% compared with 5%). Use of illicit drugs in the previous 12 months was greater among Aboriginal and Torres Strait Islander 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 2014-15, among people using specialist alcohol and other drug treatment services, 15% of clients seeking treatment for their own drug use were Aboriginal and Torres Strait Islander people and 10% of clients receiving support for someone else's drug use were Aboriginal and Torres Strait Islander people [342]. The principal illicit drugs of concern for both Aboriginal and Torres Strait Islander and non-Indigenous clients seeking treatment were cannabis (24%), amphetamines (20%) and heroin (6.1%).

For the 5 year period April 2008-March 2013, GPs managed drug use for Aboriginal and Torres Strait Islander patients at an age-adjusted rate of 10 per 1,000 encounters [52].

Burden of disease

In 2011, illicit substance 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 [70, 343]. The highest level of disease burden for Aboriginal and Torres Strait Islander people attributable to illicit substances 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 substance use contributed 5.9% to the burden of disease for mental health for both Aboriginal and Torres Strait Islander and the total population.

Hospitalisation

In 2014-2015, the most common drug-related conditions resulting in hospitalisation for Aboriginal and Torres Strait Islander people were for 'poisoning' and 'mental and behavioural disorders' [141]. 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 amphetamines⁶⁶ 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) [141].

Mortality

The rate of drug-induced deaths was around 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 for the period 2010-2014 (Table 31) [10]. Rates of drug-induced deaths for Aboriginal and Torres Strait Islander people in SA were significantly higher than those in other states and territories. The rate of drug-induced deaths for Aboriginal and Torres Strait Islander males (14 per 100,000) was higher than for females (10 per 100,000).

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, 2014 [18]

Volatile substance use

Volatile substance use (VSU) involves the inhaling of chemical compounds that give off fumes at room temperature such as solvents (e.g. petrol and glue), gases (e.g. lighter fuels) and aerosols (sprays containing propellants e.g. paints) [344]. They are also called 'inhalants' in recognition of their route of administration through the nose and mouth. They are central nervous system depressants, and their use involves deliberate inhalation to produce a state of altered consciousness or intoxication [345, 346]. With short lasting effects, users continue to inhale for hours to extend the feelings and this long-term use increases the risk of losing consciousness or suffocation.

VSU can cause hangover headaches and drowsiness which can last for hours or days and also damage the kidneys, liver, heart and lungs and can cause hearing loss and bone marrow damage [346, 347]. There is also growing acknowledgement that excessive harmful inhalant use can lead to permanent acquired brain injury [348]. Petrol sniffing is the use of one of most dangerous volatile substances and can have long-term health risks, especially relating to tetraethyl lead found in leaded petrol (no longer sold in Australia) [349].

Extent of VSU use among Aboriginal and Torres Strait Islander people

There are limited data about VSU in Australia as it is not a criminal offence and the data collected do not always include Indigenous status. It is known that VSU is an issue of concern to Aboriginal and Torres Strait Islander people as well as to non-Indigenous people [350]. Although there has been significant progress, particularly in remote Aboriginal communities, in recent years (based on reviews, reports and enquiries conducted over the past three decades which highlight VSU as a critical issue), there is still much to be done [351-357].

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 [357]. 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 low aromatic fuel (LAF).

The 2012-2013 AATSIHS reported that 6.6% of males and 4.2% of females had ever used petrol or other inhalants [52].

⁶⁶ ICD code F15 hospitalisation from use of other stimulants includes amphetamine-related disorders and caffeine but not cocaine.

Hospitalisation

There is no current systematic collection of VSU-associated mortality or morbidity data in Australia at the state, territory or national level. Volatile substance users typically present to health services with illnesses such as pneumonia or injuries such as burns caused by VSU, but the record only reflects the presenting problem [344].

The national rate of hospital separations in 2014-15 related to drug use due to poisoning and the toxic effects of organic solvents was 3.9 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people. For accidental poisoning due to organic solvents, including petroleum derivatives, the rate was 5.1 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people and for glues and paints it was 2.0 times higher than for non-Indigenous people [10].

A way of calculating Aboriginal and Torres Strait Islander hospital admissions attributable to petrol sniffing is through the aetiological fraction methodology which uses epidemiological studies to determine the proportion of a health condition attributable to various risk factors [358]. Petrol sniffing is a risk factor in the Australian Refined Diagnosis Related Groups (AR-DRG) codes⁶⁷, which provide information on the diagnosis/intervention for that hospital admission. When the relevant aetiological fractions are applied to the 282 Indigenous admissions in 2007-08, 77.4 (27%) can be attributed wholly to petrol sniffing [358].

Mortality

As previously noted, 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 [359]. 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 the underestimation of VSU mortality and morbidity rates.

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 [358, 360, 361].

Concluding comments

The 13th February, 2017 marked the 9th anniversary of the Apology to Aboriginal and Torres Strait Islander people by former Prime Minister, Kevin Rudd. Expectations for improvement in the lives of Aboriginal and Torres Strait Islander people and communities were high yet the latest *Closing the gap: Prime Minister's report 2017* [362] suggests that we are still below expectations on most targets. The Redfern Statement [363] states that the challenges facing Aboriginal and Torres Strait Islander people remain at the margins of national debate [363 p.2]. The national peak bodies that came together to formulate the Redfern Statement have been unequivocal and forthright in their assertion and belief that urgent government action must be underpinned by a firm commitment to support Aboriginal and Torres Strait Islander stewardship and leadership in both the debate and the actions to progress our national aspirations to close the gap between Aboriginal and Torres Strait Islander people and other Australians.

As reported in our *Overview* last year, regrettably it is still clear that Aboriginal and Torres Strait Islander people remain the least healthy sub-population in Australia. However, since last year there has been an even greater shift in the rhetoric from a deficit based narrative towards a fuller appreciation of the importance of focusing on Aboriginal and Torres Strait Islander led strengths based approaches [363]. The Redfern Statement asserts that 'it is time that Aboriginal and Torres Strait Islander voices are heard and respected' and that its plans for action 'are acted upon as a matter of national priority and urgency' [363 p.6]. Both the Prime Minister, Malcolm Turnbull and the Leader of the Opposition, Bill Shorten, have publicly acknowledged the importance of Aboriginal and Torres Strait Islander leadership and stewardship in pursuit of sustainable solutions. The Prime Minister stated, 'We are building new ways of working together with Indigenous leaders and their communities to create local solutions – putting Aboriginal and Torres Strait Islander people at the centre of decision making in their regions' [362, p. 4].

The importance of continuing to honour these bipartisan commitments is highlighted by the *Closing the gap: Prime Minister's report 2017* [362] which reported limited success in meeting the targets:

- The target to halve the child mortality rate by 2018 was not met in the reporting period. This is somewhat ameliorated by the fact that there has been an overall decline in both the rate and gap in child mortality since 1998.
- While there has been an overall decline in Aboriginal and Torres Strait Islander mortality since 1998 the target to close the life expectancy gap by 2031 is not on track.
- Reading and numeracy targets and employment gaps are not on track.
- Progress on school attendance rates will need to speed up if the target is to be met.

Despite these results, there have been some noticeable and measureable improvements in the health of Aboriginal and Torres Strait Islander people and communities. The following selected statistics indicate that progress is being achieved albeit slowly.

⁶⁷ The AR-DRG codes for petrol sniffing include: C91 lymphoid leukaemia; C92 myeloid leukaemia; F18 mental and behavioural disorders due to the use of volatile solvents; T52 toxic effects of organic solvents; G92 toxic encephalopathy; X46 accidental poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapours [358].

- Between 1998 and 2013, there was a 16% reduction in the death rates for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT [37].
- From 1998 to 2014, the IMR for Aboriginal and Torres Strait Islander infants 0-4 years has declined from 217 per 100,000 to 159 deaths per 100,000 [10]. This was a greater decline than for non-Indigenous children (from 115 per 100,000 to 73 deaths per 100,000) narrowing the gap from 102 per 100,000 to 86 per 100,000.
- Between 1998 and 2012, after age-adjustment, there was a 27% decline in the death rate from avoidable causes for Aboriginal and Torres Strait Islander people aged 0-74 years living in NSW, Qld, WA, SA and the NT [18].
- During 2013-2015, the median age at death for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT was 57.9 years [38] (up from 53.8 years in 2003-2005). The median age at death for Aboriginal and Torres Strait Islander males, 54.9 years in 2013-2015, increased from 50.9 years in 2003-2005; and for females to 61.5 years from 58.4 years for the same period. The non-Indigenous median age at death was nevertheless substantially higher at 81.9 years in 2013-2015.
- The gap in CVD mortality rates between Aboriginal and Torres Strait Islander and non-Indigenous people narrowed between 1998 and 2014 [10]. After adjusting for age, the gap narrowed from 169 deaths to 88 deaths per 100,000 population.
- 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 (Derived from [107]).
- The 2013-2014 NATSISS showed that 92% of Aboriginal and Torres Strait Islander people aged 15 years and over were able to obtain emotional, physical, or financial help from someone else during a time of crisis (Derived from [107]).
- Age-standardised death rates for respiratory disease in NSW, Qld, WA, SA and NT declined by 26% over the period 1998-2012 for Aboriginal and Torres Strait Islander people [1].
- Between September 2008 and August 2013, 90% of children under three years of age living in remote communities in the Top End region of Australia had some form of otitis media (OM) [176, 177]. However, changes in vaccination schedules in the NT have been concomitant with a sustained improvement in the severity of OM seen in these children [178].
- In 2014-15, the proportion of 4-14 year old children with reported tooth or gum problems was 34%, a decrease from 39% in 2008 [141].
- Over the five year period 2011-2015, there was a 22% decline in the HBV notification rates for Aboriginal and Torres Strait Islander people from 85 per 100,000 in 2011 to 66 per 100,000 in 2015 [207]. It is suggested that this reduction is due to immunisation programs for HBV.
- Since 2011, notification rates for gonorrhoea among Aboriginal and Torres Strait Islander people declined by 22%, whereas the rates among non-Indigenous people increased by 94% during the same period [207].
- In 2016, 95% of Aboriginal and Torres Strait Islander children aged five years were fully immunised against the recommended vaccine-preventable diseases [229].
- The proportion of Aboriginal and Torres Strait Islander mothers who smoked during pregnancy has decreased (from 50% in 2009 to 45% in 2014) [35].
- In 2012-2013, 23% of Aboriginal and Torres Strait Islander adults abstained from alcohol; this level was 1.6 times higher than among the non-Indigenous population [334].
- For 2010 to 2013, there was a significant decline for risky drinking in the proportion (from 32% to 23%) of Aboriginal and Torres Strait Islander people aged 14 years and older [333].
- In 2014-2015, a large proportion of Aboriginal and Torres Strait Islander people aged 15 years and older reported that they had never used illicit substances (69% in 2014-2015 and 52% in 2012-2013) [141, 340].

It is important to acknowledge that many challenges remain in our collective efforts to make a positive difference to the health of Aboriginal and Torres Strait Islander people and communities. Our focus on the positive outcomes in these concluding remarks is not intended to obscure or minimise these challenges but to highlight the many positive achievements that form the basis of a better understanding of the importance of strength based approaches. It is hoped that these achievements - coupled with the ongoing and strengthening commitment from governments to the importance of authentically and respectfully engaging Aboriginal and Torres Strait Islander people, organisations and communities - offers true promise of closing the health gap between Aboriginal and Torres Strait Islander people and other Australians.

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 [364]. 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. 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 [38]. 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.

Estimating the proportions of deaths identified correctly is not simple, so it is difficult to estimate the actual number of Indigenous deaths occurring and the corresponding rates. The ABS uses estimates of the proportions of registered deaths correctly identified as Indigenous in preparing its life tables, the source of life expectancy figures.

The Indigenous Mortality Project involved linking death registrations with 2011 Census records with the aim to assess the consistency of Indigenous status across the two datasets [365]. It was estimated that the Australia-wide rate of Indigenous identification in deaths notifications was 62%. For the jurisdictions for which results could be reported, the NT had the highest rate of consistent reporting (95%) and Vic had the lowest rate (29%). In relation to age-groups, the lowest rate of consistent identification was for people over the age of 70 years (50%). Consistent identification of Indigenous status for both the Census and death registrations was lowest in major cities (44%) and highest in remote areas (92%). The ABS has estimated that the proportion of Indigenous births identified correctly was 96% in 2002-2006, a significant improvement over the level for previous years [366]. 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 [10]. 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.

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 [367]. 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.

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

Despite the important advances that have been made in recent years in both the extent and quality of information about the health of Aboriginal and Torres Strait Islander people, there is substantial scope for further improvement. For example:

- There are deficiencies in the information available for some important areas. Probably the best example is cancer, the second most common cause of death among Aboriginal and Torres Strait Islander people. The AIHW's *Cancer in Australia: an overview*

2014 acknowledges that national data on cancer incidence and mortality among Aboriginal and Torres Strait Islander people are not available and Indigenous-specific information about screening is only collected for breast cancer and not for cervical and bowel cancer [79].

- 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. 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

excess deaths

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

expectation of life

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

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, for example, the Aboriginal and Torres Strait Islander population, divided by the rate for another population, for example, the non-Indigenous population. Rate ratios more than one would indicate that Aboriginal and Torres Strait Islander people have higher rates than non-Indigenous people. Rate ratios less than one would indicate that non-Indigenous people experience higher rates.

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

ACIR - Australian Childhood Immunisation Register

ACT - Australian Capital Territory

AHMAC - Australian Health Ministers' Advisory Council

AIDS - Acquired immune deficiency syndrome

AIHW - Australian Institute of Health and Welfare

ANZDATA - Australia and New Zealand Dialysis and Transplant Registry

AOM - Acute otitis media

APEG - Australasian Paediatric Endocrine Group

ARF - Acute rheumatic fever

AR-DRG - Australian Refined Diagnosis Related Group

BCG - Bacille Calmette-Guerin

BEACH - Bettering the Evaluation and Care of Health

BMI - Body mass index

CHD - Coronary heart disease

CKD - Chronic kidney disease

COAG - Council of Australian Governments

COPD - Chronic obstructive pulmonary disease

CSOM - Chronic suppurative otitis media

CVD - Cardiovascular disease

DALY - Disability-adjusted life year

DMFT/dmft - Decayed missing and filled teeth (deciduous /permanent)

DNA - Deoxyribonucleic acid

DSM - Diagnostic and statistical manual of mental disorders

DTP - Diphtheria, tetanus, and pertussis

ENT - Ear, nose, throat

ERP - Estimated resident population

ESRD - End-stage renal disease

FASD - Fetal alcohol spectrum disorder

GAS - Group A streptococcus

GDM - Gestational diabetes mellitus

GP - General practitioner

GSS - General Social Survey

HAV - Hepatitis A virus

HBV - Hepatitis B virus

HCV - Hepatitis C virus

HD - Haemodialysis

HDL - High density lipoprotein

Hib - Haemophilus influenzae type b

HILDA - Household Income and Labour Dynamics in Australia

HIV - Human immunodeficiency virus

HPV - Human papilloma virus

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

IFG - Impaired fasting glycaemia

IMR - Infant mortality rate

IPD - Invasive pneumococcal disease

LBW - Low birthweight

MMR - Maternal mortality ratio

MMR - Measles, mumps, rubella

NAGATSIHID - National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data

NCIRS - National Centre for Immunisation Research & Surveillance

NATSIHMS - National Aboriginal and Torres Strait Islander Health Measures Survey

NATSIHS - National Aboriginal and Torres Strait Islander Health Survey

NATSINPAS - National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey

NATSISS - National Aboriginal and Torres Strait Islander Social Survey

NDA - National Disability Agreement

NDR - National (insulin-treated) Diabetes Register

NDSS - National diabetes services scheme

NDSHS - National Drug Strategy Household Survey

NEHS - National Eye Health Survey

NHMRC - National Health and Medical Research Council

NIP - National Immunisation Program

NNDSS - National Notifiable Diseases Surveillance System

NSAOH - National Survey of Adult Oral Health

NSW - New South Wales

NT - Northern Territory

OM - Otitis media

OME - Otitis media with effusion

PD - Peritoneal dialysis

Qld - Queensland

RHD - Rheumatic heart disease

SA - South Australia

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

UV - Ultraviolet

VI - Visual Impairment

Vic - Victoria

VSU - Volatile substance use

WA - Western Australia

WAACHS - Western Australian Aboriginal Child Health Survey

WC - Waist circumference

WHO - World Health Organization

WHR - Waist to hip ratio

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