

2021

## Overview of Aboriginal and Torres Strait Islander health status, 2020

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# *Overview of Aboriginal and Torres Strait Islander health status 2020*



## Australian Indigenous Health/InfoNet

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

The Health/InfoNet achieves its mission by undertaking research into various aspects of Aboriginal and Torres Strait Islander health and disseminating the results (and other relevant knowledge and information) mainly via the Australian Indigenous Health/InfoNet websites (<https://healthinfonet.ecu.edu.au>), The Alcohol and Other Drugs Knowledge Centre (<https://aodknowledgecentre.ecu.edu.au>), Tackling Indigenous Smoking (<https://tacklingsmoking.org.au>) and WellMob (<https://wellmob.org.au>). The research involves analysis and synthesis of data and information obtained from academic, professional, government and other sources. The Health/InfoNet's work in knowledge exchange aims to facilitate the transfer of pure and applied research into policy and practice to address the needs of a wide range of users.

### Recognition statement

The Australian Indigenous Health/InfoNet recognises and acknowledges the sovereignty of Aboriginal and Torres Strait Islander people as the original custodians of the country. Aboriginal and Torres Strait cultures, customs and beliefs are persistent and enduring, continuing unbroken from the past to the present and will continue well into the future. They are characterised by resilience and a strong sense of purpose and identity despite the undeniably negative impacts of colonisation and dispossession. Aboriginal and Torres Strait Islander people throughout the country represent a diverse range of people, communities and groups each with unique identity, cultural practices and spiritualities. We recognise that the current health status of Aboriginal and Torres Strait Islander people has been significantly impacted by past and present practices and policies.

We acknowledge and pay our deepest respects to Elders past and present and emerging throughout the country (<https://healthinfonet.ecu.edu.au/acknowledging-country>). In particular, we pay our respects to the Whadjuk Nyoongar people of Western Australia on whose country our offices are located.

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### 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 <https://healthinfonet.ecu.edu.au/contact-us>)

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# *Overview of Aboriginal and Torres Strait Islander health status, 2020*

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### Cover artwork

#### **Bibdjool by Donna Lei Rioli**

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.

#### **Featured icon artwork by Frances Belle Parker**

The HealthInfoNet commissioned Frances Parker, a proud Yaegl woman, mother and artist, to produce a suite of illustrated icons for use in our knowledge exchange products. Frances translates biomedical and statistically based information into culturally sensitive visual representations, to provide support to the Aboriginal and Torres Strait Islander workforce and those participating in research and working with Aboriginal and Torres Strait Islander people and their communities. Frances came to prominence winning the Blake Prize in 2000, making her the youngest winner and the first Indigenous recipient over the 65 year history of the prize.

*"Biirrinba is the Yaygirr name for the mighty Clarence River (NSW). It is this river that is the life giving vein for the Yaegl people. And it is this river which inspires much of my artwork. I am deeply inspired by my Mother's land (Yaegl land) and the Island in the Clarence River that my Mother grew up on, Ulgundahi Island. The stories which are contained within this landscape have shaped me as a person as an artist and most recently as a Mother. This is my history, my story and it will always... be my responsibility to share this knowledge with my family and my children."*



## Preface

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

The initial sections of this *Overview* provide information about the context of Aboriginal and Torres Strait Islander health, population, and various measures of population health status. Most of the subsequent sections about specific health conditions comprise an introduction about the condition and evidence of the current status of the condition among Aboriginal and Torres Strait Islander people. Information is provided for states and territories, Indigenous Regions and remoteness, 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 (<https://healthinonet.ecu.edu.au/learn/health-facts/reviews-knowledge-exchange-products>). Additional, more in depth, information about the topics summarised in this *Overview* is included in the corresponding sections of the HealthInfoNet's website (<https://healthinonet.ecu.edu.au>).

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 2020*.



Neil Drew, Director, on behalf of the HealthInfoNet team

## Acknowledgements

Particular thanks are extended to:

- staff of the HealthInfoNet for their assistance, support and encouragement in the preparation of this *Overview*.
- previous staff members of the HealthInfoNet who have contributed to earlier versions of the *Overview*.
- the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) for the provision of the notification data on end-stage renal disease (ESRD).
- the Department of Health and other funding partners for their ongoing support of the work of the HealthInfoNet.
- members of the HealthInfoNet Advisory Board and HealthInfoNet Consultants.
- users of the HealthInfoNet resource for their ongoing support and feedback.
- readers of the *Overview* who provide feedback during the post-publication peer review period.

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## Introduction

This *Overview of Aboriginal and Torres Strait Islander health status (Overview)* provides a comprehensive summary of the most recent indicators of the health of Aboriginal and Torres Strait Islander people<sup>1</sup> 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.

Since the publication of our last *Overview* in 2020, we have actively participated in discussions and sought advice on the emerging understandings of data sovereignty and governance in Aboriginal and Torres Strait Islander health. In this issue, we continue to strive to accurately and authentically develop our capacity to represent the data and statistics that impact Aboriginal and Torres Strait Islander people and communities. It is a learning journey that we share with other data driven organisations such as the Australian Bureau of Statistics (ABS) and the Australian Institute of Health and Welfare (AIHW). Following on from the previous *Overview*, we have relied less on comparisons between Indigenous and non-Indigenous data. Of course, as with the previous *Overview*, this depends on the availability of data. We reiterate our public commitment to working with Aboriginal and Torres Strait Islander leaders to advance our understanding of data sovereignty and governance consistent with the principles and aspirations of the Maïam nayri Wingara Data Sovereignty Collective (<https://www.maïamnayriwingara.org>).

In 2021, the HealthInfoNet will undertake a nation-wide consultation, led by HealthInfoNet's senior Aboriginal Research Fellow, Dr Uncle Mick Adams, to develop policy and practice guidelines for the work of the HealthInfoNet. The consultation review's focus will be on best practice in data sovereignty and governance, including the co-design of knowledge products.

## 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 ABS, the AIHW, the Australian Health Ministers' Advisory Council (AHMAC), and the Steering Committee for the Review of Government Service Provision (SCRGSP). Important additions to the regular ABS and AIHW publications are a series of special reports that bring together key information about Aboriginal and Torres Strait Islander health and related areas:

- The *Overcoming Indigenous disadvantage* reports, produced by the SCRGSP, and published by the Productivity Commission; the report has been published biennially since 2003.
- Reports in the *Aboriginal and Torres Strait Islander health performance framework* series with substantial detailed analyses, prepared by AHMAC since 2006.
- *Reports on government services*, produced by the SCRGSP and published annually by the Productivity Commission since 2003.

This *Overview* also draws on information from the main administrative data collections (such as the birth and death registration systems and the hospital inpatient collections) and national surveys, for example, the Australian Aboriginal and Torres Strait Islander health surveys. Information from these sources has been published mainly in government reports, particularly those produced by the ABS, the AIHW and the SCRGSP. It also relies on a wide variety of other information sources, including registers for specific diseases and other conditions; regional and local surveys; and epidemiological and other studies examining particular diseases, conditions and health determinants. Information from these sources is disseminated mainly through journals and similar periodicals or in special reports (such as the annual reports of the Kirby Institute and the ANZDATA).

As noted above, we are pleased that many of these data sources are actively engaged in the national debate on data sovereignty and governance and the extent to which their efforts are reflected in publications and data sets; we have attempted to represent them in this edition of the *Overview*.

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.

<sup>1</sup> Very little information is available separately for Aboriginal people and Torres Strait Islander people.



## Key facts

### Population

- In 2020, the estimated Australian Aboriginal and Torres Strait Islander population was 864,206.
- In 2020, NSW had the highest number of Aboriginal and Torres Strait Islander people (the estimated population was 286,553 people, 33% of the total Aboriginal and Torres Strait Islander population).
- In 2020, the NT had the highest proportion of Aboriginal and Torres Strait Islander people in its population, with 32% of the NT population identifying as Aboriginal and/or Torres Strait Islander.

### Births and pregnancy outcomes

- In 2019, there were 21,925 births registered in Australia, with one or both parents identified as Aboriginal and/or Torres Strait Islander (7.2% of all births registered).
- In 2019, the median age for Aboriginal and Torres Strait Islander mothers was 26.0 years.
- In 2019, total fertility rates were 2,316 births per 1,000 for Aboriginal and Torres Strait Islander women.
- In 2018, the average birthweight of babies born to Aboriginal and Torres Strait Islander mothers was 3,214 grams.

### Mortality

- For 2019, the age-standardised death rate for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT was 9.1 per 1,000.
- For Aboriginal and Torres Strait Islander people born in 2015-2017, life expectancy was estimated to be 71.6 years for males and 75.6 years for females, around 8-9 years less than the estimates for non-Indigenous males and females.
- In 2019, the median age at death for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT was 60.4 years.
- For 2014-2018, among Aboriginal and Torres Strait Islander children aged 0-4 years, living in NSW, Qld, WA, SA and the NT, there were 603 deaths; 514 in children aged 0-1 years of age (85% of deaths) and 89 in children aged 1-4 years of age.
- In 2019, the leading causes of death among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT were ischaemic heart disease (IHD), chronic lower respiratory diseases, diabetes and lung and related cancers.
- For 2012-2018, the maternal mortality ratio for Aboriginal and Torres Strait Islander women was 20 deaths per 100,000 women who gave birth.
- In 2014-2018, there were 7,072 deaths (males: 4,148; females: 2,924) from avoidable causes among Aboriginal and Torres Strait Islander people aged 0-74 years living in NSW, Qld, WA, SA and the NT, representing 61% of all deaths for this period.

### Hospitalisation

- In 2018-19, 4.9% of all hospital separations were for Aboriginal and/or Torres Strait Islander people.
- In 2018-19, the age-adjusted separation rate for Aboriginal and Torres Strait Islander people was 956 per 1,000; with the highest rate in the NT of 2,229 per 1,000.
- In 2015-17, age-specific hospital separation rates (excluding dialysis) for Aboriginal and Torres Strait Islander people increased with age (except for 0-4 year olds), with the highest rate in the 65 years and over age-group.

- In 2018-19, 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 47% of all Aboriginal and Torres Strait Islander separations.
- In 2018-19, the age-standardised rate of overall potentially preventable hospitalisations for Aboriginal and Torres Strait Islander people was 75 per 1,000.

## Selected health conditions

### Cardiovascular health

- In 2018-19, around 15% of Aboriginal and Torres Strait Islander people reported having cardiovascular disease (CVD).
- In 2018-19, 23% of Aboriginal and Torres Strait Islander adults were found to have high blood pressure.
- In 2015-2017, in NSW, Qld, WA, SA and the NT combined, there were 730 new diagnoses of rheumatic heart disease (RHD) among Aboriginal and Torres Strait Islander people aged <45 years, a crude rate of 44 per 100,000.
- In 2018-19, there were 16,124 hospital separations for CVD among Aboriginal and Torres Strait Islander people, representing 5.4% of all Aboriginal and Torres Strait Islander hospital separations (excluding dialysis).
- In 2019, IHD was the leading specific cause of deaths of Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT.

### Cancer

- For 2011-2015, there were 6,925 new cases of cancer diagnosed among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT: an average of 1,385 new cases per year.
- For 2011-2015, the most common cancers diagnosed among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT were lung cancer, bowel, breast cancer (in females) and prostate cancer (in males).
- Survival rates indicate that of the Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, and the NT who were diagnosed with cancer between 2006 and 2015, about half survived for five years or more after their diagnosis.
- In 2018-19, there 9,357 hospital separations for neoplasms<sup>2</sup> among Aboriginal and Torres Strait Islander people.
- For 2014-2018, the age-standardised mortality rate in NSW, Qld, WA, SA and the NT due to cancer of any type was 221 per 100,000; 263 per 100,000 for males and 189 per 100,000 for females.

### Diabetes

- In 2018-19, 7.9% of Aboriginal and Torres Strait Islander people reported having diabetes.
- In 2018-19, 13% of Aboriginal and Torres Strait Islander adults aged 18 years and over self-reported having diabetes and/or high glucose levels.
- For 2015-2017, 6,504 Aboriginal and Torres Strait Islanders were hospitalised for diabetes.
- In 2019, diabetes was the third leading cause of death for Aboriginal and Torres Strait Islander people.

<sup>2</sup> Some data sources use the term ‘neoplasm’ to describe conditions associated with abnormal growth of new tissue, commonly referred to as a tumour. Neoplasms can be benign (not cancerous) or malignant (cancerous) [1].

### ***Kidney health***

- In 2018-19, 1.8% of Aboriginal and Torres Strait Islander people (Aboriginal people 1.9%; Torres Strait Islander people 0.4%) reported kidney disease as a long-term health condition.
- In 2012-13, 18% of Aboriginal and Torres Strait Islander adults had biomedical signs of chronic kidney disease (CKD).
- For 2014-2018, after age-adjustment, the notification rate of end-stage renal disease (ESRD) was 603 per 1,000,000.
- In 2018-19, 'care involving dialysis' was the most common reason for hospitalisation among Aboriginal and Torres Strait Islander people.
- In 2019, 378 Aboriginal and Torres Strait Islander people commenced dialysis and 55 were the recipients of new kidneys.
- For 2015-2019, the age-adjusted death rate for kidney disease (as a major cause of death) for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT was 19 per 100,000.
- In 2018, the most common causes of death among the 217 Aboriginal and Torres Strait Islander people who were receiving dialysis was CVD (64 deaths) and withdrawal from treatment (51 deaths).

### ***Injury, including family violence***

- In 2012-13, 2.5% of Aboriginal and Torres Strait Islander people reported having a long-term condition caused by injury.
- In 2018-19, 16% of Aboriginal and Torres Strait Islander people aged 15 years and over had experienced physical harm or threatened physical harm at least once in the last 12 months.
- In 2018-19, injury was the leading cause of hospitalisation (excluding dialysis) for Aboriginal and Torres Strait Islander people.
- In 2018-19, 18% of injury-related hospitalisations among Aboriginal and Torres Strait Islander people were for assault.
- In 2019, intentional self-harm was the leading specific cause of injury deaths for NSW, Qld, SA, WA, and the NT (5.7% of all Aboriginal and Torres Strait Islander deaths).

### ***Respiratory health***

- In 2018-19, 29% of Aboriginal and Torres Strait Islander people reported having a long-term respiratory condition.
- In 2018-19, 16% of Aboriginal and Torres Strait Islander people reported having asthma.
- In 2016-18, crude hospitalisation rates were highest for Aboriginal and Torres Strait Islander people presenting with influenza and pneumonia (8.3 per 1,000), followed by chronic obstructive pulmonary disease (COPD) (6.0 per 1,000), acute upper respiratory infections (4.4 per 1,000) and asthma (2.8 per 1,000).
- In 2019, chronic lower respiratory disease was the second highest cause of death overall for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT.

### ***Eye health***

- In 2018-19, eye and sight problems were reported by 38% of Aboriginal people and 40% of Torres Strait Islander people.
- In 2018-19, eye and sight problems were reported by 32% of Aboriginal and Torres Strait Islander males and by 43% of females.
- In 2018-19, the most common eye conditions reported by Aboriginal and Torres Strait Islanders were hyperopia (long sightedness: 22%), myopia (short sightedness: 16%), other diseases of the eye and adnexa (8.7%), cataract (1.4%), blindness (0.9%) and glaucoma (0.5%).

- In 2018-19, 10% of Aboriginal and Torres Strait Islander children, aged 0-14 years, were reported to have eye or sight problems.
- In 2019, 263 cases of trachoma were detected among 3,154 Aboriginal and Torres Strait Islander children living in at-risk communities in Qld, WA, SA and the NT.
- For 2016-18, 5,350 of the approximately 8,600 hospitalisations for diseases of the eye among Aboriginal and Torres Strait Islander people were for disorders of the lens (mainly cataracts).
- For 2016-18, crude hospitalisation rates for eye disease, by Indigenous Regions, ranged from 11 per 1,000 in West Qld South to 2.0 per 1,000 in the South and East region of SA.

### ***Ear health and hearing***

- In 2018-19, 14% of Aboriginal and Torres Strait Islander people reported having a long-term ear and/or hearing problem.
- In 2018-19, 43% of Aboriginal and Torres Strait Islander people aged seven years and over reported having hearing loss in one or both ears.
- In 2018-19, among Aboriginal and Torres Strait Islander children aged 0-14 years, the prevalence of otitis media (OM) was 2.6%, and of partial or complete deafness 3.8%.
- In 2018-19, the age-adjusted hospitalisation rate for ear conditions for Aboriginal and Torres Strait Islander people was 3.8 per 1,000 population.

### ***Oral health***

- In 2012-2014, 61% of Aboriginal and Torres Strait Islander children aged 5-10 years had experienced tooth decay in their baby teeth, and 36% of Aboriginal and Torres Strait Islander children aged 6-14 years had experienced tooth decay in their permanent teeth.
- In 2017-18, 7.1% of Aboriginal and Torres Strait Islander people aged 15 years and over had complete tooth loss.
- In 2018-19, there were 3,773 potentially preventable hospitalisations for dental conditions for Aboriginal and Torres Strait Islander people. The crude rate of hospitalisation was 4.5 per 1,000.

### ***Disability***

- In 2018-19, 38% of Aboriginal, and 35% of Torres Strait Islander people reported having a disability or restrictive long-term health condition.
- In 2018-19, 8.2% of Aboriginal, and 8.3% of Torres Strait Islander people reported a profound or severe core activity limitation.
- In 2018-19, Aboriginal and Torres Strait Islander people reported a profound/severe disability more often in non-remote areas (8.6%) than in remote areas (5.7%).
- In 2018-19, the most self-reported disabilities for Aboriginal and Torres Strait Islander people were physical (63%), sensory (47%), psychological (23%) and intellectual (18%).
- In 2016, 6.7% of Aboriginal and Torres Strait Islander people with a profound or severe disability reported a need for assistance.
- In 2018-19, 5.5% of disability service users were Aboriginal and Torres Strait Islander people, with most aged under 60 years (94%).
- In 2018-19, the main disability groups accessing services were Aboriginal and Torres Strait Islander people with a psychiatric condition (37%), physical disability (24%) and intellectual disability (15%).
- In 2018-19, 1,066 Aboriginal and Torres Strait Islander National Disability Agreement service users transitioned to the National Disability Insurance Scheme.

## Communicable diseases

- In 2018, there were 6,897 notifications for chlamydia for Aboriginal and Torres Strait Islander people.
- In 2018, there were 4,439 gonorrhoea notifications for Aboriginal and Torres Strait Islander people.
- In 2018, there were 791 syphilis notifications for Aboriginal and Torres Strait Islander people.
- In 2017, Qld (45%) and the NT (35%) accounted for 80% of the syphilis notifications from all jurisdictions.
- In 2019, there were 25 cases of newly diagnosed human immunodeficiency virus (HIV) infection among Aboriginal and Torres Strait Islander people in Australia.
- In 2018, there were 739 Aboriginal and Torres Strait Islander people diagnosed with hepatitis C (HCV) in Australia.
- In 2017, there were 96 Aboriginal and Torres Strait Islander people diagnosed with hepatitis B (HBV) in Australia.
- For 2014-2016, 581 (12%) of the 4,727 cases of invasive pneumococcal disease (IPD) were identified as Aboriginal and Torres Strait Islander.
- For 2011-2015, there were 26 deaths attributed to IPD with 11 of the 26 deaths (42%) in the 50 years and over age-group.
- For 2014-2016, 63 (11%) of the 602 notified cases of meningococcal disease were identified as Aboriginal and Torres Strait Islander.
- In 2018, of the 1,438 notifications of tuberculosis (TB) in Australia, 29 (2.0%) were identified as Aboriginal and Torres Strait Islander.
- For 2000-2017, there were 76 Aboriginal and Torres Strait Islander people diagnosed with invasive *Haemophilus influenzae* type b (Hib) in Australia.
- In 2018-19, the proportion of Aboriginal and Torres Strait Islander people reporting a disease of the skin and subcutaneous tissue was 3.2% (males 2.4% and females 4.0%).
- In 2018-19, there were 1,230 Aboriginal and Torres Strait Islander children, aged 4 years and under, who were hospitalised with a principal diagnosis of 'diseases of the skin and subcutaneous tissue'.

## Factors contributing to Aboriginal and Torres Strait Islander health

### Nutrition and breastfeeding

- In 2018-19, 39% of Aboriginal and Torres Strait Islander people aged 15 years and over reported eating the recommended amount of two serves of fruit per day but only 4.2% reported eating the recommended five serves of vegetables per day.
- In 2018-19, 92% of Aboriginal and Torres Strait Islander children aged 2-3 years old ate an adequate amount of fruit per day and 23% ate an adequate amount of vegetables per day.
- In 2018-19, 24% of Aboriginal and Torres Strait Islander people aged 15 years and over reported that they usually consumed sugar sweetened drinks every day and 5.5% consumed diet drinks; 71% usually consumed sugar sweetened drinks or diet drinks at least once per week.
- In 2018-19, 20% of children aged 2-14 years usually consumed sugar sweetened drinks daily and 1.5% consumed diet drinks daily; 63% usually consumed sugar sweetened drinks or diet drinks at least once a week.
- In 2012-13, on average, Aboriginal and Torres Strait Islander people reported consuming 111 grams of sugar daily.
- In 2012-13, the average daily sodium intake for Aboriginal and Torres Strait Islander people was approximately one teaspoon of salt.
- In 2012-13, 22% of Aboriginal and Torres Strait Islander people reported running out of food or were unable to buy food.
- In 2018-19, 87% of Aboriginal and Torres Strait Islander children aged 0-2 years had been breastfed.

### **Physical activity**

- In 2018-19, 89% of Aboriginal and Torres Strait Islander people surveyed (aged 15 years and over) had not met the physical activity guidelines, and 22% had not participated in any physical activity in the week prior to being surveyed.
- The proportion of Aboriginal and Torres Strait Islander adult males who participated in strength or toning activities on two or more days was 24%, while the proportion for adult females was 15%.

### **Bodyweight**

- In 2018-19, 71% of Aboriginal and Torres Strait Islander people aged 15 years and over were either overweight or obese (Aboriginal people: 71%; Torres Strait Islander people: 75%), 25% were in the normal weight range and 3.9% were underweight.
- In 2018-19, Aboriginal and Torres Strait Islander people aged over 18 years, living in major cities, had a higher body mass index (BMI) than those living in very remote areas (77% and 66% respectively).
- In 2018-19, of Aboriginal and Torres Strait Islander children aged 2-17 years, 38% were overweight or obese; 53% were normal weight and 8.8% were underweight.

### **Tobacco use**

- In 2018-19, 37% of Aboriginal and Torres Strait Islander people aged 15 years and over reported they were current daily smokers, a reduction from levels reported in 2012-13 (41%).
- The proportion of Aboriginal and Torres Strait Islander mothers who reported smoking during pregnancy decreased from 52% in 2009 to 44% in 2018.
- In 2018-19, Aboriginal and Torres Strait Islander people living in remote areas reported a higher proportion of current daily smokers (49%) than those living in non-remote areas (35%).
- Between 2012-13 and 2018-19, the highest reductions in daily smoking were found in the younger age-groups (15-34 years).
- A study from 2021 found half of deaths among Aboriginal and Torres Strait Islander people in NSW aged 45 years and over, and 37% of deaths among all age-groups were caused by smoking.

### **Alcohol use**

- In 2018-19, 26% of Aboriginal and Torres Strait Islander adults reported abstaining from alcohol.
- In 2018-19, 18% of Aboriginal and 22% of Torres Strait Islander adults did not exceed the guideline for drinking at risk on a single occasion.
- In 2018-19, 26% of Aboriginal and Torres Strait Islander adults did not exceed the guideline for lifetime risk.
- In 2018-19, Aboriginal and Torres Strait Islander males were more likely to exceed the guideline for lifetime risk (30%) than females (10%).
- For 2010 to 2019, there was a decline (32% to 19%) in the proportion of Aboriginal and Torres Strait Islander people aged 14 years and over who exceeded the 2009 guidelines for lifetime risk (two standard drinks per day).
- In 2018-19, 90% of mothers of Aboriginal and Torres Strait Islander children (aged 0-3 years) reported abstaining from alcohol during pregnancy.
- For 2014-2018, the main cause of alcohol-related deaths for Aboriginal and Torres Strait Islander people was from alcoholic liver disease.

### ***Illicit drug use***

- In 2018-19, 70% of Aboriginal and Torres Strait Islander people aged 15 years and over reported they had never used illicit substances in the last 12 months.
- In 2018-19, 28% of Aboriginal and Torres Strait Islander people aged 15 years and over reported they had used an illicit substance in the previous 12 months.
- In 2016-18, hospitalisation for mental/behavioural disorders due to drug use was highest for amphetamines (211 per 100,000) for Aboriginal and Torres Strait Islander people.
- For 2014-2018, SA recorded the highest rate of drug-induced deaths for Aboriginal and Torres Strait Islander people (20 per 100,000), followed by NSW (18 per 100,000), and WA (17 per 100,000).
- For 2014-2018, rates of drug induced deaths were higher for Aboriginal and Torres Strait Islander males (17 per 100,000) than for females (11 per 100,000).

### ***Volatile substance use***

- In 2014-15, 0.7% of Aboriginal and Torres Strait Islander people 15 years and over reported using petrol or other inhalants.
- In 2016-18, the rate of hospital separations for Aboriginal and Torres Strait Islander people from poisoning and accidental poisoning due to the toxic effect of organic solvents (e.g. petrol) was 0.04 per 1,000.
- In 2016-18, hospitalisation rates among Aboriginal and Torres Strait Islander people for accidental poisoning from organic solvents was 0.02 per 1,000.

### ***Immunisation***

- In September 2020, 97% of Aboriginal and Torres Strait Islander 5 year old children were fully immunised against the recommended vaccine-preventable diseases.

### ***Environmental health***

- In 2018-19, 18% of Aboriginal and Torres Strait Islander people were reported living in overcrowded households.
- In 2018-19, 80% of Aboriginal and Torres Strait Islander households reported living in houses of an acceptable standard.
- In 2018-19, 33% of Aboriginal and Torres Strait Islander households reported major structural issues within their dwelling.
- In 2018-19, over 94% 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 2018-19, Aboriginal and Torres Strait Islander crude hospitalisation rates for selected diseases related to environmental health were 9.1 per 1,000 for intestinal infectious diseases, 9.2 per 1,000 for influenza and pneumonia, 8.0 per 1,000 for bacterial disease, 4.6 per 1,000 for acute upper respiratory infections, 2.7 per 1,000 for asthma and 1.8 per 1,000 for scabies.
- For 2014-2018, the age-standardised death rate for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT, from conditions associated with poor environmental health was 44 per 100,000 for males and 40 per 100,000 for females.



## Social and cultural concepts

Aboriginal and Torres Strait Islander people have a ‘whole of life’ view of health that incorporates the total wellbeing of their community and not just the individual [2]. This view also includes the concept of life-death-life. The National Aboriginal Community Controlled Health Organisation (NACCHO) has adopted the World Health Organization’s (WHO) view that people should be at the centre of health care and that comprehensive primary health care is central to achieving real outcomes and health benefits for Aboriginal and Torres Strait Islander people rather than a disease focused approach [2, 3].

There is now clear evidence to show that social and cultural factors influence an individual’s health [2]. Ongoing marginalisation, separation from culture and land, food and resource insecurity, intergenerational trauma, disconnection from culture and family, racism, systemic discrimination and poverty have resulted in poorer physical and mental health for many Aboriginal and Torres Strait Islander people, and an increase in chronic conditions [4, 5].

In Australia, Aboriginal people have occupied their traditional lands for the past 50,000 to 120,000 years and their continuity, history and cultural traditions are unrivalled in the world [6]. Torres Strait Islander people live permanently in 20 communities on 17 of the 270 islands in the Torres Strait and across mainland Australia including mainland communities in Far North Qld. The Torres Strait is between the tip of Cape York in Qld and Papua New Guinea.

Aboriginal people enjoyed a semi-nomadic lifestyle in family and community groups, moving across a defined area following seasonal changes [6]. Torres Strait Islander people had a communal village lifestyle revolving around fishing, trading and gardening. Land was, and still is today, a central part of Aboriginal and Torres Strait Islander customs, culture and law [7]. Country and connection to country is intricately linked to caring for country, the maintenance of cultural life, identity, individual autonomy and Aboriginal and Torres Strait Islander sovereignty. These each have their own implications for the social and emotional wellbeing of Aboriginal and Torres Strait Islander people [8].

There are distinctive ethnic and cultural differences between Aboriginal societies and between Torres Strait Islander societies, each having their own languages and traditions [9]. Despite their differences, Aboriginal and Torres Strait Islander people have had many similar experiences relating to colonisation that have led to negative outcomes on their quality of life and their health [6, 10].

There have been a number of positive changes towards Aboriginal and Torres Strait Islander self-determination and sovereignty. With representation in Parliament, Aboriginal and/or Torres Strait Islander people now have a political voice [11]. In addition, there has been the development of a shift away from the deficit narratives that have infused (and confused) much of the debate about the health and wellbeing of Aboriginal and Torres Strait Islander people, towards a strengths based approach [12]. This has come about after decades of leadership from Aboriginal and Torres Strait Islander Community Controlled Health Organisations (ACCHOs). Megan Davis, Professor of Law, University of NSW, said of ACCHOs, ‘It is apparent when we look to the Aboriginal community health services sector, we can see that for decades and decades they have been leading the way already in the realisation of the most fundamental aspect of the right to self-determination: making decisions about one’s health. Community control is intuitive to communities’ [13]. This unique network of Aboriginal medical services is a prime example of how organisations that are grounded in community can deliver results that improve health outcomes and reduce the demand on the hospital system [14]. Aboriginal-led services foster self-determination and therefore a sense of confidence and control. Supporting this model means that services are holistic, culturally safe, and more trusted.

## Social indicators

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

### Education

The 2016 Australian Census [15] indicated that the number of Aboriginal and Torres Strait Islander people completing year 12 or its equivalent had increased with 47% of those aged 20 to 24 years reporting the completion of year 12, compared with 32% in 2006.

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

- Aboriginal and Torres Strait females were more likely to have completed year 12 or equivalent than males (51% compared with 43%).
- Aboriginal and Torres Strait Islander people living in urban areas were more likely to have completed year 12 or equivalent compared with those living in rural areas (50% compared with 34%).
- The highest proportions of Aboriginal and Torres Strait Islander people completing year 12 or equivalent were in the ACT (66%) and Qld (55%).

For Aboriginal and Torres Strait Islander people aged 25-64 years, the 2016 Census [15] indicated that:

- 30% reported the completion of year 12 or its equivalent.
- Females were more likely to have completed year 12 or equivalent than males (32% compared with 27%).
- Aboriginal and Torres Strait Islander people living in urban areas were more likely to have completed year 12 or equivalent compared with those living in rural areas (32% compared with 22%).
- The highest proportions of Aboriginal and Torres Strait Islander people completing year 12 or equivalent were in the ACT (52%) and Qld and Vic (both 36%).

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

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

ABS school reports show that [16, 17]:

- In 2020 there were 240,180 school students who identified as Aboriginal and/or Torres Strait Islander, an increase of 4.1% from 2019.
- The retention rate for Aboriginal and Torres Strait Islander students who started secondary school in year 7/8<sup>3</sup> and continued through to year 12, increased from 59% in 2019 to 60% in 2020.
- In 2020, the highest proportions of Aboriginal and Torres Strait Islander students who started secondary school in year 7/8 and continued through to year 12 were in the ACT (99%) and SA (75%). The jurisdictions with the lowest retention rates were NT (36%), NSW and WA (both with 56%).

<sup>3</sup> Commencement year for secondary schooling varies [17].

A national report on schooling in Australia [18] showed that in 2019:

- 83% of year 3, 78% of year 5, 78% of year 7 and 72% of year 9 Aboriginal and Torres Strait Islander students were at, or above the national minimum standard for reading.
- 85% of year 3, 73% of year 5, 65% of year 7 and 53% of year 9 Aboriginal and Torres Strait Islander students were at, or above the national minimum standard for writing.
- 76% of year 3, 78% of year 5, 77% of year 7 and 75% of year 9 Aboriginal and Torres Strait Islander students were at, or above the national minimum standard for spelling.
- 79% of year 3, 70% of year 5, 69% of year 7 and 68% of year 9 Aboriginal and Torres Strait Islander students were at, or above the national minimum standard for grammar and punctuation.
- 81% of year 3, 80% of year 5, 76% of year 7 and 84% of year 9 Aboriginal and Torres Strait Islander students were at, or above the national minimum standard for numeracy.

### **Employment**

According to the 2016 Australian Census [15]:

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

### **Income**

In the 2016 Census [15]:

- 20% of Aboriginal and Torres Strait Islander people reported an equivalised<sup>4</sup> weekly income of \$1,000 or more compared with 13% in 2011 [15, 19].
- Over half (53%) of Aboriginal and Torres Strait Islander people reported an equivalised weekly household income of between \$150 and \$799 [15].

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<sup>4</sup> Equivalised household income adjusts the actual incomes of households to make households of different sizes and compositions comparable [15].

## The Aboriginal and Torres Strait Islander population

The ABS estimated<sup>5</sup> the Aboriginal and Torres Strait Islander population at 864,206 people in 2020 (Table 1) [20]. The Aboriginal and Torres Strait Islander population accounted for 3.4% of Australia's total population of just over 25.5 million (Derived from [21]). The Aboriginal and Torres Strait Islander population was highest in NSW (286,553 people), followed by Qld (241,082). The NT had the highest proportion of Aboriginal and Torres Strait Islander people among its population (32%) and Vic the lowest (1.0%).

**Table 1. Estimated Aboriginal and Torres Strait Islander (Indigenous) population, by jurisdiction, Australia, 2020**

Jurisdiction	Indigenous population (number)	Proportion of Australian Indigenous population (%)	Proportion of total jurisdiction population (%)
NSW	286,553	33	3.5
Vic	63,615	7.4	1.0
Qld	241,082	28	4.7
WA	109,138	13	4.1
SA	45,926	5.3	2.6
Tas	30,604	3.5	5.7
ACT	8,414	1.0	2.0
NT	78,596	9.1	32
Australia	864,206	100	3.4

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

Source: Derived from ABS, 2019 [21], ABS, 2020 [20]

The ABS estimated that of the population of 864,206 Aboriginal and Torres Strait Islander people in 2020, 44% lived in inner/outer regional areas, 38% in major cities and 18% in remote/very remote areas [21]. In terms of specific geographical areas, the top five Indigenous Regions where Aboriginal and Torres Strait Islander people resided in 2020 were Brisbane (94,455 residents); NSW Central and North Coast (93,562); Sydney-Wollongong (87,229); Perth (43,072) and Townsville-Mackay (34,594).

Data from the 2016 Census indicated that 44% of Aboriginal and Torres Strait Islander people lived in regional areas, more than one-third (37%) lived in major cities and 19% lived in remote or very remote areas [22]. In terms of specific geographical areas, more than one-half (59%) of all Aboriginal and Torres Strait Islander people counted in the 2016 Census lived in 10 of the 58 Indigenous Regions<sup>6</sup> [24]. The largest populations were in three regions in eastern Australia (Brisbane, NSW Central and North Coast, and Sydney-Wollongong), which accounted for 32% of the total Aboriginal and Torres Strait Islander population.

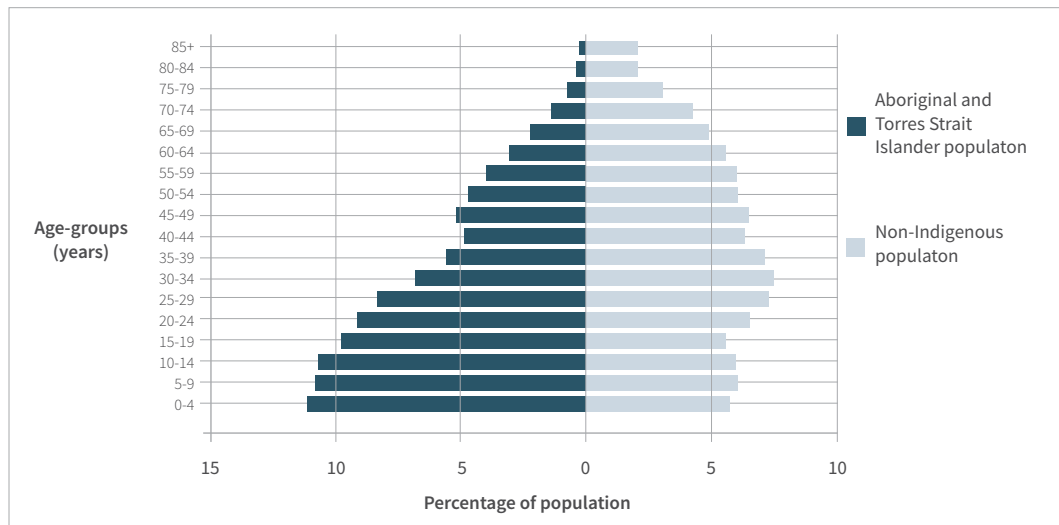
According to estimates from the 2016 Census, 91% of Indigenous people were identified as Aboriginal, 5% as Torres Strait Islander and 4% as of both Aboriginal and Torres Strait Islander descent [22]. Around 64% of Torres Strait Islander people lived in Qld with NSW having the second largest number of Torres Strait Islander people.

The Aboriginal and Torres Strait Islander population is much younger overall than the non-Indigenous population (Figure 1) [20] (Derived from [21]). According to ABS estimates, about one-third (33%) of Aboriginal and Torres Strait Islander people were aged less than 15 years, compared with 18% of non-Indigenous people. About 5.2% of Aboriginal and Torres Strait Islander people were aged 65 years or over, compared with 17% of non-Indigenous people.

<sup>5</sup> Population estimates are released regularly by the ABS and provide a more accurate measure of the actual size of a population. They are assessments of what would happen to the population if components of population change (births, deaths and migration) were to hold in the future [20].

<sup>6</sup> Indigenous Regions are large geographical units loosely based on the former Aboriginal and Torres Strait Islander Commission boundaries [23].

**Figure 1. Population pyramid of Aboriginal and Torres Strait Islander and non-Indigenous populations, 30 June 2020**



Sources: Derived from ABS, 2019 [21], ABS, 2020 [20]

## Births and pregnancy outcomes

There have been improvements in birth and pregnancy outcomes for Aboriginal and Torres Strait Islander mothers and babies in recent years, with evidence of an increase in the proportion of mothers attending antenatal care in the first trimester, a decrease in the rate of mothers smoking during pregnancy, and a slight decrease in the proportion of babies born small for gestational age [25]. ‘Birthing on Country’ is an area of maternal and infant health that is gathering momentum [26] due to the positive impact it has on mothers and babies [27]. It is acknowledged that research on ‘Birthing on Country’ requires more growth and funding to cover the inequities and inequalities currently experienced by Aboriginal and Torres Strait Islander women in the field of maternal, infant health [26].

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 [28]. In 2019, there were 21,925 births (11,145 males: 10,780 females) registered in Australia with one or both parents identified as Aboriginal and/or Torres Strait Islander (7.2% of all births registered) [28]. This probably underestimates the true number as Indigenous status is not always identified, and there may be a lag in birth registrations (See Appendix 1 for a discussion of data limitations).

For births registered as Indigenous: 25% recorded both parents as Aboriginal and/or Torres Strait Islander; 45% recorded only the mother as Aboriginal and/or Torres Strait Islander (including births where paternity was not acknowledged and those where the father’s Indigenous status was unknown); and in 30% of registrations only the father was recorded as Aboriginal and/or Torres Strait Islander (including births where the mother’s Indigenous status was unknown) [28].

## Age of mothers

### About births and fertility

There are a number of general measures of births and fertility<sup>7</sup>, but detailed analysis involves the use of age-specific rates. Age-specific rates are the annual number of live births per 1,000 women in five-year age-groups from 15 to 49 years (the relatively small numbers of births to women aged less than 15 years are included in the 15-19 years age-group, similarly births to women aged 50 years and over are included in the 45 to 49 years age-group) [28].

<sup>7</sup> The study of birth information is known as fertility analysis, where ‘fertility’ refers to the number of babies born alive. This meaning

In 2019, for babies born to Aboriginal and Torres Strait Islander women, 59% of babies were born to those aged 20-29 years, and 11% of babies were born to teenagers (15-19 years of age) [28].

The median age of Aboriginal and Torres Strait Islander mothers was 26.0 years [28]. The highest fertility rates among Aboriginal and Torres Strait Islander women were among the 20-24 and 25-29 years age-groups (Table 2). The fertility rate of teenage Aboriginal and Torres Strait Islander women was 45 babies per 1,000 women.

**Table 2. Age-specific fertility rates, Aboriginal and Torres Strait Islander mothers, selected jurisdictions, Australia, 2019**

Age-group of mother (years)	Jurisdiction						Australia
	NSW	Vic	Qld	WA	SA	NT	
Aboriginal and Torres Strait Islander mothers							
15-19	41	30	50	58	35	57	45
20-24	121	100	146	136	122	125	127
25-29	123	120	145	125	110	95	125
30-34	99	97	111	104	88	68	98
35-39	55	56	67	59	45	39	56
40-44	10	13	15	10	12	10	12

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, 2020 [28]

## Total fertility rate

The summary measure of fertility is the total fertility rate, which is the sum of age-specific fertility rates divided by 1,000. It represents the number of children a female would bear if each female experienced current age-specific fertility rates at each age of her reproductive life [28].

In 2019, the total fertility rate was 2,316 births per 1,000 Aboriginal and Torres Strait Islander women (Table 3) [28]. The highest total fertility rate for Aboriginal and Torres Strait Islander women was in Qld (2,668 babies per 1,000 women), followed by WA (2,464 per 1,000) and NSW (2,247 per 1,000).

**Table 3: Total fertility rates for Aboriginal and Torres Strait Islander mothers, selected jurisdictions, Australia, 2019**

	Jurisdiction						Australia
	NSW	Vic	Qld	WA	SA	NT	
Aboriginal and Torres Strait Islander mothers	2,247	2,084	2,668	2,464	2,057	1,974	2,316

Notes:

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

Source: ABS, 2020 [28]

is different to the lay use of the word, which means the capacity to bear children.

## Antenatal care

Antenatal care from health professionals helps pregnant women by monitoring their health, screening, and providing information and support during pregnancy [29, 30]. It can help with the early identification of potentially preventable risk factors (especially when care is provided during the first trimester of pregnancy) that adversely affect maternal and child health outcomes [29].

In 2018, pregnant Aboriginal and Torres Strait Islander women attended an average of 10 antenatal visits [25]<sup>8</sup>. The Department of Health recommends 10 visits for first-time pregnancy without complications and seven visits for subsequent uncomplicated pregnancies [30]. Of these women, 66% attended the first antenatal visit during the first trimester of pregnancy [25]. The proportions were highest in inner regional areas (68%), with proportions for other areas ranging from 67% in outer regional areas to 63% for very remote areas. The proportion of expectant Aboriginal and Torres Strait Islander mothers attending antenatal care in the first trimester has increased from 50% in 2012 to 66% in 2018.

## Birthweight

In 2018, the average birthweight of babies born to Aboriginal and Torres Strait Islander mothers was 3,214 grams [25]. Low birthweight (LBW), defined as a birthweight of less than 2,500 grams [31], increases the risk of health problems and death in infancy [32]. In 2018, 12% of babies born to Aboriginal and Torres Strait Islander mothers were of LBW [25], of which 1.9% combined, were very LBW (less than 1,500 grams [31]) and extremely LBW (less than 1,000 grams [31]).

There were similar proportions of LBW babies born between 2013 and 2018 (14.4% and 13.8% respectively) [25]. In 2018, LBW for babies of Aboriginal and Torres Strait Islander mothers varied little by remoteness with 11% of babies born in major cities and 15% in very remote areas [25].

Factors impacting on LBW include preterm birth, socioeconomic disadvantage, the age of the mother and antenatal care [32]. A mother's nutritional status and use of tobacco during pregnancy also impact on the birthweight of her baby [33].

Tobacco smoking while pregnant, in particular, has a major impact on birthweight. In 2018, 44% of Aboriginal and Torres Strait Islander mothers (two in five mothers) reported smoking during pregnancy [25]. In 2018, rates of smoking for Aboriginal and Torres Strait Islander mothers were highest in remote and very remote areas (48% and 57% respectively), and lowest in major cities (38%). Since 2012, smoking among mothers has decreased for all remoteness areas (between three and six percent) except in very remote areas where it increased by four percent.

The impact of tobacco smoking during pregnancy can be seen in the proportions of LBW babies [34]. For 2015-2017, excluding preterm and multiple births, 47% of LBW births to Aboriginal and Torres Strait Islander mothers were attributable to smoking during pregnancy. It has been estimated that if the smoking rate for Aboriginal and Torres Strait Islander pregnant women (age-standardised) was the same as it was for other mothers (12%), the proportion of LBW babies could be reduced by up to 33%.

A population-based cohort study using linked data from 2010 to 2014 examined the association between not smoking in pregnancy and the pregnancy outcomes among Aboriginal women in NSW [35]. It showed improved perinatal outcomes for babies including a lower risk of perinatal death, preterm birth and small for gestational age. The study concluded that the rates of adverse outcomes for babies of non-smoking Aboriginal women were similar to those among the general population.

<sup>8</sup> This excludes very preterm births [25].



## Mortality

Mortality measures for Aboriginal and Torres Strait Islander people were a key part of the *Closing the gap* initiative led by the Council of Australian Governments (COAG) (replaced in May 2020 with the National Federation Reform Council) in collaboration with the National Coalition of Aboriginal and Torres Strait Islander Peak Organisations [36]. There were a number of targets set by COAG for life expectancy, child mortality, education and employment [34]. In July 2020, a new national agreement on *Closing the gap* was endorsed. This is the first time an initiative to improve life outcomes for Aboriginal and Torres Strait Islander people has been created with Aboriginal and Torres Strait Islander people. Specific outcomes, targets and indicators aimed at policy direction and monitoring progress for mortality include life expectancy; all-cause mortality; leading causes of death and potentially avoidable mortality [34]. The difference in health outcomes (health gap) between Aboriginal and Torres Strait Islander people and non-Indigenous Australians (including life expectancy and infant/child mortality) can be attributed to a number of factors including:

- differences in the social determinants of health
- differences in health risk factors
- differences in access to appropriate health services - not covered in this report [34, 37].

There were 3,787 deaths in Australia in 2019 where the deceased person was identified as Aboriginal and/or Torres Strait Islander (Table 4) [38]. See Appendix 1 for discussion of data limitations.

**Table 4. Numbers and proportions (%) of Aboriginal and Torres Strait Islander deaths, Australia, 2019**

Jurisdiction	Number of deaths	Proportion of deaths in jurisdiction %
NSW	1,122	2.0
Vic	254	0.6
Qld	1,016	3.1
WA	578	3.8
SA	223	1.6
Tas	68	1.5
NT	496	43
ACT	29	1.4
Australia	3,787	2.2

Notes:

1 Australian total includes other territories.

2 Proportion (%) of deaths in jurisdictions % includes 1,362 deaths with Indigenous status not reported.

Source: ABS, 2020 [38]

In 2019, there were 1,362 deaths for which no Indigenous status was reported, representing 0.8% of registered deaths; it is very likely that some of these deaths were among Aboriginal and Torres Strait Islander people [38].

## Death rates

Crude and age-standardised death rates, median age at death, age-specific death rates and infant/child mortality rates (see the Glossary for further information) for Aboriginal and Torres Strait Islander people are only available for NSW, Qld, WA, SA and the NT as they are the jurisdictions with adequate levels of identification and sufficient numbers of deaths for mortality analysis to be undertaken [38]. The Aboriginal and Torres Strait Islander data for these measures are based on three-year averages, calculated for each calendar year, and then averaged. The reported rate for 2019 is based on the three year averages for the 2017-2019 period.

In 2019, the age-standardised death rate for Aboriginal and Torres Strait Islander people was 9.1 per 1,000 population (Table 5) [38]. Rates for Aboriginal and Torres Strait Islander people varied by jurisdiction, with the highest rate occurring in the NT (13 per 1,000) and the lowest in NSW (7.2 per 1,000).

**Table 5. Age-standardised death rates, Aboriginal and Torres Strait Islander people, NSW, Qld, WA, SA and the NT, 2019**

Jurisdiction	Numbers	Aboriginal and Torres Strait Islanders
NSW	1,122	7.2
Qld	1,016	9.5
WA	578	11
SA	223	10
NT	496	13
Total for the selected jurisdictions	3,435	9.1

Notes:

1 Rates are per 1,000 population.

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.

Source: ABS, 2020 (Derived from [38])

In 2019, the crude death rate in NSW, Qld, WA, SA and the NT, for Aboriginal and Torres Strait Islander males was similar to that for females (4.8 and 4.0 per 100,000 respectively) [38].

For 2014-2018, in NSW, Qld, WA, SA and the NT, 14,734 deaths (males: 8,046, females: 6,688) were identified as Aboriginal and/or Torres Strait Islander [34]. These data exclude 3,623 deaths where Indigenous status was not stated, which may lead to under-identification of Indigenous people in the mortality data. The crude death rate for all Aboriginal and Torres Strait Islander people was 418 per 100,000, with the rate for males (458 per 100,000) higher compared with females (379 per 100,000). After age-adjustment, the death rate for Aboriginal and Torres Strait Islander people was 917 per 100,000 with NSW recording the lowest rate (690 per 100,000), followed by Qld (932 per 100,000); SA (973 per 100,000); WA (1,152 per 100,000) and the NT the highest rate (1,465 per 100,000).

## Expectation of life

In 2018, the ABS published revised estimates for expectation of life at birth for Aboriginal and Torres Strait Islander people [39]. According to these estimates, Aboriginal and Torres Strait Islander males born in Australia in 2015-2017 could expect to live to 71.6 years, 8.6 years less than the 80.2 years expected for non-Indigenous males. The expectation of life at birth of 75.6 years for Aboriginal and Torres Strait Islander females was 7.8 years less than the expectation of 83.4 years for non-Indigenous females. Revised estimates were also published for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT (Table 6).

**Table 6. Expectation of life at birth in years, by Indigenous status and sex, selected jurisdictions, Australia, 2015-2017**

Jurisdiction	Aboriginal and Torres Strait Islander	Non-Indigenous	Difference
<b>Males</b>			
NSW	70.9	80.2	9.4
Qld	72.0	79.8	7.8
WA	66.9	80.3	13.4
NT	66.6	78.1	11.5
Australia (headline)	71.6	80.2	8.6
Australia (unadjusted)	70.0	80.2	10.3
<b>Females</b>			
NSW	75.9	83.5	7.6
Qld	76.4	83.2	6.7
WA	71.8	83.8	12.0
NT	69.9	82.7	12.8
Australia (headline)	75.6	83.4	7.8
Australia (unadjusted)	74.4	83.5	9.0

Notes:

- 1 These estimates are based on the average number of Aboriginal and Torres Strait Islander deaths registered in 2015-2017 adjusted for under-identification and over-identification of Indigenous status in registrations. Final Aboriginal and Torres Strait Islander population estimates are based on the 2016 Census.
- 2 Australian estimates are based on deaths in all states and territories.
- 3 Differences are based on unrounded estimates.
- 4 Headline estimates for Australia are calculated taking age-specific identification rates into account.
- 5 Unadjusted estimates are not the headline estimates for Australia, because they are calculated without an age-adjustment, but are provided to enable effective comparisons with the state and territory estimates.

Source: ABS, 2018 [39]

Life expectancy for Aboriginal and Torres Strait Islander people varied considerably by remoteness of residence [39]. Aboriginal and Torres Strait Islander males living in major cities had a life expectancy of 72.1 years in 2015-2017, compared with 65.9 years for those living in remote and very remote areas. For females, the figures were 76.5 years for major cities and 69.6 years for remote and very remote areas (Table 7).

**Table 7. Expectation of life at birth in years, by Indigenous status and remoteness, Australia, 2015-2017**

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

Notes:

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

Source: ABS, 2018 [39]

The life expectancy data for 2015-17 are not comparable to previous census data due to changes in the identification of Indigenous status [34]. Due to this, the *Overview* does not provide trend analysis data for life expectancy.

## Age at death

In 2019, the median age at death<sup>9</sup> for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT was 60.4 years [38]. The latest information available for the median age of death, by jurisdiction, is for 2018. The median age of death varied across the selected jurisdictions with NSW having the highest median age of death for both males and females (Table 8) [40]. The lowest median age of death for males was reported for the NT, and for females was in WA.

**Table 8. Median age at death, Aboriginal and Torres Strait Islanders, by sex, NSW, Qld, WA, SA and the NT, 2018**

Jurisdiction	Aboriginal and Torres Strait Islanders		
	Males	Females	Persons
NSW	60.5	66.5	62.7
Qld	59	65	61.6
WA	55.1	58.3	56.8
SA	55.1	62.5	58.3
NT	54.8	60.4	57.9
Total for the selected jurisdictions	57.7	63	60.2

Notes:

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

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

Source: ABS, 2019 [40]

## Age-specific death rates

In 2019, in NSW, Qld, WA, SA, and the NT, the age-specific death rate for Aboriginal and Torres Strait Islander people for all ages was 439 per 100,000 [38]. The age-specific rates increased with age from 5-14 years, with the highest rate reported in the 75 years and over age-group (7,320 per 100,000 estimated resident population (ERP)), followed by the 65-74 years age-group (2,517 per 100,000) and 55-64 years age-group (1,283 per 100,000). The lowest rate of 14 per 100,000 was in the 5-14 years age-group.

## 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 2019, the Aboriginal and Torres Strait Islander IMR was 5.8 per 1,000 live births [38].

In the five-year period 2014-2018, in NSW, Qld, WA, SA and the NT, 514 infant deaths represented 85% of all deaths among 0-4 year old Aboriginal and Torres Strait Islander children (603) (Derived from [34]). The IMR was highest among male infants compared with female infants (6.9 per 1,000 and 5.7 per 1,000 respectively) [34]. By selected jurisdiction, the IMR for Aboriginal and Torres Strait Islander infants combined was 6.3 per 1,000 with the highest rate in the NT (14 per 1,000), followed by WA (6.8 per 1,000); Qld (6.4 per 1,000); SA (4.6 per 1,000) and NSW the lowest (4.5 per 1,000).

Aboriginal and Torres Strait Islander infants most commonly died from conditions in the International Classification of Diseases (ICD) 'Certain conditions originating in the perinatal period', including birth trauma, disorders relating to fetal growth, and complications from pregnancy, labour and delivery, and respiratory and cardiovascular disorders specific to the perinatal period [34]. This accounted for over half (57%) of all Aboriginal and Torres Strait Islander infant deaths for 2014-2018. The second major cause was ICD 'Symptoms, signs and ill-defined conditions, which includes sudden infant death syndrome (SIDS) and accounted for 15% of Aboriginal and Torres Strait Islander infant deaths.

<sup>9</sup> The median age at death is the age below which 50% of people die.

## Child mortality

For 2014-2018, among Aboriginal and Torres Strait Islander children aged 0-4 years, living in NSW, Qld, WA, SA and the NT, there were 603 deaths; 514 in children aged 0-1 years of age and 89 in children aged 1-4 years of age [34]. The child mortality rate was 146 per 100,000 for 0-4 year olds and 27 per 100,000 for 1-4 year olds at rates 2.0 and 1.8 times higher respectively, compared with non-Indigenous children. Aboriginal and Torres Strait Islander males had the highest child mortality rate for both age-groups (0-4 years: 159 per 100,000 and 1-4 years: 30 per 100,000) compared with females (0-4 years: 131 per 100,000 and 1-4 years: 24 per 100,000). For the selected jurisdictions, the NT has the highest child mortality rates for the 0-4 and 1-4 year old age-groups (305 and 58 per 100,000 respectively) and NSW the lowest rates (95 and 16 per 100,000 respectively).

In the five-year period 2014-2018, Aboriginal and Torres Strait Islander children most commonly died from conditions in the International Classification of Diseases (ICD) 'Certain conditions originating in the perinatal period' in the 0-4 year age-group (49%) and from 'External causes of morbidity and mortality' including transport accidents and injury, in the 1-4 year age-group (49%) [34].

## Causes of death

Ischaemic heart disease (IHD) was the leading cause of death of Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT in 2019 [41]. IHD accounted for 405 deaths, representing 12% of all deaths for Aboriginal and Torres Strait Islander people (total 3,435 for selected jurisdictions). The other leading specific causes of death were chronic lower respiratory diseases: 266 deaths (7.7%); diabetes: 239 deaths (7%) and cancer of trachea, bronchus and lung: 205 deaths (6.0%).

In 2019, for both Aboriginal and Torres Strait Islander males and females living in NSW, Qld, WA, SA and the NT, the leading cause of death was IHD [41]. The next leading causes of death for males were intentional self-harm and chronic lower respiratory diseases, and for females, chronic lower respiratory diseases and diabetes.

Five-year aggregated age-standardised death rates for the period 2015-2019 for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT show that the leading cause of death was IHD (117 per 100,000) [41]. The next leading causes of death were chronic lower respiratory diseases (76 per 100,000) and diabetes (74 per 100,000). For 2015-2019, the leading cause of death for both Aboriginal and Torres Strait Islander males and females living in NSW, Qld, WA, SA and the NT was IHD (150 per 100,000 and 88 per 100,000 respectively). The next leading causes of death for males were chronic lower respiratory diseases (83 per 100,000) and cancer of the trachea, bronchus and lung (72 per 100,000) and diabetes (72 per 100,000), and for females, diabetes (76 per 100,000) and chronic lower respiratory diseases (71 per 100,000).

Further information for underlying causes of death is available for the 2014-2018 period for Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT. The leading causes of death were neoplasms (including cancer) 23% of all deaths; circulatory diseases (e.g. heart attacks) 23%; external causes of morbidity and mortality (e.g. injury) 15%; respiratory diseases 9.4% and diabetes 7.5% [42]. Among the top leading causes of death for Aboriginal and Torres Strait Islander males were circulatory diseases at 23% of all deaths; neoplasms 22% and external causes of morbidity and mortality 18%. For females, they were neoplasms 24%; circulatory diseases 22% and respiratory diseases 11%.

Age-specific rates, from 5 years of age and above, for underlying causes of death among Aboriginal and Torres Strait Islander people, indicated that external causes of morbidity and mortality (e.g. injury and self-harm) were the leading cause of death for Aboriginal and Torres Strait Islander people aged 5-14 to 35-44 years in the 2014-2018 period [42]. Leading causes of deaths for the: 45-54 years age-group were circulatory diseases, for the 55-64 to 65-74 years age-group were neoplasms (including cancer) and for 75 years and over were circulatory diseases.

Information for 2014-2018 for NSW, Qld, WA, SA and the NT indicated circulatory diseases and neoplasms (including cancer) as the leading causes of death for Aboriginal and Torres Strait Islander people [42].

This pattern was also evident for data by remoteness with age-standardised death rates increasing with remoteness. Of note, circulatory diseases were 1.7 higher in remote areas compared with non-remote areas (326 per 100,000 and 198 per 100,000 respectively) and neoplasms (including cancer) 1.4 times higher (290 per 100,000 and 202 per 100,000 respectively). The highest rate difference between remote and non-remote areas was for endocrine, nutritional and metabolic diseases (e.g. diabetes) deaths; 183 per 100,000 compared with 60 per 100,000.

## Maternal mortality

Maternal deaths refer to deaths of women during pregnancy or up to 42 days after delivery [43, 44]. Direct maternal deaths refer to those resulting from obstetric complications (including in pregnancy, labour, and in the first six 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. Coincidental deaths refer to deaths from unrelated causes (accidental and/or incidental) that occur during the pregnancy or up until six weeks after delivery.

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 [43, 44].

In Australia between 2012-2018, 16 of the 126 maternal deaths reported were of Aboriginal and Torres Strait Islander women (Indigenous status was not reported in 11 of the deaths) [44]. Of these 16 Aboriginal and Torres Strait Islander maternal deaths, eight were direct and eight were indirect. The MMR for Aboriginal and Torres Strait Islander women was 20 deaths per 100,000 women who gave birth.

Between 2006-2017<sup>10</sup> there were 24 maternal deaths with the leading causes of Aboriginal and Torres Strait Islander deaths being cardiovascular diseases (25% of maternal deaths) and sepsis (21%) [43].

## Avoidable deaths

Potentially avoidable deaths refers to deaths that could have been prevented with timely and effective health care, including early detection and effective treatment [45]. They are calculated using the population data for Australians less than 75 years of age. For Aboriginal and Torres Strait Islander people chronic disease and injury cause the highest proportion of avoidable deaths [42].

In 2014-2018, there were 7,072 deaths (males: 4,148; females: 2,924) from avoidable causes among Aboriginal and Torres Strait Islander people aged 0-74 years living in NSW, Qld, WA, SA and the NT [34]. The 7,072 deaths represented 61% of Aboriginal and Torres Strait Islander people who died during this period. Males were more likely to die from avoidable causes than females (crude rates 238 and 168 per 100,000 respectively). The avoidable age-specific mortality rate was relatively high for children under one year of age (412 per 100,000 live births), falling to the lowest rate for children aged 1-4 years (18 per 100,000 ERP) and 5-14 years (12 per 100,000 ERP) before increasing from the 5-14 years through to the 65-74 years age-group (Table 9).

<sup>10</sup> Data were unavailable for WA and due to the small number of Aboriginal and Torres Strait Islander women in the National Maternal Data Collection, data for 2006-2017 were used [43].

**Table 9. Numbers and age-specific rates for avoidable deaths, by Indigenous status, NSW, Qld, WA, SA and the NT, 2014-2018**

Age-group (years)	Aboriginal and Torres Strait Islander people	
	Number	Rate per 100,000
Less than 1	335	412
1-4	60	18
5-14	97	12
15-24	471	69
25-34	678	135
35-44	941	241
45-54	1,391	392
55-64	1,647	712
65-74	1,452	1,371
All ages – crude rate	7,072	203
All ages – age-standardised rate	7,072	312

Source: AIHW, 2020 [34]

Age-adjusted rates for avoidable deaths were highest in the NT (548 per 100,000), followed by WA (443 per 100,000), with the lowest in NSW (216 per 100,000) [34]. Aboriginal and Torres Strait Islander people living in remote areas had the highest avoidable mortality rate (479 per 100,000), 2.2 times higher than those living in major cities (217 per 100,000) and 1.7 times higher than those living in regional areas (278 per 100,000).

In 2014-2018, 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 IHD (21%), diabetes (12%), suicide and self-inflicted injuries (11%), and chronic obstructive pulmonary disease (COPD) (8.3%) and cancer (8.1%) [34].

## Hospitalisation

Statistics on hospitalisation provide some indication of the burden of disease in the population [46]. They are, however, a poor reflection of the extent and patterns of treatable illness in the community because they only represent the most serious illnesses, those serious enough requiring hospitalisation [34]. Hospitalisations are also influenced, to some extent, by the geographic accessibility of hospitals and variations in admission policies and practices for illnesses [37, 47]. 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 [47] (See Appendix 1).

Another limitation of the available hospital statistics as an indicator of the health of the population, is that they relate to episodes of hospitalisation rather than to individual patients [37, 48]. Also, it is difficult to analyse patterns of care for patients hospitalised multiple times (for example for kidney dialysis) from the current national hospitalisation data [37, 49].

Hospitalisation rates will be affected by advancements in the health system [34], improvements in self-identification by Aboriginal and Torres Strait Islander people [50], and reforms that tackle the social determinants of health [34].

## Separation rates

Of the nearly 11.5 million hospital separations in Australia<sup>11,12</sup> during 2018-19, there were 558,553 (4.9%) identified as Aboriginal and/or Torres Strait Islander (Table 10) [49]. Of these hospital separations, 92% were for Aboriginal people, 4.3% were for Torres Strait Islander people, and 4.2% were for people who identified

11 All hospitalisation data for Tas, ACT and the NT includes only public hospitals [49].

12 247,082 separations (2.2%) had no Indigenous status reported [49].



as being of both Aboriginal and Torres Strait Islander descent. Of the 558,553 separations; 57% were for females and 43% for males.

In 2018-19, the overall age-standardised separation rate for Aboriginal and Torres Strait Islander people was 956 separations per 1,000 (Table 10) [49]. The highest age-standardised separation rate was for Aboriginal and Torres Strait Islander people living in the NT (2,229 per 1,000) and the lowest in NSW (556 per 1,000).

**Table 10. Numbers of hospital separations and age-standardised hospital separation rates for Aboriginal and Torres Strait Islanders, by jurisdiction, 2018-19**

Jurisdiction	Number	Rate
NSW	110,695	556
Vic	32,003	708
Qld	153,800	961
WA	98,666	1,404
SA	30,452	1,024
NT	120,719	2,229
Australia	558,553	956

Notes:

1 Rates per 1,000 population.

2 Numbers and rates for the NT are for public hospitals only; numbers and rates are not included separately for public hospitals in Tas or the ACT but included in totals where applicable.

Source: AIHW, 2020 [49]

For the two year period 2015-17, just over one million Aboriginal and Torres Strait Islander people were hospitalised at an age-standardised rate of 907 per 1,000 population [34]. Dialysis accounted for 461,806 of these separations and when care involving dialysis was excluded the rate was 435 per 1,000 (crude rate 340 per 1,000).

## Age-specific separation rates

In 2015-17, age-specific hospital separation rates (excluding dialysis) for Aboriginal and Torres Strait Islander people increased with age (except for 0-4 year olds), with the highest rate in the 65 years and over age-group (Table 11) [34]. For Aboriginal and Torres Strait Islander females, the rates, compared with males, were higher across all age-groups from 15 to 54 years of age.

**Table 11. Age-specific hospital separation rates (excluding dialysis), by sex, Aboriginal and Torres Strait Islanders, 2015-17**

Age-group (years)	Males	Females	Persons
0-4	346	273	311
5-14	112	96	104
15-24	151	371	258
25-34	234	521	377
35-44	368	500	436
45-54	487	527	508
55-64	608	588	597
65+	893	864	877
All ages (age-standardised)	395	477	435
All ages (crude)	290	390	340

Notes:

1 Rates per 1,000 population.

2 Data includes public and private hospitals in all jurisdictions.

3 Age-standardised using the Australian 2001 standard population.

Source: AIHW, 2020 [34]

In 2018-19, Aboriginal and Torres Strait Islander children aged 0-4 years were hospitalised at a crude rate of 323 per 1,000, with diseases of the respiratory system being responsible for the highest rates of hospitalisation (84 per 1,000) [51]. For the period 2016-18, hospitalisation rates for Aboriginal and Torres Strait children aged 0-4 years increased with remoteness: major cities (285 per 1,000); regional areas (294 per 1,000) and remote/very remote areas (475 per 1,000). Hospitalisation rates in remote/very remote areas were 1.7 times higher than those in the city.

## Causes of hospitalisation

In 2018-19, the most common reason for the hospitalisation of Aboriginal and Torres Strait Islander people in Australia was for conditions in the ICD 'Factors influencing health status and contact with health services', mostly for care involving dialysis, responsible for 47% of Aboriginal and Torres Strait Islander separations (261,425 separations) [49]. Many of these separations involved repeat admissions for the same people. ICD 'Injury, poisoning and certain other consequences of external causes' (including motor vehicle accidents, assaults, self-inflicted harm and falls) was the second most common cause of hospitalisation for Aboriginal and Torres Strait Islander people, responsible for 37,460 separations (6.7% of all separations). After ICD 'Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified', the next leading cause of hospitalisation for Aboriginal and Torres Strait Islander people was 'Diseases of the respiratory system' responsible for 30,262 separations (5.4% of all separations) (Table 12).

**Table 12. Numbers, proportions (%), and age-standardised hospitalisation rates for leading causes of hospital separations among Aboriginal and Torres Strait Islander people, Australia, 2018-19**

Principal diagnosis (ICD)	Number of separations	Proportion of separations (%)	Age-standardised separation rate
Injury, poisoning and certain other consequences of external causes	37,460	6.7	52
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	32,803	5.9	52
Diseases of the respiratory system	30,262	5.4	45
Pregnancy, childbirth and the puerperium	29,323	5.2	32
Diseases of the digestive system	27,828	5.0	43
Mental and behavioural disorders	23,700	4.2	34
Diseases of the circulatory system	16,124	2.9	32
Diseases of the genitourinary system	15,557	2.8	25
Diseases of the musculoskeletal system and connective tissue	13,797	2.5	25
Diseases of the skin and subcutaneous tissue	11,707	2.1	16
Endocrine, nutritional and metabolic diseases	10,998	2.0	18
Certain infectious and parasitic diseases	9,675	1.7	14
Neoplasms	9,357	1.7	19
Diseases of the nervous system	8,135	1.5	12
Factors influencing health status and contact with health services	261,425	47	510
All causes	558,553	100	956

Notes:

1 Separation rates per 1,000 population.

2 Hospitalisation data for the Tas, ACT and the NT include only public hospitals.

3 Some principal diagnoses have been excluded.

Source: AIHW, 2020 [49]

## Potentially preventable hospitalisations

Potentially preventable hospitalisations are admissions which ‘could have potentially been prevented through the provision of appropriate individualised preventative health interventions and early disease management usually delivered in primary care and community-based care settings’ [52]. Rates for potentially preventable hospitalisations, including those for chronic conditions, acute conditions and vaccine-preventable conditions, may be used as an indirect measure of problems with access to care and effective primary care [53].

In 2018-19, the age-standardised rate of overall potentially preventable hospitalisations for Aboriginal and Torres Strait Islander people was 75 per 1,000 [49]. The highest rates for potentially preventable hospitalisations of Aboriginal and Torres Strait Islander people were for chronic conditions (36 per 1,000 (including 7.2 per 1,000 for diabetes complications)) and acute conditions (29 per 1,000). The rate for vaccine-preventable conditions was 11 per 1,000. Information by jurisdiction (Table 13) reveals that the NT had the highest rates for potentially preventable hospitalisations of 136 per 1,000.

**Table 13. Age-standardised hospital separation rates for selected potentially preventable hospitalisations for Aboriginal and Torres Strait Islander people, by condition type, by jurisdiction, all hospitals, 2018-19**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Vaccine-preventable conditions	4.7	6.1	10	16	13	1.7	2.1	35	11
Acute conditions	20	21	34	38	26	13	20	51	29
Chronic conditions	29	35	38	44	36	16	17	56	36
Total	53	62	81	94	73	29	38	136	75

Notes: Rates are per 1,000 population.

Source: AIHW, 2020 [49]

For 2016-18, age-standardised potentially preventable hospitalisation rates were available by remoteness [51]. For this period, the rate for all three condition types increased with remoteness with the highest rates in the remote/very remote setting: vaccine preventable conditions (7.8 per 1,000); chronic conditions (50 per 1,000) and acute conditions (52 per 1,000) (Table 14). When comparing between condition types and remoteness settings, acute conditions were highest, with the rate for remote/very remote areas 2.5<sup>13</sup> times the rate for major cities (52 and 20 per 1,000 respectively).

**Table 14. Age-standardised hospital separation rates for potentially preventable hospitalisations for Aboriginal and Torres Strait Islander people, by condition type, by remoteness, 2016-18**

	Major cities	Regional	Remote/very remote	Total
Vaccine-preventable conditions	3.3	3.7	7.8	4.4
Acute conditions	20	26	52	29
Chronic conditions	26	33	50	34

Notes:

1 Rates are per 1,000 population.

2 Data are from public and private hospitals in all jurisdictions.

3 Rates are directly age-standardised using the Australian 2001 standard population.

Source: Steering Committee for the Review of Government Service Provision, 2020 (Derived from [51])

In 2018-19, the national crude rate of hospitalisations for Aboriginal and Torres Strait Islander children aged 0-4 years for potentially preventable diseases and injuries was 171 per 1,000 [51]. For remoteness, available data for 2016-18 show that the rates increased by remoteness: major cities (135 per 1,000); regional (147 per 1,000) and remote/very remote areas (319 per 1,000). The rate of hospitalisations of Aboriginal and Torres Strait Islander children was 2.4 times as high in remote/very remote areas as it was in major cities.

<sup>13</sup> Rounding may result in inconsistencies in calculated rates.

## Selected health conditions

### Cardiovascular health

Cardiovascular disease (CVD) is the term for those diseases and conditions that affect the heart and blood vessels [54]. Specific types of CVD include IHD, cerebrovascular disease (including stroke), hypertension (high blood pressure), and rheumatic heart disease (RHD) [31, 54]. CVD presents a significant burden for Aboriginal and Torres Strait Islander people in terms of prevalence, hospitalisation and mortality [55].

Most types of CVD (excluding RHD) share a common set of risk factors. These include: smoking, unhealthy diet, physical inactivity, high alcohol use, high blood pressure, high cholesterol, unhealthy weight, type 2 diabetes, chronic kidney disease, depression/social isolation, sex, family history of CVD, ethnicity and age [56-58]. Evidence shows that the risk of CVD starts relatively early for Aboriginal and Torres Strait Islander people, and a consensus statement was released this year recommending that Aboriginal and Torres Strait Islander people begin having CVD risk assessments at younger ages because of early disease onset [56].

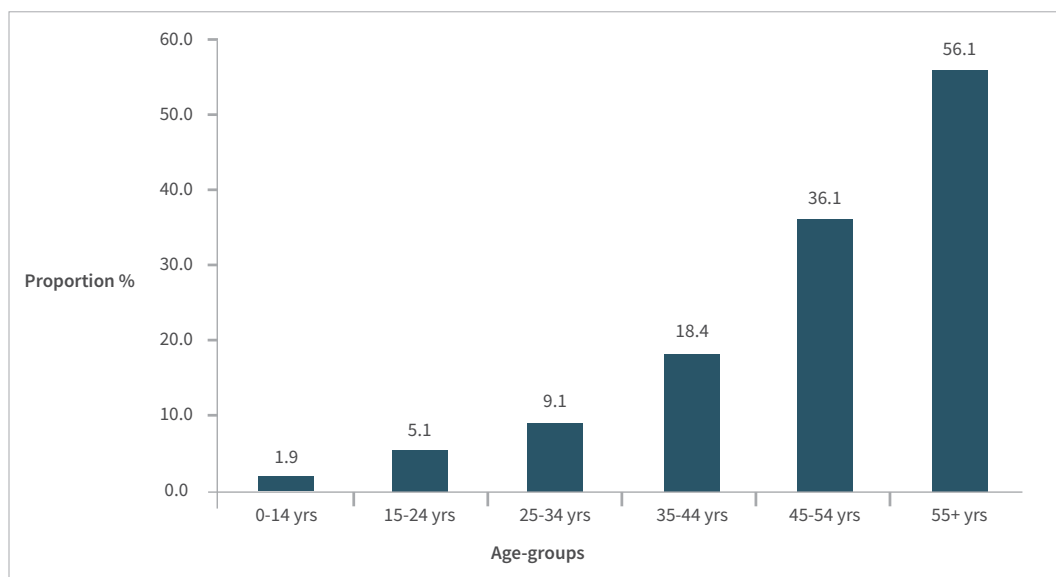
Unlike other types of CVD, RHD occurs when acute rheumatic fever (ARF), an illness that affects the heart, joints, brain and skin, leads to permanent damage to the heart valves [59]. ARF is caused by an untreated bacterial (group A streptococci (GAS)) infection of the throat<sup>14</sup>. Reducing ARF 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 [59, 60]. A comprehensive, long-term strategy was released in 2020 setting out the actions required to eliminate RHD in Australia [59].

### Extent of cardiovascular disease among Aboriginal and Torres Strait Islander people

#### Prevalence of cardiovascular disease

Around 15% of participants in the 2018-19 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) reported having CVD<sup>15</sup> [61]. CVD was reported more frequently by females (17%) than by males (14%). The prevalence of CVD increased with age, from 1.9% among those aged 0-14 years to 56% among those aged 55 years and over (Figure 2).

**Figure 2. Proportion (%) of Aboriginal and Torres Strait Islander people with self-reported CVD, by age-group (years), Australia, 2018-19**



Note: Proportions expressed as percentages.  
Source: ABS, 2019 [61]

<sup>14</sup> and probably, in some settings, of the skin [59, 60].

<sup>15</sup> CVD includes any of the conditions defined by ICD-10 codes I00-I99 [31].

‘Heart, stroke and vascular disease’<sup>16</sup> was self-reported as a long-term condition by 5.2% of 2018-19 NATSIHS participants (5.3% of Aboriginal people and 3.0% of Torres Strait Islander people) [61]. The prevalence of ‘heart, stroke and vascular disease’ was slightly higher among males (5.5%) than females (4.9%). Prevalence increased with age, from 0.3% among those aged 0-14 years to 26% among those aged 55 years and over. Prevalence was slightly higher in non-remote areas (5.4%) than remote areas (4.9%). Of Australia’s states and territories, Tas and the ACT had the highest prevalence of self-reported ‘heart, stroke and vascular disease’ (6.7% and 6.5% respectively), while NSW and Vic had the lowest (both 5.0%).

Hypertension<sup>17</sup> was self-reported by 8.3% of NATSIHS participants (8.3% of Aboriginal people and 6.6% of Torres Strait Islander people) [61]. The prevalence of hypertension was similar for males and females (8.4% and 8.2% respectively). Prevalence increased with age, from none among those aged 0-14 years to 38% among those aged 55 years and over. Prevalence was higher in remote areas (10%) than non-remote areas (7.9%). Of Australia’s states and territories, Tas and the NT had the highest prevalence of self-reported hypertension (9.4% and 8.8% respectively), while Vic had the lowest (5.5%).

As well as being asked to self-report whether they had hypertension, participants in the 2018-19 NATSIHS aged 18 years and over were invited to voluntarily provide a blood pressure reading at the time of the interview. When measured<sup>18</sup>, 23% of adult participants had high blood pressure<sup>19</sup> [61]. Twenty-three per cent (23%) of Aboriginal adults and 26% of Torres Strait Islander adults had measured high blood pressure. Prevalence was higher among males than females (25% versus 21%). For males, prevalence was highest in the 45-54 years age-group and for females it was highest at ages 55 years and over (Table 15). Prevalence of measured high blood pressure was 22% in remote areas and 23% in non-remote areas across jurisdictions combined. Prevalence was highest in SA (30%) and lowest in Vic (18%).

**Table 15: Proportion (%) of Aboriginal and Torres Strait Islander people with measured high blood pressure, by age-group and sex, persons aged 18 years and over, 2018-19**

Age-group (years)	Males	Females	Persons
18-24	9.5	7.3	8.8
25-34	19	12	16
35-44	24	22	23
45-54	40	32	36
55 years and over	39	35	37
Total 18 years and over	25	21	23

Note: Proportions expressed as percentages.  
Source: ABS, 2019 [61]

High cholesterol was reported by 4.5% of NATSIHS participants, with the prevalence being identical for males and females [61]. The prevalence of high cholesterol increased with age, from none among those aged 0-14 years to 23% among those aged 55 years and over.

### Incidence and prevalence of ARF and RHD

The End RHD in Australia: Study of Epidemiology (ERASE) project, sought to provide the first multi-jurisdictional estimates of ARF/RHD morbidity burden in Australians aged <55 years using linked data from ARF/RHD registers, inpatient hospitalisations and death registries in NSW, Qld, WA, SA and the NT<sup>20</sup> [62]. It found that in 2015-2017, in NSW, Qld, WA, SA and the NT combined, there were 1,265 episodes of ARF among Aboriginal and Torres Strait Islander people aged <45 years. The crude rate was 76 per 100,000. Over half the episodes (55%) occurred in females, and the age-standardised rate was 1.4 times higher for females than

16 A group of long-term health conditions which includes: IHD (including heart attack and angina), cerebrovascular disease (including stroke), heart failure, oedema (fluid retention), and diseases of arteries, arterioles and capillaries [61].

17 Self-reported hypertension only; excludes clinically measured high blood pressure results [61].

18 Forty percent of adult participants in the NATSIHS did not have a blood pressure reading taken; for these participants, imputation (estimation of data) was used to obtain blood pressure [61].

19 Measured high blood pressure is defined as a blood pressure reading of ≥140/90 mmHg. Measured high blood pressure does not necessarily mean a person has hypertension [61].

20 The five jurisdictions where the majority of Aboriginal and Torres Strait Islander people live [62].

males. Over half the episodes (55%) occurred in people aged <15 years, and age-specific rates were highest for people aged 5-14 years (136 per 100,000, 653 episodes) (Table 16). The jurisdictions with the highest proportion of total episodes were the NT (59%, 744 episodes) and Qld (24%, 301 episodes). Nearly 8 out of every 10 episodes (77%) occurred in people living in remote or very remote areas<sup>21</sup> (Derived from [62]).

**Table 16. Number and age-specific rate of ARF episodes, Aboriginal and Torres Strait Islander people aged <45 years, NSW, Qld, WA, SA and the NT, 2015-2017**

Age-group (years)	Number of episodes	Proportion of total episodes (%)	Age-specific rate per 100,000
0-4	36	2.8	15
5-14	653	52	136
15-24	312	25	76
25-34	185	15	61
35-44	79	6.3	34
Total 0-44	1265	100	76

Note: Rates are rounded. Due to rounding, individual percentages may not add up to 100.

Source: Katzenellenbogen et al., 2020 (Derived from [67])

In 2015-2017, in NSW, Qld, WA, SA and the NT combined, there were 730 new diagnoses of RHD among Aboriginal and Torres Strait Islander people aged <45 years [62]. The crude rate was 44 per 100,000. The age-standardised rate was 1.9 times higher for females than males. The age-specific rate was relatively stable from ages 5 to 34 (between 49 and 51 new diagnoses per 100,000) (Table 17).

**Table 17. Number and age-specific rate of new RHD diagnoses, Aboriginal and Torres Strait Islander people aged <45 years, NSW, Qld, WA, SA and the NT, 2015-2017**

Age-group (years)	Number of episodes	Proportion of total episodes (%)	Age-specific rate per 100,000
0-4	5	0.7	2.0
5-14	234	32	49
15-24	202	28	49
25-34	153	21	51
35-44	136	19	58
Total 0-44	730	100	44

Note: Rates are rounded. Due to rounding, individual percentages may not add up to 100.

Source: Katzenellenbogen et al., 2020 (Derived from [62])

At mid-2017, in NSW, Qld, WA, SA and the NT combined, there were 3,967 Aboriginal and Torres Strait Islander people aged <55 years living with RHD [62]. Over two-thirds (67%, 2,665 people) were female. The mean age of people living with RHD was 23 years. People living with RHD were most likely to live in the NT (46%, 1,837 people) and Qld (33%, 1,297 people). About 7 in every 10 people living with RHD (72%, 2,727 people) lived in a remote or very remote area<sup>22</sup> (Derived from [62]).

In 2015-2017, in NSW, Qld, WA, SA and the NT combined, there were 5,126 Aboriginal and Torres Strait Islander people aged <55 years with a history of ARF and/or RHD [62]. The mean annual crude prevalence was 816 per 100,000. The mean annual age-standardised prevalence was 1.8 times higher for females than males. The mean annual age-specific prevalence was highest for those aged 25-34 years (1,212 per 100,000). The mean annual age-standardised prevalence was highest in the NT (3,545 per 100,000) and WA (1,012 per 100,000).

Several studies have used echocardiographic screening (ultrasound of the heart) to determine RHD prevalence in specific regions of Australia. A recent study in a West Arnhem Land community in the NT found that the total prevalence of ARF and RHD among Aboriginal and Torres Strait Islander people aged 5-20 years in that community was at least 10% [63]. A 2008-2010 survey found that the crude rate of definite RHD among Aboriginal and Torres Strait Islander children aged 5-15 years differed between regions, from 4.7 per

<sup>21</sup> 77% of episodes for which remoteness data was available (n=74 missing) [62].

<sup>22</sup> 72% of episodes for which remoteness data were available (n=246 missing) [62].

1,000 in Far North Qld to 15 per 1,000 in the Top End of the NT [64]. Both studies uncovered substantial levels of previously undetected disease.

### Hospitalisation

There were 16,124 hospital separations for CVD<sup>23</sup> among Aboriginal and Torres Strait Islander people in 2018-19 [49], representing 5.4% of all Aboriginal and Torres Strait Islander hospital separations (excluding dialysis) (Derived from [49]). In 2018-19, the crude CVD hospitalisation rate was 19 per 1,000 [51]. In 2016-18, the crude CVD hospitalisation rate was 19 per 1,000 for males and 18 per 1,000 for females.

In 2015-17, age-specific hospitalisation rates for CVD rose with age, from 1.9 per 1,000 for those aged 0-4 years to 111 per 1,000 for those aged over 65 years [34]. Although rates were highest for those aged over 65 years, CVD is recognised as having a substantial impact on younger Aboriginal and Torres Strait Islander people, with the age-specific rate for those aged 35-44 years being 22 per 1,000 in 2015-17.

In 2015-17, the crude rate of CVD hospitalisation for Aboriginal and Torres Strait Islander people was highest in the NT (33 per 1,000), WA (22 per 1,000) and Qld (18 per 1,000) and lowest in Tas (9 per 1,000) [34]. Other jurisdictions had rates of around 14 per 1,000. In 2016-18, rates were much higher in remote and very remote areas (29 per 1,000) than in inner and outer regional areas (18 per 1,000) and major cities (13 per 1,000) [51].

In 2015-17, of specific CVDs, IHD was responsible for the highest number of hospitalisations of Aboriginal and Torres Strait Islander people (36% of CVD hospitalisations), followed by pulmonary and other forms of heart disease (33%), cerebrovascular disease (9.3%), ARF (2.6%), RHD (1.9%) and hypertension (2.9%)<sup>24</sup> [34].

Rates of hospitalisation for heart-related conditions for Aboriginal and Torres Strait Islander people vary between regions. In 2012-2016, age-standardised rates of hospitalisation for heart attack, angina and heart failure combined<sup>25</sup> were highest in the SA4 region<sup>26</sup> of 'Perth – North East' (WA) (20 per 1,000) and 'Darwin' (NT) (18 per 1,000), and lowest in 'Sydney – Outer West and Blue Mountains' (NSW) (5.4 per 1,000) and 'Central Coast' (NSW) (6.6 per 1,000) [65].

### Mortality

Of all specific causes of death, IHD was the leading cause of Aboriginal and Torres Strait Islander deaths in NSW, Qld, WA, SA and the NT combined in 2019 (405 deaths) [41]. The age-standardised death rate due to IHD was 113 per 100,000. The age-standardised IHD death rate for males (145 per 100,000) was much higher than the rate for females (85 per 100,000).

Age-specific IHD death rates in 2015-2019 increased with age, with rates being highest for those aged 75 years and over (836 per 100,000) [41]. Although rates were highest among older people, IHD is recognised as having a substantial impact on younger Aboriginal and Torres Strait Islander adults; in 2015-2019, IHD was the leading cause of death for those aged 35-44 years (age-specific rate of 50 per 100,000 deaths) and the fourth-leading cause of death for those aged 25-34 years (age-specific rate of 10 per 100,000 deaths). Age-standardised IHD death rates in 2015-2019 were highest in the NT (168 per 100,000) and lowest in NSW (85 per 100,000).

In 2019, cerebrovascular disease was the sixth-leading specific cause of deaths of Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT combined (134 deaths) [41]. The age-standardised death rate due to cerebrovascular disease was 45 per 100,000. Age-standardised death rates for cerebrovascular disease for males and females were similar (47 per 100,000 and 42 per 100,000 respectively). Age-standardised cerebrovascular death rates for Aboriginal and Torres Strait Islander people in 2015-2019 were highest in WA (53 per 100,000) and lowest in NSW (34 per 100,000)<sup>27</sup>.

<sup>23</sup> ICD-10 codes I00-I99.

<sup>24</sup> 'Other diseases of the circulatory system' accounted for the remainder of CVD hospitalisations (around 14%) [34].

<sup>25</sup> Hospitalisations for the combined diagnostic groups ST-Elevation Myocardial Infarction (STEMI), Non-ST-elevation myocardial infarction (NSTEMI), Unstable Angina and Heart Failure.

<sup>26</sup> 'SA4 Regions' are statistical regions based on the Australian Statistical Geography Standard (ASGS) according to Statistical Area Level 4. Note that data was not available for some regions for this indicator, including all Tasmanian and most Victorian regions.

<sup>27</sup> Age-standardised death rate for cerebrovascular disease not available for NT [41].



In 2014-2018, there were 3,319 deaths of Aboriginal and Torres Strait Islander people in NSW, Qld, WA, SA and the NT combined caused by CVD [34]. CVD was the second-leading general cause of death after neoplasms (including cancer), accounting for 23% of all deaths. The crude CVD mortality rate was 94 per 100,000 [51]. The age-standardised CVD mortality rate for Aboriginal and Torres Strait Islander males (259 per 100,000) was higher than the rate for females (203 per 100,000) [34]. As with IHD, age-specific mortality rates for overall CVD increased with age, with high rates seen among people as young as 25-34 years (23 per 100,000). Age-standardised rates were highest in the NT (348 per 100,000) and lowest in NSW (171 per 100,000). Rates were higher in remote areas (326 per 100,000) than non-remote areas (198 per 100,000). Of specific CVD types, IHD caused the most deaths (56% of CVD deaths), followed by other heart disease<sup>28</sup> (17%), cerebrovascular disease (15%), hypertensive diseases (5.0%), RHD (3.5%) and other diseases of the circulatory system<sup>29</sup> (3.3%).

## Cancer

Cancer is the term used for a number of related diseases that cause damage to healthy body cells causing them to grow abnormally [66]. Cancer is a genetic disease, arising from changes to the genes that control the way cells behave. In all cancers, some of the cells of the body divide in an uncontrolled manner (cells normally grow and divide as the body needs them).

Cancer can start almost anywhere in the body [66] and there are more than 200 types of cancer [67]. The location in the body where the cancer cells begin forming is known as the primary site, and cancer is usually classified by this, for example lung cancer. When cancer cells travel and spread to other parts of the body it is described as metastasis.

Some data sources use the term 'neoplasm' to describe conditions associated with abnormal growth of new tissue, commonly referred to as a tumour. Neoplasms can be benign (not cancerous) or malignant (cancerous) [1].

There is limited evidence available on cancer to inform initiatives to improve outcomes for Aboriginal and Torres Strait Islander people diagnosed with cancer [68]. Inconsistent Indigenous identification in cancer notifications in several jurisdictions has been a problem [69], however nationally there is indication that accuracy in Indigenous identification is improving [1].

The National Aboriginal and Torres Strait Islander Cancer Framework highlights the need for improved Indigenous identification, including on pathology requests and reports [68]. It also expresses a need for routine national data collection, access and linkage to allow national monitoring and reporting, and inform strategies to improve cancer care and outcomes.

### *Extent of cancer among Aboriginal and Torres Strait Islander people*

#### **Incidence and prevalence**

In the 2018-19 NATSIHS, 1.3% of Aboriginal and Torres Strait Islander people reported having neoplasms (including both malignant and benign) as a long-term health condition [61]. The proportion of females who reported neoplasms was slightly higher than that of males, with percentages of 1.4% and 1.3% respectively. Among the 45-54 years age-group the proportion was 2.8% and among the 55 years and over age-group it was 5.3%. When comparing across jurisdictions, the highest proportion of cancer was reported in WA with 1.3%, and when comparing by remoteness, non-remote areas had a higher proportion of cancer (1.3%) reported than remote areas (0.7%).

For 2011-2015, there were 6,925 new cases of cancer diagnosed in Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT (an average of 1,385 new cases per year) [34]. The figures were similar across both sexes, with 3,435 new cases of cancer in males and 3,490 new cases in females (Table 18). Lung cancer had the highest incidence (15%) of all cancers among Aboriginal and Torres Strait Islander people with an average of 208 cases diagnosed each year. Prostate cancer accounted for 17% of all cancers diagnosed among males, and among females, breast cancer had the highest incidence (23% of all cancers diagnosed).

<sup>28</sup> ICD-10 codes I26-I52.

<sup>29</sup> ICD-10 codes I70-I99.



**Table 18. Incidence of all cancers combined and selected cancers for Aboriginal and Torres Strait Islander people, by sex, NSW, Qld, WA and the NT, 2011-2015**

Primary site	Males		Female		Persons	
	Number of new cases	Average number of new cases (per year)	Number of new cases	Average number of new cases (per year)	Number of new cases	Average number of new cases (per year)
Lung	539	108	501	100	1,040	208
Breast	n/a	n/a	810	162	810	162
Colorectal (bowel)	319	64	294	59	613	123
Prostate	575	115	n/a	n/a	575	115
Head and neck	348	70	121	24	469	94
Uterine	n/a	n/a	238	48	238	48
Liver	170	34	64	13	234	47
Cervical	n/a	n/a	146	29	146	29
Other cancer types	1,484	297	1,316	263	2,800	560
All cancers combined	3,435	687	3,490	698	6,925	1,385

Notes:

1 Number of cases of breast, uterine and cervical cancers are for females only, and prostate cancer is for males only.

2 All cancers combined comprises ICD-10 codes C00–C97, D45–D46, D47.1 and D47.3–D47.5, with the exception of basal and squamous cell skin cancers.

3 n/a – non-applicable.

Source: AIHW, 2020 [34]

For 2011–2015 the incidence rate of all cancers combined for Aboriginal and Torres Strait Islander people was 495 per 100,000 population [34]. Across jurisdictions, the incidence rate was highest in Qld at 529 per 100,000, followed by NSW at 500 per 100,000. In the NT the incidence rate was slightly lower at 448 per 100,000 and WA had the lowest rate at 441 per 100,000. When comparing by remoteness, outer regional, remote and very remote locations had higher incidence rates (535, 505 and 517 per 100,000 respectively) than major cities and inner regional locations (495 and 442 per 100,000 respectively).

Across most jurisdictions the most common new diagnoses among Aboriginal and Torres Strait Islander people in 2011–2015, were for cancers of the lung, bowel, breast and prostate [34]. However, for the NT the most common diagnoses included cancers of the head and neck and liver instead of bowel and prostate. Prostate cancer accounted for 2.2% of diagnoses in the NT, while in the other states it was 7.1%–9.7% of diagnoses. When comparing by age-groups the incidence rates of most cancer types generally increased with age. One anomaly was cervical cancer, which had a higher rate among females aged 45–54 years (24 per 100,000), than among those aged 55–74 years (rates of 18 per 100,000 for the 55–64 years age-group and 23 per 100,000 for the 65–74 years age-group).

Age-adjusted incidence rates for Aboriginal and Torres Strait Islander people are available for some cancer types through monitoring mechanisms for some national screening programs. Information about the incidence of bowel cancer among Indigenous people in NSW, Vic, Qld, WA and the NT was presented in the *National Bowel Cancer Screening Program monitoring report 2020* [70]. For the period 2011–2015, the age-standardised incidence rate of bowel cancer among Aboriginal and Torres Strait Islander people, aged 50–74 years, was 117 per 100,000.

Incidence data for cervical cancer in the period 2011–2015 were presented in the *National Cervical Screening Program monitoring report 2020* [71]. The incidence rate for cervical cancer among Indigenous Australian women, aged 25–74 years, living in NSW, Qld, WA and the NT was 19 per 100,000. It is noted in the report that counts and rates for Indigenous women are underestimated due to the relatively large proportion of women whose Indigenous status is not stated.

In the *BreastScreen Australia monitoring report 2020* [72], detailed information was provided about the incidence of breast cancer across four jurisdictions: NSW, Qld, WA and the NT, for the five-year period 2011–2015. Across these jurisdictions, there were 501 cases of breast cancer diagnosed among Aboriginal and

Torres Strait Islander females aged 50-74 years, with an incidence rate of 233 per 100,000 women. The incidence rate was highest in NSW (243 per 100,000), followed by Qld (238 per 100,000). WA had an incidence rate of 221 per 100,000 and the lowest rate was reported in the NT (200 per 100,000). The incidence rate across all age-groups was 52 cases per 100,000 females and peaked in the 65-69 years age-group (404 per 100,000).

### Survival

Information on survival from cancer for Aboriginal and Torres Strait Islander people is available for the 10 year period 2006-2015 and is provided only for NSW, Qld, WA and the NT, where data are considered of sufficient completeness for reporting [34]. The approximate relative survival for all cancers combined was 51%; this means that about half of the people diagnosed with cancer had survived for five years or more after their diagnosis. The five-year approximate relative survival for Aboriginal and Torres Strait Islander males was lower than for females (48% and 54% respectively). The five-year approximate relative survival for some cancer types was higher than others, with prostate, breast and uterine cancers having the greatest chance of survival (Table 19).

**Table 19. Five-year approximate relative survival (%) for Aboriginal and Torres Strait Islander people by sex, for selected cancers, NSW, Qld, WA and the NT, 2006-2015**

Cancer type	Males	Females	Persons
Lung	12%	10%	11%
Colorectal (bowel)	54%	62%	58%
Head and neck	40%	46%	42%
Breast	n/a	81%	n/a
Cervical	n/a	55%	n/a
Prostate	89%	n/a	n/a
Uterine	n/a	79%	n/a
Bladder	47%	49%	48%
Stomach	22%	n.p.	21%
All cancers combined	48%	54%	51%

Notes:

- Survival for breast, uterine and cervical cancers are for females only. Survival for prostate cancer is for males only.
- n/a – non-applicable.
- n.p. – not published (estimate not reliable as there were not enough cases).
- All cancers combined include cancer types not listed in the table.

Source: AIHW, 2020 [34]

Crude survival rates are available for the same jurisdictions in the period 2006-2015, which show survival decreases with remoteness [34]. The five-year crude survival rate for major cities was 50%, while for inner and outer regional locations it was 46% and for remote and very remote locations it was 36%.

### Hospitalisation

In 2018-19, there were 9,357 hospital separations for neoplasms (including all types of cancer), representing 3.1% of all separations (excluding dialysis) among Aboriginal and Torres Strait Islander people (Derived from [49]). Aboriginal and Torres Strait Islander people were hospitalised for neoplasms at a rate of 19 per 1,000, this was a lower rate than that for the general population at 25 per 1,000. More detailed hospitalisation data for Aboriginal and Torres Strait Islander people are available for the two-year period 2015-17. In this period, there were 24,871 cancer-related hospitalisations, comprising of 13,621 same day separations and 11,250 overnight separations [34]. Of these, 10,232 hospitalisations were for cancer as the principal diagnosis, at an age-standardised rate of 12 per 1,000 [34]. The rate was higher for males (14 per 1,000) than for females (10 per 1,000). The rate of hospitalisations increased with age, with the highest rate being 49 per 1,000 among the 65 years and over age-group. Most hospitalisations took place in regional locations (46%) and cities (36%), while 17% took place in remote and very remote locations.

Numbers of hospitalisations are available for selected cancer types for the two-year period 2015-17, including:

1,281 hospitalisations for cancers of the blood and lymphatic system; 985 for lung cancer; 678 for breast cancer; 605 for bowel cancer; 464 for bladder cancer; 463 for prostate cancer (in males); 437 for cancers of the mouth and throat; 188 for cervical cancer (in females); and 1,346 for cancers of unknown primary site.

### Mortality

For the period 2014-2018, the age-standardised mortality rate due to cancer of any type was 221 per 100,000 [34]. The rate for males, 263 per 100,000, was much higher than for females, 189 per 100,000. Cancer death rates increased incrementally with age: from 1.6 per 100,000 for children aged 0-14 years to 1,591 per 100,000 for those aged 75 years and over.

Numbers of deaths relating to cancer among Aboriginal and Torres Strait Islander people are available for the period 2014-2018 [34]. The combined total number of deaths for all cancers was 3,340, comprising 1,762 males and 1,578 females. Table 20 shows numbers of deaths for males and females for selected cancers.

**Table 20. Number of deaths for Aboriginal and Torres Strait Islander people by sex, for selected cancers, NSW, Qld, WA, SA and the NT, 2014-2018**

Cancer site/type	Number of deaths		Total number of deaths
	Males	Females	
Lung	487	392	879
Colorectal (bowel)	139	114	253
Blood and lymphatic	128	122	250
Unknown primary site	120	113	233
Liver	146	85	231
Pancreatic	102	109	211
Head and neck	155	53	208
Breast	3	189	193
Oesophageal	100	29	129
Bladder	79	46	125
Prostate	96	n/a	96
Cervical	n/a	66	66
Other cancers	207	291	466
All cancers combined	1,762	1,578	3,340

Notes:

- 1 Numbers of deaths due to cervical cancer are for females only, and prostate cancer is for males only.
- 2 This table includes number of deaths for five selected cancer types for the Aboriginal and Torres Strait Islander population group. Deaths caused by other types of cancer are combined in the Other cancers row.
- 3 This table only includes deaths due to malignant neoplasms (cancerous tumours) and excludes deaths due to non-malignant neoplasms (in situ tumours, benign tumours and tumours of uncertain or unknown malignancy).
- 4 n/a – non applicable.

Source: AIHW, 2020 [34]

Further information is available regarding mortality for some of the more common types of cancer. In 2019, cancers of the trachea, bronchus and lung combined were the fourth leading cause of death for Aboriginal and Torres Strait Islander people (205 deaths: 111 males; 94 females) living in NSW, Qld, WA, SA and the NT [41]. The age-adjusted mortality rate for cancers of the trachea, bronchus and lungs for both males and females combined in 2019 was 61 per 100,000. For people aged 65-74 years, this rate increased to 267 per 100,000. Other types of cancer that were listed in the top 20 leading causes of death for Aboriginal and Torres Strait Islander people in 2019 include; cancers of the colon (bowel), sigmoid, rectum and anus (20 deaths per 100,000); cancers of the liver and intrahepatic bile ducts (16 per 100,000); pancreatic cancer (16 per 100,000); and cancers of the lymphoid, haematopoietic and related tissue (14 per 100,000). For males other cancers included; prostate (28 deaths per 100,000) and oesophagus (15 per 100,000), and for females other cancers included; breast (23 per 100,000) and uterine (10 per 100,000) [41].

For the period 2015-2019, generally cancers were not a leading cause of death among young Aboriginal and

Torres Strait Islander people (aged up to 45 years), however, cancers of the lymphoid, haematopoietic and related tissues (blood cancers) were the fifth leading cause of death among young Aboriginal and Torres Strait Islander males (aged 15-24 years) at a rate of 1.7 per 100,000 [41].

Indigenous identification data for mortality due to bowel cancer were collected by the National Mortality Database for the period 2014-2018, and presented in the *National Bowel Cancer Screening Program monitoring report 2020* [70]. The age-standardised mortality rate for Aboriginal and Torres Strait Islander people aged 50-74 years, living in NSW, Qld, SA, WA and the NT, was 37 per 100,000.

In the five year period 2014-2018, there were 57 deaths due to cervical cancer among Indigenous females aged 25-74 years in NSW, Qld, WA, SA and the NT [71]. The age-standardised mortality rate was 7.7 per 100,000 people (3.5 times higher than the non-Indigenous rate of 2.2). Later stage at diagnosis and availability of treatment, especially for females in remote areas, are suggested to be factors accounting for the higher cervical cancer mortality rates found for Aboriginal and Torres Strait Islander females [73].

The *BreastScreen Australia monitoring report 2020* provides mortality analysis for Aboriginal and Torres Strait Islander females in NSW, Qld, WA, SA and the NT [72]. For the period 2014-2018, there were 189 deaths due to breast cancer. Mortality rates are provided only for women in the 50-74 years age-group. For Aboriginal and Torres Strait Islander females in this age-group the mortality rate was 44 per 100,000. Breast cancer incidence and mortality as well as participation rates, are performance indicators monitored by BreastScreen Australia [72]. Participation in the BreastScreen Australia program<sup>30</sup> has historically been low for Aboriginal and Torres Strait Islander women [74, 75]. In positive news, the participation rate for women aged 50 to 69 years has increased from 25% in 1996-1997 to 37% in 2017-2018 [72]. However, participation in the screening program is still much lower than for non-Indigenous women, for whom the participation rate is 55%.

The patterns of Aboriginal and Torres Strait Islander cancer incidence and mortality can be partly explained by the higher level of risk factors, most notably tobacco use [76]. The rate of daily smokers among Aboriginal and Torres Strait Islander adults across all jurisdictions, as self-reported in the 2018-19 NATSIHS, was 40% [61]. This is the main contributing factor to the high incidence of lung cancer. High incidence rates of liver cancer are consistent with risky levels of alcohol consumption and a higher prevalence of hepatitis B infection. In the period 2018-19, 20% of Aboriginal and Torres Strait Islander adults were considered to have exceeded the lifetime risk guidelines for alcohol consumption [61]. Other factors contributing to cancer mortality include:

- Aboriginal and Torres Strait Islander people being more likely to have cancers that have a poor prognosis
- being diagnosed with cancer at a later stage
- being more likely to present with co-morbidities (that may lead to poorer outcomes)
- being less likely to receive any treatment, or adequate treatment [77, 78].

## Diabetes

Diabetes is a chronic disease marked by high levels of glucose in the blood, caused by the pancreas not producing enough insulin<sup>31</sup> or not being able to use the insulin effectively, or both [79].

There are several types of diabetes, the most frequently occurring are type 1, type 2 and gestational diabetes mellitus (GDM) [79]. Type 1 diabetes is usually diagnosed in children and young people but can occur at any age. Type 2 diabetes is the most common form [80] and is largely preventable by maintaining a healthy lifestyle. GDM develops in some women during pregnancy [80].

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 [81]. The most common form is type 2 diabetes which occurs at earlier ages for Aboriginal and Torres Strait Islander people and is often

<sup>30</sup> The BreastScreen Australia program provides free mammograms (breast cancer check) to women aged 40 years and over, every two years.

<sup>31</sup> Insulin is necessary to convert glucose to energy [79].

undetected and untreated. Complications from diabetes may occur within months of diagnosis while others may develop over several years [82]. Aboriginal and Torres Strait Islander people with diabetes tend to have higher levels of risk factors such as smoking [79] and may show signs of other chronic conditions, including chronic kidney disease, cardiovascular disease, liver disease and anaemia [83].

## ***Extent of diabetes among Aboriginal and Torres Strait Islander people***

### **Incidence and prevalence**

Results from the 2018-19 NATSIHS indicated that 7.9% of Aboriginal and Torres Strait Islanders self-reported they had diabetes, with similar proportions for Torres Strait Islander people (7.9%) and Aboriginal people (7.8%) [61]. The prevalence of diabetes among Aboriginal and Torres Strait Islander males and females was also similar (7.6% and 8.2% respectively). The proportion of Aboriginal and Torres Strait Islander people self-reporting diabetes generally increased with age; in the 55 years and over age-group 35% reported diabetes, which was more than 14 times higher than for the 25-34 years age-group where 2.5% reported diabetes [61]. The proportion of people with diabetes was highest in WA and the NT (both 11%). For the remaining states and territories, Qld was the highest at 8.7%, followed by SA (8.6%), NSW (6.3%), Vic (5.5%), the ACT (5.2%) and Tas (4.7%). Prevalence was greater in remote areas (12%) compared with non-remote areas (7.0%).

The 2018-19 NATSIHS indicated that 13% of Aboriginal and Torres Strait Islander adults aged 18 years and over self-reported having diabetes or high glucose levels (HGL) [34]. Of those surveyed, 92% reported having their blood glucose levels checked in the last 12 months. The prevalence of self-reported diabetes or HGL was similar for males and females (13 and 14% respectively) and increased with age (0.8%: 18-24 years of age, to 36%: 55 years of age and over). The proportion of self-reported diabetes or HGL for Aboriginal and Torres Strait Islander adults varied by jurisdiction, with the highest in WA (19%) and the lowest in Tas (7.2%).

In 2019, according to the National (insulin treated) Diabetes Register (NDR), 130 Aboriginal and Torres Strait Islander people were diagnosed with type 1 diabetes at an age-standardised incidence rate of 13 per 100,000; males 16 per 100,000, females: 9.8 per 100,000 [84].

In 2018, the crude prevalence rate for (insulin treated) type 1 diabetes among Aboriginal and Torres Strait Islander people aged 0-24 years was 208 per 100,000: (males: 186 per 100,000 and females: 231 per 100,000) [85].

For type 2 diabetes, in the initial stages, known as pre-diabetes, blood glucose levels are higher than normal but not high enough to be diagnosed as diabetes [81]. Impaired glucose regulation can be measured by impaired fasting glycaemia (IFG) testing.

In 2017-18, there were 1,715 new cases of GDM among Aboriginal and Torres Strait Islander women aged 15-49 years with a crude incidence proportion of 13% [85]. More detailed information is available for 2016-17 when there were 1,647 new cases of GDM among Aboriginal and Torres Strait Islander women aged 15-49 years [86]. Incidence increased with age and was highest in the 40 years and over age-group (32%) where women were nearly four times more likely to be diagnosed with gestational diabetes than Aboriginal and Torres Strait Islander women aged 15-19 years (6.6%).

### **Hospitalisation**

Hospital services are typically required to treat the advanced stages of complications of diabetes or acute episodes of poor glycaemic control [81]. Between July 2015 and June 2017, 6,504 Aboriginal and Torres Strait Islanders were hospitalised for diabetes, at a crude hospitalisation rate of 4.1 per 1,000 [34]. After age-adjustment, they were more likely to be hospitalised for type 2 diabetes (61%) followed by type 1 diabetes (24%) and GDM (14%).

For 2015-17, the age-specific hospitalisation rates indicated that Aboriginal and Torres Strait Islander males aged 35 years and over were hospitalised at higher rates compared with females [34]. The highest rate being in the 65 years and over age-group where males were hospitalised for diabetes (19 per 1,000) compared with females (15 per 1,000) [34]. In the same period, the age-standardised rate of hospitalisations was highest for Aboriginal and Torres Strait Islanders living in very remote areas (9.3 per 1,000) and lowest for those living in inner regional areas (4.2 per 1,000). The rates varied by jurisdiction and was lowest in Tas (2.7 per 1,000) and highest in WA (8.8 per 1,000).

In 2017-18, there were 2,504 hospitalisations with a principal diagnosis of type 2 diabetes among Aboriginal and Torres Strait Islander people [87]. The age-standardised hospitalisation rate was 5.1 per 1,000, with higher rates among males than females (5.5 and 4.7 per 1,000 respectively). Rates were highest in the 45 years and over age-groups (45-54 years: 7.9 per 1,000, 55-64 years: 11 per 1,000, 65 years and over: 17 per 1,000). Hospitalisation rates for type 2 diabetes among Aboriginal and Torres Strait Islander people living in remote and very remote areas were 2.3 times higher than for those living in major cities (8.4 per 1,000 and 3.6 per 1,000 respectively).

In 2017-18, the crude rate of hospitalisations with a principal and/or additional diagnosis of type 2 diabetes among Aboriginal and Torres Strait Islander people was 85 per 1,000 [85]. The hospitalisation rate was higher among females (99 per 1,000) than males (71 per 1,000).

In 2017-18, there were 1,016 hospitalisations with a principal diagnosis of type 1 diabetes with an age-standardised rate of 1.3 per 1,000 (males: 1.1 per 1,000 and females: 1.4 per 1,000) [87]. Rates were highest in the 15-44 years age-groups (15-24 years: 1.9 per 1,000, 23-34 years: 1.7 per 1,000, 35-44 years: 2.5 per 1,000) and lowest in the 0-4 years age-group (0.3 per 1,000). Hospitalisation rates for type 1 diabetes among Aboriginal and Torres Strait Islander people living in major cities were 1.8 times higher than for those living in remote and very remote areas (1.3 per 1,000 and 0.7 per 1,000 respectively).

In 2017-18, the crude rate of hospitalisations with a principal and/or additional diagnosis of type 1 diabetes among Aboriginal and Torres Strait Islander people was 3.7 per 1,000 [85]. The hospitalisation rate was similar among males (3.8 per 1,000) and females<sup>32</sup> (3.7 per 1,000).

In 2017-18, there were 589 hospitalisations with a principal diagnosis of diabetes during pregnancy among Aboriginal and Torres Strait Islander women [87]. The hospitalisation rates were highest among women aged 35-39 years (88 per 1,000) followed by women aged 40-44 years (67 per 1,000), with the lowest rate in the 10-19 years age-group (15 per 1,000). Hospitalisation rates increased with remoteness; the rate was more than five times higher for those living in remote or very remote areas than for those living in major cities (119 and 22 per 1,000 population respectively).

### **Mortality**

Diabetes was the third leading cause of death among Aboriginal and Torres Strait Islander people in 2019 [41]. Diabetes is the third leading cause of death for females and the fifth for males (males: 103 deaths, females: 136 deaths). Diabetes accounted for 239 deaths, 7% of all deaths among Aboriginal and Torres Strait Islander people at an age-standardised rate of 70 deaths per 100,000. The death rate decreased by 9.5% between 2010-2014 and 2015-2019.

For Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT, Qld recorded the highest number of deaths for diabetes (as an underlying cause), accounting for 75 deaths in 2019 [41].

For 2015-2019, the age-specific death rates for diabetes as an underlying cause of death for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA and the NT was 49 per 100,000 for the 45-54 years age-group, 115 per 100,000 for the 55-64 years age-group, 278 per 100,000 for the 65-74 years age-group and 577 per 100,000 for the 75 years and over age-group [41].

<sup>32</sup> Excludes hospitalisation of inner-hospital contracted patients to private sector hospital in WA [85].

## Social and emotional wellbeing (including mental health)

Social and emotional wellbeing (SEWB) has been 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, culture, spirituality, family and community, the body and emotions [10, 88].

Colonisation has had a systematically profound impact on every domain of health and wellbeing for Aboriginal and Torres Strait Islander people and by implication on SEWB [89, 90]. Factors such as; discrimination and racism, economic exclusion, removal of children by the state, being exposed to violence and grief and loss are contributing stressors to the burden of psychological distress that Aboriginal and Torres Strait Islander people continue to experience due to the legacy of colonisation [7]. Intergenerational trauma is directly linked to an increased risk of substance use dependence, physical and mental health problems and greater rates of incarceration [7, 91, 92]. Aboriginal and Torres Strait Islander culture and self-determination can be powerful protective factors in providing a buffer to psychological distress [93]. Factors that have been identified as enhancing SEWB include; maintaining connection to country, spirituality, ancestry and kinship networks, as well as strong community governance and cultural continuity [7]. Renewal of Aboriginal and Torres Strait Islander culture and Indigenous knowledge systems and the capacity for self-determination is increasingly being seen as fundamental to healing and supporting social and emotional wellbeing [88].

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

#### Prevalence

The 2018-19 NATSIHS found that 31% of Aboriginal and Torres Strait Islander respondents aged 18 years and over reported high or very high levels of psychological distress in the four weeks prior to the interview (Aboriginal people: 31% and Torres Strait Islander people: 23%) [61]. In 2018-19, more females reported high or very high levels of psychological distress compared with males (35% and 26% respectively). Similar levels of high to very high levels of psychological distress were reported across age-groups with the highest level of 33% reported among the 45-54-years age-group. Vic and SA were the jurisdictions that reported the highest proportion of people with high levels of distress (both 36%) and the NT the lowest (26%). The proportion of Aboriginal and Torres Strait Islander people who experienced high or very high levels of psychological distress was higher in non-remote areas (31%) than remote areas (28%).

In the 2018-19 NATSIHS, 25% of Aboriginal and 17% of Torres Strait Islander people, aged two years and over, reported having a mental and/or behavioural condition [94]. The proportion of people with a mental health condition was about the same for males (23%) and females (25%) [94]. Respondents aged between 25-54 years were more likely to have a mental and/or behavioural condition (30-32%), with the lowest proportion in the 0-14 years age-group (15%). Across the jurisdictions, mental and behavioural conditions were reported the most in the ACT (40%), followed by Tas (34%) and Vic (33%), with the lowest reporting in the NT (10%). Mental and behavioural conditions were around three times more likely to be reported by Aboriginal and Torres Strait Islander people living in non-remote areas (28%) than remote areas (9.8%).

Further information from the 2018-19 NATSIHS indicated that anxiety was the most common mental or behavioural condition reported by Aboriginal and Torres Strait Islander people aged two years and over (17%) [61]. Anxiety was almost twice as common for females (21%) than males (12%). The age-groups with the highest proportion of anxiety were the 25-34 years (25%) and 35-44 years age-group (24%).

Depression was the second most common condition reported under mental and behavioural conditions (13%), with females reporting higher levels (16%) compared with males (10%) [61]. The reporting of depression increased with age, from 2.5% among those aged 0-14 years to 23% among those aged 45-54 years, before decreasing to 20% among people aged 55 years and over.



## Hospitalisation

In 2018-19, there were 23,700 hospital separations of Aboriginal and Torres Strait Islander people with a principal ICD diagnosis of 'Mental and behavioural disorders' [49]. These separations accounted for 8.0% of all hospital separations (excluding dialysis) for Aboriginal and Torres Strait Islander people (Derived from [49]).

For 2015-17, the age-adjusted separation rates for ICD 'Mental and behavioural disorders due to psychoactive substance use' and 'Schizophrenia, schizotypal, and delusional disorders' were higher among Aboriginal and Torres Strait Islander males (15 and 8.4 per 1,000) compared with females (11 and 5.5 per 1,000) [42]. Rates for 'Mood disorders' and 'Neurotic, stress-related and somatoform disorders' were higher among females (5.1 and 4.2 per 1,000) compared with males (3.3 and 3.0 per 1,000).

'Intentional self-harm' categorised as a principal diagnosis<sup>33</sup>, was responsible for 2,980 (0.5%) of all hospital separations for Aboriginal and Torres Strait Islander people in 2018-19 (Derived from [49]), the same as the proportion recorded in 2017-18 [95].

## Mortality

The most recent detailed information indicates that mental health conditions accounted for 523 deaths among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT in 2014-2018 [42]. Of these 523 deaths, 230 were among males and 293 among females (Table 21)<sup>34</sup>.

**Table 21. Numbers and rates of deaths from mental health related conditions (excluding intentional self-harm) for Aboriginal and Torres Strait Islanders, by sex and cause of death, NSW, Qld, WA, SA, and the NT, 2014-2018**

Cause of death	Males		Females	
	Number	Rate	Number	Rate
Mental disorders due to substance use	78	8.5	22	1.8
Organic mental disorders	132	39	217	46
Other mental disorders	20	4.6	54	11
All mental disorders	230	52	293	59

Notes:

1 Rates are deaths per 100,000, rounded to the nearest whole number, age standardised using the 2001 Australian standard population.

2 Details of death from intentional self-harm (suicide) are not included in this table.

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

Source: AIHW, 2020 [42]

In 2019, 195 Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA, and the NT died from intentional self-harm (suicide) [41]. It was the fifth leading cause of death overall (second for males and seventh for females).

The rate of suicide deaths increased from 21 per 100,000 in 2010-2014 to 25 per 100,000 in 2015-2019 [41]. In 2015-2019, suicide as a cause of death was three times more likely for males (38 per 100,000) as for females (12 per 100,000).

For 2015-2019, the median age for death by suicide was 30.5 years. The age-groups with the highest rates of deaths by suicide were 25-34 years for males (72 per 100,000) and 15-24 years for females (28 per 100,000) [41].

For 2015-2019, age-standardised death rates from intentional self-harm (suicide) for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT ranged from 19 per 100,000 in NSW to 35 per 100,000 in WA (Table 22) [41].

33 Intentional self-harm as a principal diagnosis for external causes of injury or poisoning for Aboriginal and Torres Strait Islander people.

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



**Table 22. Age-standardised death rates for intentional self-harm (suicide) among Aboriginal and Torres Strait Islander people, by sex and jurisdiction, NSW, Qld, WA, SA and the NT, 2015-2019**

Jurisdiction	Males		Females		Persons	
	Number	Rate	Number	Rate	Number	Rate
NSW	170	31	51	8	221	19
Qld	220	42	71	12	291	26
WA	125	48	58	21	183	35
SA	24	27	15	n.p	39	20
NT	80	37	n.p	n.p	109	26

Notes:

1 Rates per 100,000 population, rounded to the nearest whole number, have been calculated using Aboriginal and Torres Strait Islander population estimates and projections based on the 2016 Census.

2 n.p: not published.

Source: ABS, 2020 [41]

WA consistently records the highest death rates, with a rate of 35 per 100,000 in 2015-2019 [36, 41]. Large national surveys do not reflect the higher rates of suicide that some communities experience. A report sourcing data from the ABS, WA Department of Health and the WA Police Force for two five year periods (2008-2012 and 2013-2017) found that the suicide rate for Indigenous people in the Kimberley in WA was twice as high as the suicide rate among all Indigenous Australians (5 per 10,000 compared with 2.5 per 10,000) [96].

## Kidney health (renal disease)

Kidneys clean the blood by processing excess fluid, unwanted chemicals and waste and producing urine [97]. The most common cause of kidney disease is diabetes and there is a strong link between kidney disease and high blood pressure [98]. Other causes include immune diseases, congenital conditions, and genetic disorders, such as polycystic kidney disease. Many people are unaware that they have kidney disease as up to 90% of kidney function can be lost before symptoms appear [99].

Chronic kidney disease (CKD) refers to conditions of the kidney that cause dysfunction or kidney damage that last for three months or more [99]. There are five stages of CKD according to the level of kidney function. In early stages (1-2), there are usually no symptoms and the kidneys are still able to function when they are slightly damaged, making diagnosis difficult. In middle stages (3-4), levels of waste (urea and creatinine) in the blood rise and the person starts to feel unwell and kidney function slows down with increased urination. In end-stage kidney disease (ESKD)<sup>35</sup> (stage 5), a person will require dialysis or a transplant to stay alive. The most common causes of ESKD are diabetes, glomerulonephritis, hypertension and polycystic kidney disease [100].

CKD can be prevented by a healthy lifestyle or treated, if detected early [42]. Modifiable risk factors include high blood pressure, tobacco smoking, overweight and obesity and impaired glucose regulation [99].

For Aboriginal and Torres Strait Islander people, non-modifiable risk factors associated with CKD also include being over the age of 30 years, family history of CKD, history of acute kidney injury and established vascular disease [101].

Kidney disease has a marked impact on the quality of life of those who suffer from the disease as well as those who care for them [102-104]. Treating CKD is also expensive for the health system [100].

### *Extent of kidney disease among Aboriginal and Torres Strait Islander people*

#### **Prevalence/incidence**

Around 1.8% of Aboriginal and Torres Strait Islander people (Aboriginal 1.9%; Torres Strait Islander (0.4%) reported kidney disease as a long-term health condition in the 2018-19 NATSIHS [61]. The proportions of Aboriginal and Torres Strait Islander people reporting kidney disease was higher for females (2.3%) than males (1.2%). The reported prevalence of kidney disease among Aboriginal and Torres Strait Islander people was less than 2% for all age-groups under 35 years, increasing to 2.3% for people aged 35-44 years, 2.7% for

35 Used interchangeably with end-stage renal disease (ESRD).

people aged 45-54 years and 7.6% for people aged 55 years and over. By jurisdiction, the highest proportions were reported for the NT (3.7%) and WA (2.9%), with the other states and territories (excluding Tas) less than 2% each. Proportions were higher for people living in remote area (3.4%) than non-remote areas (1.4%).

In the 2012-13 Australian Aboriginal and Torres Strait Islander Health Survey (AATSIHS), 18% of Aboriginal and Torres Strait Islander adults had biomedical signs of CKD (12% in stage 1 and 1.1% in stages 4-5 [105]. However, only 1.8% self-reported that they had kidney disease [106]. For those aged 18-34 years, 9% had biomedical signs of CKD increasing to 49% among those aged 65 years and over [107].

With most information on CKD limited to self-reported data, the primary focus in the literature has been on end-stage renal disease (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 [108]. The difference is complicated by the age-distributions of each population. Rates fluctuate from year to year but in recent years Aboriginal and Torres Strait Islander rates have been increasing.

Data from the ANZDATA for the five-year period 2014-2018 reveal that the age-standardised notification rate of ESRD for Aboriginal and Torres Strait Islander people was 603 per 1,000,000 population (Derived from [21, 109, 110]). The highest notification rates of ESRD were recorded for Aboriginal and Torres Strait Islander people living in the NT (1,819 per 1,000,000), WA (1,100 per 1,000,000), and SA (627 per 1,000,000) (Table 23) (Derived from [21, 109, 110]).

**Table 23. Numbers of notifications and age-standardised notification rates for ESRD for Aboriginal and Torres Strait Islander people, selected jurisdictions, Australia, 2014-2018**

Jurisdiction	Aboriginal and Torres Strait Islander	
	Number	Rate
NSW	179	207
Vic	49	288
Qld	392	585
WA	371	1,100
SA	81	627
NT	479	1,819
Australia	1,570	603

Notes:

1 Rates per 1,000,000 population have been standardised using the ERP from 30 June 2001.

2 Notification rates for Tas and the ACT have not been shown separately because of the small numbers of notifications but are included in the figures for Australia.

3 Rounding may result in inconsistencies in calculated ratios.

Source: Derived from ANZDATA, 2019 [109], ABS, 2019 [21], ABS, 2019 [110]

Of people newly registered with the ANZDATA in 2014-2018, 56% of Aboriginal and Torres Strait Islander people were aged less than 55 years (Table 24) (Derived from [21, 109, 110]).

**Table 24. Numbers of notifications and notification rates of ESRD for Aboriginal and Torres Strait Islander people by age-group, Australia, 2014-2018**

Age-group (years)	Aboriginal and Torres Strait Islander	
	Number	Rate
0-14	9	6.6
15-24	30	39
25-34	118	207
35-44	247	563
45-54	482	1,199
55-64	445	1,687
65-74	204	1,681
75+	35	721
All ages	1,570	603

Notes:

1 Rates per 1,000,000 population.

2 Rates for 'All ages' are age-standardised.

3 Rounding may result in inconsistencies in calculated ratios.

Source: Derived from ANZDATA, 2019 [109], ABS, 2019 [21], ABS, 2019 [110]

### Hospitalisation, dialysis and transplantation

Detailed information from ANZDATA is available for 2019 when a total of 378 Aboriginal and Torres Strait Islander people commenced haemodialysis (HD) and peritoneal dialysis (PD) (HD: 325 and PD: 53), an increase from 2018 (322 people) [111]. Qld accounted for the highest proportion of patients commencing dialysis (31%), followed by the NT (29%) and WA (21%).

In 2019, there were 2,044 prevalent dialysis patients in Australia (PD and HD treatments) identified as Aboriginal and Torres Strait Islander [111]. HD accounted for the majority of treatment; 92%, with only 7.7% of Aboriginal and Torres Strait Islander dialysis patients receiving peritoneal dialysis (PD) (Derived from [111]). The highest proportion of patients on dialysis were from the NT (34%), followed by Qld (25%) and WA (22%) (Table 25). By modality, the NT had the highest proportion of patients on HD (35%) and Qld on PD (40%).

**Table 25. Prevalence of Aboriginal and Torres Strait Islanders on dialysis, by modality, Australia, 2019**

Jurisdiction	Total		HD		PD	
	Number	Percentage	Number	Percentage	Number	Percentage
NSW	210	10	185	9.8	25	16
Vic	46	2.3	41	2.2	5	3.2
Qld	501	25	438	23	63	40
WA	457	22	434	23	23	15
SA	109	5.3	104	5.5	5	3.2
Tas	6	0.3	5	0.3	1	0.6
ACT	17	0.8	14	0.7	3	1.9
NT	698	34	666	35	32	20
Total	2,044	100	1,887	100	157	100

Note:

1 Rounding may result in inconsistencies in calculated percentages.

Source: Derived from ANZDATA, 2020 [111].

In 2017-18, there were 33 per 1,000 (27 per 1,000 for males and 39 per 1,000 for females), (crude rates) hospitalisations for Aboriginal and Torres Strait Islander people for CKD as a principal or additional diagnosis [99]. For regular dialysis as a principal diagnosis, there were 284 per 1,000 hospitalisations for Aboriginal and Torres Strait Islander people (248 per 1,000 for males and 321 per 1,000 for females). For the incidence of treated ESKD, there were 0.39 per 1,000 (0.35 per 1,000 for males and 0.43 per 1,000 for females), with a total of 1,570 hospitalisations for Aboriginal and Torres Strait Islander people (703 males and 867 females).

In 2018-19 there were 242,274 hospitalisations for Aboriginal and Torres Strait Islander people for ESKD (289 per 1,000, crude rate) [51]. Detailed information for ESKD is available for 2016-18. The crude hospitalisation rate for ESKD among Aboriginal and Torres Strait Islander people was 278 per 1,000 (males: 241 per 1,000, females: 316 per 1,000). Rates increased with remoteness, 137 per 1,000, for major cities, 229 per 1,000 for inner and outer regional areas and 681 per 1,000 for remote and very remote areas. The rate for remote and very remote areas was 5.0 times the rate for major cities.

In 2019, there were 55 transplant operations for Aboriginal and Torres Strait Islander recipients [111]. At 31 December 2019, 58 (5.3%) of the 1,100<sup>36</sup> patients on the waiting list for a transplantation were Aboriginal and/or Torres Strait Islander.

### Mortality

In 2018, the age-standardised death rate for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and NT, from kidney disease was 20 per 100,000 [34]. For 2014-2018, 1.8% (259) deaths of Aboriginal and Torres Strait Islander people were due to kidney disease. There were also 2,709 deaths (182 per 100,000, age-standardised) where kidney disease was an associated cause of death.

For 2016-2018, there were 72 per 100,000 (crude rate) deaths<sup>37</sup> among Aboriginal and Torres Strait Islander people (males: 64 per 100,000, females: 80 per 100,000) for CKD in NSW, Qld, WA, SA and the NT [99].

In 2019, there were 83 deaths (males: 33; females: 50) from diseases of the urinary system<sup>38</sup> as an underlying cause of death among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT [41]. After age-adjustment, the death rate for Aboriginal and Torres Strait Islander people was 27 per 100,000 (males: 19 per 100,000, females: 32 per 100,000). For females, diseases of the urinary system were ranked 8th compared with males at 14th.

For 2015-2019, the age-adjusted death rate for kidney disease (as a major cause of death) for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA<sup>39</sup> and the NT was 19 per 100,000 [112]. The highest rate was reported for both WA and the NT; 40 per 100,000.

In 2018, 217 Aboriginal and Torres Strait Islander people who were receiving dialysis died [108]. The most common causes of death for the dialysis patients were CVD (64 deaths) and withdrawal from treatment (51 deaths). Most deaths were among Aboriginal and Torres Strait Islander people on HD treatment (94%).

### Injury, including family violence

Injury includes both physical harm to a person's body and non-physical harm, including grief, loss and suffering [113], but in public health practice attention is almost entirely confined to physical harm [114]. 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 [115].

The classification of injury has generally followed the WHO ICD, which includes particular attention to the external cause of the injury<sup>40</sup> [31]. When looking at injury in the Aboriginal and Torres Strait Islander context, there are several factors which must be taken into consideration. These include low socioeconomic contexts [115, 117], alcohol and other drug use, intimate partner violence [118], disruption to culture [113] as well as less access to prevention efforts and high-quality treatment and rehabilitation services.

36 Included 63 (5.7%) patients with an unreported Indigenous status [111].

37 As an underlying or associated cause of death.

38 Disease of the urinary system includes disorders of the bladder and urethra, as well as those specifically of the kidneys and ureters [41].

39 Data were not published for SA [112].

40 This system is followed in this section, but it has its limitations (for more details, see [116]).

## *Extent of injury and family violence among Aboriginal and Torres Strait Islander people*

### **Prevalence**

In the 2018-19 NATSIHS, 16% of Aboriginal and Torres Strait Islander people (17% of males and 14% of females) aged 15 years and over had experienced physical harm or threatened physical harm at least once in the last 12 months [61]. The proportion was highest for those aged 25-34 years (21%) and lowest for those aged 55 years and over (8.8%) [34]. Age-standardised proportions were highest in the ACT (21%) and WA (18%), and lowest in the NT (12%), Vic (14%) and Qld (14%). The crude proportion was slightly lower in remote areas (14%) than non-remote areas (16%).

The 2012-13 AATSIHS reported that 2.5% of Aboriginal and Torres Strait Islander people had a long-term condition caused by injury, with the highest reported levels in the 35-44 years and 45-54 years age-groups [106]. Males reported a slightly higher level of injury (2.8%) than females (2.3%).

### **Hospitalisation**

There were 37,460 hospital separations for injuries for Aboriginal and Torres Strait Islander people in 2018-19, representing 13% of all Aboriginal and Torres Strait Islander separations (excluding dialysis) (Derived from [49]). Injury was the leading cause of hospitalisation (excluding dialysis). The crude rate of hospitalisation was 45 per 1,000 [51]. The leading external causes of injury-related hospitalisation were falls (21%), assault (18%), exposure to mechanical forces (17%) and complications of medical and surgical care (14%) (Derived from [49]).

In 2015-17, the crude rate of hospitalised injury for Aboriginal and Torres Strait Islander people was 43 per 1,000 [34]. The rate was higher for males (46 per 1,000) than females (40 per 1,000). Rates were highest for those aged 65 years and over (65 per 1,000) and 35-44 years (64 per 1,000), and lowest for those aged 5-14 years (21 per 1,000). Rates were highest in the NT (81 per 1,000) and lowest in Tas (17 per 1,000).

In 2018-19, the age-standardised rate of hospitalised injury for Aboriginal and Torres Strait Islander people in remote and very remote areas (82 per 1,000) was nearly twice the rate for those in major cities (41 per 1,000) (Derived from [51]). For those living in remote and very remote areas, assault was the leading cause of hospitalised injury (34% of injury hospitalisations); in major cities, falls were the leading cause (22% of injury hospitalisations).

In 2018-19, there were 2,332 injury-related hospitalisations for Aboriginal and Torres Strait Islander children aged 0-4 years, representing 14% of potentially preventable hospitalisations for this age-group (Derived from [51]). The crude rate of hospitalisation was 25 per 1,000. In 2016-18, the age-specific rate for this age-group was highest in the NT (34 per 1,000) and lowest in Tas, the ACT and NSW (each less than 20 per 1,000) [51]. Rates were highest in remote and very remote areas (30 per 1,000) and lowest for those in major cities (22 per 1,000).

In 2018-19, there were 3,371 non-fatal hospitalisations for family violence assaults for Aboriginal and Torres Strait Islander people [51]. The crude hospitalisation rate for females (6.1 per 1,000) was about three times the rate for males (1.9 per 1,000). In 2016-18, spouses/domestic partners were the perpetrators of the majority (72%) of non-fatal hospitalised family violence assaults against females, while 'other family members' were the perpetrators of the majority (58%) against males. In 2016-18, age-adjusted hospitalisation rates were highest for those aged 35-44 years (10 per 1,000) and lowest for children aged 0-14 years (0.4 per 1,000). The NT and WA had the highest age-adjusted rates (19 per 1,000 and 8.0 per 1,000 respectively) and NSW and Vic had the lowest (both 0.9 per 1,000). Rates were highest in remote and very remote areas combined (14 per 1,000) and lowest in major cities (1.4 per 1,000).

### **Mortality**

Important specific causes of injury deaths for NSW, Qld, SA, WA and the NT in 2019 were:

- intentional self-harm (195 deaths, 5.7% of all Aboriginal and Torres Strait Islander deaths)
- accidental poisoning (91 deaths, 2.6% of all Aboriginal and Torres Strait Islander deaths)
- land transport accidents (87 deaths, 2.5% of all Aboriginal and Torres Strait Islander deaths) (Derived from [41]).

In 2014–2018, there were 2,162 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 (18% of male deaths and 10% of female deaths) [34]. Injury was the third-leading cause of death. The crude injury death rate was 61 per 100,000 [51]. Leading specific causes of injury-related death, as a percentage of total injury deaths were intentional self-harm (40% for males and 30% for females), accidental poisoning (15% for males and 21% for females), transport accidents (20% for males and 17% for females), and assault (7.5% for males and 10% for females) [34]. Age-specific death rates for injury for people aged >1 year were highest for those aged 35–44 years (115 per 100,000) and 75 years and above (197 per 100,000), and lowest for those aged 5–14 years (10 per 100,000). Age-standardised injury death rates were highest in the NT (122 per 100,000) and lowest in NSW (61 per 100,000). The age-standardised injury death rate for those in remote areas was 1.6 times the rate for those in non-remote areas (Derived from [34]).

## Respiratory health

Respiratory health can be compromised by a number of conditions that affect the airways and other structures of the lung [119], and impair the process of breathing and oxygen delivery [120]. These conditions range from acute respiratory infections to chronic respiratory conditions [55].

Respiratory disease is associated with a number of contributing factors, including: risky behaviours (particularly tobacco use); environmental conditions; occupational exposures and hazards [55, 121]; family history and other health conditions (obesity, infectious diseases) [121]. Infants and children are particularly susceptible to developing respiratory diseases due to risk factors including: exposure to tobacco smoke; poor living conditions; poor nutrition and limited access to medical care [122, 123].

### *Extent of respiratory disease among Aboriginal and Torres Strait Islander people*

#### Prevalence

Long-term diseases of the respiratory system<sup>41</sup> were reported by 29% of Aboriginal and Torres Strait Islander people who participated in the 2018–19 NATSIHS (Table 26) [61]. The proportion of Aboriginal and Torres Strait Islander people reporting respiratory diseases increased with age, from 19% in the 0–14 years age-group to 47% in the 55 years and over age-group. For COPD<sup>42</sup>, the proportion reported increased with age, apart from the 0–14 years age-group.

Asthma was reported by 16% of Aboriginal and Torres Strait Islander people in the 2018–19 NATSIHS; it was the most commonly reported long-term respiratory disease and the second most commonly reported long-term disease overall [61]. Asthma was reported more commonly by females (18%) than by males (13%), and by people living in non-remote areas (17%) than those in remote areas (8.6%). The prevalence of asthma increased with age from 12% in the 0–14 years age-group to 26% in the 55 and over age-group (Table 26).

**Table 26. Long-term respiratory diseases among Aboriginal and Torres Strait Islander people, by age-group, all jurisdictions, 2018–19, proportion (%)**

	Age-group (years)						Total
	0-14	15-24	25-34	35-44	45-54	55+	
COPD	1.7	0.8	1.3	3.6	6.4	13	3.4
Asthma	12	14	15	17	21	26	16
Chronic sinusitis	2.6	4.7	8.9	13	14	13	7.4
Other diseases of the respiratory system	8.6	16	20	19	19	20	15
Total respiratory system diseases	19	28	32	35	37	47	29

Note:

1 'Other diseases of the respiratory system' includes hay fever and allergic rhinitis, chronic sinusitis, all other diseases of respiratory system, symptoms/signs involving respiratory systems.

Source: ABS, 2019 [61]

41 Individuals who reported a current respiratory condition that had lasted, or was expected to last, for six months or more [61].

42 Chronic obstructive pulmonary disease (COPD) relates to a progressive lung disease for which the symptoms are not fully reversible, and includes chronic bronchitis and emphysema [124].

The level of respiratory disease among Aboriginal and Torres Strait Islander females was approximately 1.2 times higher than for males, 32% and 26% respectively (Table 27). Other specific long-term respiratory diseases reported by Aboriginal and Torres Strait Islander people in the 2018-19 NATSIHS were chronic sinusitis (7.4%) and COPD (3.4%), with proportions for both diseases being almost twice as high in females than males [61].

**Table 27. Long-term respiratory diseases among Aboriginal and Torres Strait Islander people, by sex 2018-19**

	Males (%)	Females (%)	Persons (%)
COPD	2.5	4.3	3.4
Asthma	13	18	16
Chronic sinusitis	5.3	9.3	7.4
Other diseases of the respiratory system	13	17	15
Total respiratory system diseases	26	32	29

Notes:

1 Rates are non-age standardised.

2 'Other diseases of the respiratory system' includes hayfever and allergic rhinitis, chronic sinusitis, all other diseases of respiratory system, symptoms/signs involving respiratory systems.

Source: ABS, 2019 [61]

## Hospitalisation

For 2018-19, there were 30,262 hospital separations with a principal diagnosis of respiratory disease among Aboriginal and Torres Strait Islander people [49], representing more than 10% of all separations (excluding dialysis) identified as Aboriginal and Torres Strait Islander (Derived from [49]).

For 2016-18, detailed information is available regarding hospitalisation rates for specific respiratory conditions including COPD, acute upper respiratory infections, influenza and pneumonia and asthma [51]. Crude hospitalisation rates were highest for Aboriginal and Torres Strait Islander people presenting with influenza and pneumonia (8.3 per 1,000), followed by COPD (6.0 per 1,000), acute upper respiratory infections (4.4 per 1,000) and asthma (2.8 per 1,000) (Table 28). The age-specific hospitalisation rates for acute upper respiratory infections were highest in the 0-14 years age-group (8.3 per 1,000); for influenza and pneumonia in the 65 years and over age-group (31 per 1,000) followed by the 45-64 years age-group (17 per 1,000), and for asthma in the 0-14 years age-group (4.0 per 1,000).

**Table 28. Hospitalisation rates for selected respiratory diseases among Aboriginal and Torres Strait Islander people, by age-group, 2016-18, proportion (%)**

	Age-group (years)					Crude rate
	0-14	15-24	25-44	45-64	65+	
Influenza and pneumonia	5.5	2.2	6.7	17	31	8.3
COPD	n/a	n/a	n/a	n/a	n/a	6.0
Acute upper respiratory infection	8.3	2.9	2.4	2.1	2.0	4.4
Asthma	4.0	1.5	2.3	2.9	2.6	2.8

Note: n/a – non applicable, information unavailable.

Source: Steering Committee for the Review of Government Service Provision (Derived from [51])

For 2016-18, the age-standardised rates of hospitalisation for Aboriginal and Torres Strait Islander people with COPD, influenza and pneumonia, acute upper respiratory infections and asthma all increased with remoteness [51]. The rate for influenza and pneumonia was 3.4 times<sup>43</sup> higher for Aboriginal and Torres Strait Islander people living in remote/very remote areas (25 per 1,000) compared with the rate for those living in major cities (7.2 per 1,000).

<sup>43</sup> Rounding may lead to inconsistencies in rates reported.



## Mortality

In 2019, chronic lower respiratory disease (which includes asthma, bronchitis, bronchiectasis, emphysema, and other COPD)<sup>44</sup> was the second highest cause of death overall for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT (responsible for 266 deaths) [41]. There was a 19% increase in the mortality rates for chronic lower respiratory diseases in Aboriginal and Torres Strait Islander people between the period 2010-2014 and 2015-2019 (64 per 100,000 for 2010-2014 to 76 per 100,000 for 2015-2019). Of the top five causes of death in 2019, by sex, chronic lower respiratory disease ranked as the second most common cause of death for Aboriginal and Torres Strait Islander females (140 deaths), while for Aboriginal and Torres Strait Islander males it was ranked as the third (126 deaths) [41]. After age-adjustment, the death rate for chronic lower respiratory disease among Aboriginal and Torres Strait Islander people was 83 per 100,000 (females: 78 per 100,000; males: 91 per 100,000).

Age-specific information is available for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT for the period 2015-2019 [41]. The rate for deaths from chronic lower respiratory diseases (as an underlying cause of death) increased with age from 36 per 100,000 in the 45-54 years age-group, 109 per 100,000 for the 55-64 years age-group, 271 per 100,000 for the 65-74 years age-group and 690 per 100,000 for 75 years and over age-group.

In 2019, influenza and pneumonia were responsible for 54 Aboriginal and Torres Strait Islander deaths, with an age-adjusted death rate of 14 per 100,000 [41].

For the period 2014-2018, there were 1,383 deaths among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT due to respiratory diseases as an underlying cause of death [34]. This accounted for 9.4% of the total deaths of Aboriginal and Torres Strait Islander people. Of these deaths, 62% (856 deaths) were a result of COPD; 17% (232 deaths) due to pneumonia and influenza, and 4.6% (63 deaths) from asthma.

## Eye health

Eye health, particularly for Aboriginal and Torres Strait Islander people, can be affected by several factors; however, they are complex and are often dependent on a range of social and cultural determinants of health [125]. Factors include for example: previous eye problems; access to services; care coordination; medical factors (age, obesity, high blood pressure, diabetes, LBW and malnutrition); environmental and living conditions; use of alcohol; and tobacco and living in remote areas [125-127]. Eye disease and poor vision can limit opportunities in education, employment and social engagement and also increase the risk of injury, which can lead to dependence on services and other people [34, 128, 129]. Even partial loss of vision can reduce an individual's ability to live independently and increase the risk of mortality [130, 131].

There is evidence that Aboriginal and Torres Strait Islander children, especially those living in remote areas, generally experience better vision than non-Indigenous children [12, 132]. Data reported in the 2016 National Eye Health Survey (NEHS) suggested there has been some improvement in the eye health of Aboriginal and Torres Strait Islander adults [125]. It was estimated that 90% of vision impairment (VI) and blindness among both Indigenous and non-Indigenous people is preventable or treatable [133].

### *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 surveys<sup>45</sup> and surveillance activities that rely on eye examinations or self-report<sup>46</sup>.

44 Chronic lower respiratory diseases included diseases coded J40-J47 by the WHO's International statistical classification of diseases and related health problems (ICD) 10th revision [31].

45 Survey findings may not be directly comparable due to differing ways of defining and assessing vision loss [133, 134].

46 Self-reported survey data are open to interpretation; they provide insight on an individual's view of their eye health, but these may not have been diagnosed by a health professional [125]. The surveys do not count eye conditions that the respondent is not aware of.



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

The NEHS, a cross-sectional population based study, was conducted between March 2015 and April 2016 [133]. It provides the latest evidence about the prevalence, causes and treatment of VI<sup>47</sup> and blindness<sup>48</sup> among Indigenous adults in Australia. The NEHS examined the eyes of 1,738 Indigenous people (aged 40-92 years) and 3,098 non-Indigenous people (aged 50-98 years) living in 30 randomly selected urban, rural and remote sites across Australia. According to the NEHS, bilateral VI (vision impairment in both eyes) and bilateral blindness occurred among 11% and 0.3% of Indigenous people aged 40 year and over respectively.

There was no statistical significant difference in the prevalence of VI or blindness between Indigenous males and females [133]. Vision impairment increased with age among Indigenous adults participating in the NEHS, ranging from 5.7% for those in the 40-49 years age-group to 46% for those aged 80 years and over. The prevalence of VI among Indigenous adults in outer regional and very remote areas (17% and 15% respectively) was up to double that in other areas (8.2% in major cities, 8.4% in inner regional areas and 8.3% in remote areas). In 2016, it was estimated that up to 18,300 Indigenous people aged 40 years or older were living with VI or blindness.

According to the NEHS, the main causes of VI in Indigenous adults were uncorrected refractive error<sup>49</sup> (63%) and cataract (20%) [133]. Diabetic retinopathy (DR) was the third most common cause of VI in Indigenous adults (5.5%). Among those participants with self-reported diabetes, a high proportion of Indigenous adults had DR and vision-threatening DR (39% and 9.5% respectively) [135]. While not among the main causes of VI, the prevalence of vision loss due to ocular trauma (eye injury) among Indigenous adults was 0.8% [136]. Participants who were male or living in a very remote area were also more likely to have vision loss from ocular trauma.

The NEHS identified five Indigenous participants with bilateral blindness, the main causes of which were cataract (two people), DR (one person), optic atrophy (one person) and a combination of mechanisms (one person) [133].

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

Although self-report is considered an unreliable population-based research tool for identifying eye disease in those with vision loss [137], self-reported information is the only recent data available for some aspects of eye health.

Eye and sight problems<sup>50</sup> were reported in the 2018-19 NATSIHS by more than one-third (38%) of Aboriginal and Torres Strait Islander people (38% of Aboriginal people and 40% of Torres Strait Islander people), making it the most commonly reported condition among the long-term health conditions that data was collected for in the survey [61]. In the survey, eye and sight problems were reported by 32% of males and by 43% of females. The proportion of Aboriginal and Torres Strait Islander people reporting eye or sight problems in non-remote areas combined<sup>51</sup> was 40% and in remote areas combined 30%. The lowest proportion reported was among people living in very remote areas at 27%. Proportions of people reporting eye or sight problems varied across jurisdictions, with the highest proportion being recorded in SA (49%) and the lowest in the NT (29%). Proportions reported for the other states and territories: the ACT 47%; Tas 47%; Vic 43%; NSW 38%; Qld 37%; and WA 33%.

The most common eye conditions reported by Aboriginal and Torres Strait Islander people in the 2018-19 NATSIHS were: hyperopia (long-sightedness: 22%), myopia (short-sightedness: 16%), other diseases of the eye and adnexa<sup>52</sup> (8.7%), cataract (1.4%), blindness (0.9%) and glaucoma (0.5%) (Table 29) [61]. Females reported higher levels of refractive error (hyperopia and myopia) compared with males, while males reported slightly higher levels of blindness and glaucoma compared with females.

47 The NEHS defines vision impairment as 'presenting distance visual acuity <6/12 in the better eye' [133].

48 The NEHS defines blindness as 'presenting distance visual acuity <6/60 in the better eye' [133].

49 A condition in which light that passes through the front of the eye fails to focus precisely on the retina, causing long or short sightedness and difficulties changing focus [133].

50 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 [61].

51 Non-remote areas include major cities and inner and outer regional areas [61].

52 'Other diseases of the eye and adnexa' include: macular degeneration, astigmatism, presbyopia, other disorders of choroid, retina/ocular muscles binocular, colour blind, other visual disturbances or loss of vision and other diseases of the eye and adnexa [61].

**Table 29. Prevalence (%) of diseases of the eye and adnexa among Aboriginal and Torres Strait Islander people, by sex, 2018-19**

	Males (%)	Females (%)	Persons (%)
Hyperopia	18	25	22
Myopia	11	20	16
Cataract	1.3	1.4	1.4
Blindness	0.9	0.8	0.9
Glaucoma	0.6	0.4	0.5
Other diseases of the eye and adnexa	8.3	9.2	8.7
Total	32	43	38

Notes:

1 Proportions are non-age standardised.

2 Hyperopia is otherwise known as long-sightedness.

3 Myopia is otherwise known as short-sightedness.

4 Refer to footnote for detailed explanation of 'Other diseases of the eye and adnexa'.

Source: ABS, 2019 [61]

In 2018-19, the reported prevalence of all diseases of the eye and adnexa in the Aboriginal and Torres Strait Islander population generally increased with age [61]. The total eye and adnexa diseases increased from 10% in the 0-14 years age-group to 93% in the 55 years and over age-group, apart from the 15-24 years (32%) and 25-34 years (29%) age-groups.

In 2018-19, 10% of Aboriginal and Torres Strait Islander children aged 0-14 years, were reported to have diseases of the eye and adnexa<sup>53</sup> [61]. The most common reported conditions were hyperopia (4.3%) and myopia (4.0%).

### Prevalence estimates of trachoma and trichiasis based on surveillance

Trachoma primarily occurs in remote and very remote Indigenous communities in WA, SA and the NT, with cases being found in NSW and Qld in 2008 [126]. Australia is the only high-income country with endemic levels of trachoma. The National Trachoma Surveillance and Reporting Unit provides prevalence data for trachoma which shows there have been substantial improvements in trachoma control in Indigenous communities in Australia [138].

The estimated prevalence<sup>54</sup> of active trachoma among Indigenous children aged 5-9 years in selected at-risk remote communities decreased from 15% in 2009 to 4.8% in 2012 and then remained at a level of 4.5% from 2013-2019 [125]. However, persistently high levels of trachoma were still found in some regions in 2018 and 2019. [126]. From 2018 to 2019, there was a decrease in the number of communities found to be at-risk of trachoma (from 120 in 2018 to 115 in 2019) [126, 139]; however, the overall prevalence of trachoma in Australia increased slightly from 3.9% to 4.5% in this period [126] and the number of communities with endemic trachoma decreased from 63 to 45.

In 2019, screening was undertaken in at-risk communities in Qld, WA, SA, and the NT [126]. Among the 3,154 children aged 5-9 years who were screened, 263 cases (8.3%) were detected: 168 were in the NT, 82 in WA, 13 in Qld and no cases in SA. This was an increase from levels in 2018 when the total number of cases detected was 144 (7.0%) from 2,045 children screened [139]. No trachoma was reported in children aged 5-9 years in 52% of at-risk communities, an increase from 2018 when 30% of at-risk communities reported no trachoma [126].

If left untreated, trachoma can cause scarring of the eyelid and in-turned eyelashes that lead to blindness (trichiasis) [126]. In 2019, screening in at-risk communities in Qld, WA, SA and the NT detected trichiasis in both 0.1% of Indigenous adults aged 15 years and over and 40 years and over [126]. A total of 11 cases of trichiasis were detected in 127 screened communities [126]; this had decreased from 2018 when 23 cases were detected in 131 screened communities [139].

53 An adult was asked to respond on behalf of children aged less than 15 years [61].

54 Small population sizes and the mobility of the population may result in fluctuations in the rates reported [125].

## Hospitalisation

In 2018-19, there were 5,222 hospital separations for diseases of the eye and adnexa among Aboriginal and Torres Strait Islander people in Australia [49], accounting for 1.8% of all separations (excluding dialysis) (Derived from [49]).

A more detailed analysis of hospitalisation data is available for the period July 2016 to June 2018 [125]. In this period, there were around 8,600 hospitalisations for diseases of the eye (by principal diagnosis) among Aboriginal and Torres Strait Islander people, with the majority (5,350) being for disorders of the lens, a category which primarily refers to cataracts. Crude hospitalisation rates for diseases of the eye for Aboriginal and Torres Strait Islander people aged 45 years and over increased with age from 5.9 per 1,000 in the 45-54 years age-group to 72 per 1,000 in the 75 years and over age-group.

For 2016-18, detailed information is available for hospitalisation rates for eye diseases (by principal diagnosis) by the Roadmap to Close the Gap for Vision<sup>55</sup> project's Indigenous Regions [125]. Crude hospitalisation rates ranged from 11 per 1,000 in West Qld South to 2.0 per 1,000 in the South and East region of SA. The top four after West Qld South were West Qld North and Pilbara (both 9.6 per 1,000), APY lands (9.5 per 1,000) and Central NT (9.1 per 1,000). The lowest rates after South and East region of SA were in Western Sydney (2.2 per 1,000), Barossa Hill Fleurieu and the ACT (both 2.4 per 1,000) and Gippsland West (Vic) (2.7 per 1,000).

Between July 2016 and June 2018, there were 2,039 hospitalisations for eye injury among Aboriginal and Torres Strait Islander people, with the majority (about 720) being for an open wound of the eyelid and periocular area (eye socket) [125]. When comparing males with females, crude hospitalisation rates for eye injury were highest among Aboriginal and Torres Strait Islander males across all age-groups except 75 years and over. The highest rate for males was in the 35-44 years age-group at 2.5 per 1,000, and for females in the 25-34 years age-group, at 2.1 per 1,000.

## Ear health and hearing

Otitis media (OM) is the medical term for all forms of inflammation and infection of the middle ear [140]. OM can be caused by viruses or bacteria or both, and often occurs as a result of another illness, such as a cold [141]. The main cause of hearing loss in Aboriginal and Torres Strait Islander children is OM and its complications, including otitis media with effusion (glue ear) and chronic suppurative otitis media (CSOM) (persistent discharge through a hole in the eardrum) [140, 142].

The hearing loss associated with OM can cause speech, language and psychosocial delays, and impact on education and employment outcomes [141, 143-146]. Additionally, a lack of detection of hearing problems further exacerbates these outcomes [147]. 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 [148].

As with many other areas of Aboriginal and Torres Strait Islander health, high rates of recurring ear infections are associated with social disadvantage, crowded housing conditions, inadequate access to clean water and functional sewerage systems, nutritional problems and poor access to health care [12, 149]. A reduced risk of OM has been found for children who were breastfed [12, 150].

### *Extent of ear disease among Aboriginal and Torres Strait Islander people*

#### Prevalence

High levels of ear disease and hearing loss have been reported for many years in Aboriginal and Torres Strait Islander communities [141]. The levels of chronic OM 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' [151, p.2].

<sup>55</sup> The Roadmap to Close the Gap for Vision project was undertaken by the University of Melbourne's Indigenous Eye Health Unit to review health services and develop a model of care to improve eye care for Indigenous people. The 64 Roadmap regions provide assistance at a community level [125].

Multiple surveys undertaken between 2001 and 2013 showed that 90% of children under three years of age living in remote communities in the Top End region of Australia had some form of OM [152-154]; however, changes in vaccination schedules in the NT have been associated with a sustained improvement in the severity of OM seen in these children [154].

Ear and/or hearing problems were reported as a long-term health condition by 14% of all Aboriginal and Torres Strait Islander people who participated in the 2018-19 NATSIHS [61]. Levels of reported ear/hearing problems were the same for males and females (14%). The proportion of Aboriginal and Torres Strait Islander people with reported ear/hearing problems in the 2018-19 NATSIHS increased with age, from 6.9% of children aged 0-14 years, to 34% of those aged 55 years and over. For children aged 0-14 years, the prevalence of OM was 2.6% and of partial or complete deafness was 3.8%. Hearing loss in adults ranged from 6.5% of adults aged 15-24 years to 30% of those aged 55 years and over.

Prevalence differed little between remote areas (13%) and non-remote areas (14%) [61]. Of Australia's states and territories, the ACT had the highest reported prevalence of ear/hearing problems (21%) and the NT the lowest (10%). Ear/hearing problems were reported by 10% of Torres Strait Islander people and 14% of Aboriginal people.

The 2018-19 NATSIHS included, for the first time, an independent measure of hearing loss which aimed to find the level of under-reported ear/hearing problems [155]. Of those Aboriginal and Torres Strait Islander people aged seven years and over who volunteered to self-administer the test, 43% had hearing loss in one or both ears at the time of interview<sup>56</sup>. Of those, 79% did not report having a long-term ear/hearing problem (84% of people in remote areas and 77% in non-remote areas). The proportion of males (43%) with hearing loss in at least one ear was similar to females (42%). Prevalence was higher in remote areas (59%) than non-remote areas (39%). In remote areas, the prevalence of independently measured hearing loss was more than five times the prevalence of self-reported hearing problems (11%). The prevalence of hearing loss doubled between the ages of 35-44 years (41%) and 55 years and over (82%). The prevalence of hearing loss among children aged 7-14 years was 29%, and of those, the majority (92%) did not report a hearing problem<sup>57</sup>. The results of the hearing test reveal that under-reporting of ear/hearing problems may be substantial and add support to research that highlights hearing health as intrinsic to wellbeing and good educational and employment outcomes.

Long-term ear or hearing problems were reported for 6.9% of Aboriginal and Torres Strait Islander children aged 0-14 who participated in the 2018-19 NATSIHS [51]. OM was reported for 2.6% of children and deafness for 3.8%. Ear and hearing problems were more prevalent among children in remote areas (9.7%) than children in non-remote areas (6.4%).

Information about the ear health and hearing status of young Aboriginal and Torres Strait Islander people in the NT is collected from an outreach ear program funded by the Australian Government<sup>58</sup> [156]. Of the 1,817 Aboriginal and Torres Strait Islander people aged 0-20 years who received a service through the program in 2018, 61% were diagnosed with at least one type of ear condition at their latest visit. The prevalence of ear conditions ranged from 52% among those aged 11-15 years to 73% among those aged 0-2 years. Among children and young people who had an ear condition, the most common diagnosis was otitis media with effusion (23%), followed by eustachian tube dysfunction<sup>59</sup> (18%), CSOM without discharge (15%) and CSOM with discharge (13%). Of the children who received an audiology service through the program, 47% were found to have some hearing loss in one or both ears.

### General Practitioners attendances and hospitalisation

In 2010-2015, ear and hearing problems accounted for 8.4% of all general practitioners (GP) encounters with Aboriginal and Torres Strait Islander children aged 0-14 years (11% of encounters with children aged 0-4 years and 5.5% of encounters with children aged 5-14 years) [157]. The majority (84%) of ear-related encounters were for ear infection, primarily acute OM (Derived from [157].)

56 Hearing loss measured may not always relate to a long-term hearing problem. Hearing loss can result from short-term congestion or conditions in which the test was taken, including environmental noise [155].

57 This estimate has a high margin of error and should be interpreted with caution [155].

58 Population is not a random sample and is not representative of all Aboriginal and Torres Strait Islander children and young people in the NT [156].

59 Blocking of the tubes that run between the middle ear and the upper throat [156].

There were 3,669 ear-related hospitalisations in 2018-19 [49], representing 1.2% of all hospitalisations (excluding dialysis) of Aboriginal and Torres Strait Islander people (Derived from [49]). Aboriginal and Torres Strait Islander people were hospitalised for ear disease at an age-adjusted rate of 3.8 per 1,000 population.

In 2018-19, there were 2,424 ear-related hospitalisations for Aboriginal and Torres Strait Islander children aged 0-14 years [12], of which 90% were for diseases of the middle ear and mastoid (Derived from [12]). The crude rate of ear-related hospitalisation for children aged 0-14 years was 8.7 per 1,000 (13 per 1,000 for children aged 0-3 years and 7.2 per 1,000 for children aged 4-14 years) [12]. In 2016-18, the crude rate of ear-related hospitalisation for children in remote areas (15 per 1,000) was higher than the rate for children in regional areas (7.6 per 1,000) and major cities (7.3 per 1,000).

## 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 [158]. The two most common oral diseases are dental caries (tooth decay) and periodontal disease (gum disease) [159].

Dental caries occurs when bacteria in plaque interacts with sugar in food and drink to produce acids that degrade tooth enamel [160]. The stickiness of the plaque keeps these acids in contact with teeth and, over time, the enamel can break down and a cavity forms. The main contributor to caries is the consumption of free sugars<sup>60</sup>. Untreated caries can lead to pain and an increased likelihood of root canal therapy or tooth extraction being needed.

Periodontal diseases are a group of inflammatory diseases that affect the gums and other parts of the mouth structure [160]. Gingivitis is an early reversible form of the disease which, if untreated, can lead to a serious condition called periodontitis. The factors associated with periodontitis include smoking, diabetes, obesity, low socioeconomic status, adverse maternal outcomes, poor oral hygiene and older age.

The importance of improving the oral health of Aboriginal and Torres Strait Islander people was recognised by the Australian Medical Association (AMA) in 2019 when it dedicated its annual report card on Indigenous health to the topic of oral health [161]. Actions identified by the AMA as crucial to the improvement of Aboriginal and Torres Strait Islander oral health included increasing fluoridation of Australia's water supplies, enhancing oral health promotion, growing the Aboriginal and Torres Strait Islander dental workforce and strengthening data collection.

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

#### Child oral health

The 2012-2014 National Child Oral Health Study (NCOHS), which included a clinical examination component, found that:

- The proportion of Aboriginal and Torres Strait Islander children aged 5-10 years who had experienced any tooth decay in their primary (baby) teeth was 61% [159]. The average number of decayed, missing or filled primary tooth surfaces<sup>61</sup> for Aboriginal and Torres Strait Islander children aged 5-10 years was 6.3.
- The proportion of Aboriginal and Torres Strait Islander children aged 6-14 years who had experienced any tooth decay in their permanent (adult) teeth was 36% [159]. The average number of decayed, missing or filled permanent tooth surfaces for Aboriginal and Torres Strait Islander children aged 6-14 years was 1.3.
- The prevalence of visible dental plaque among Aboriginal and Torres Strait Islander children aged 5-14 years was 60% and the prevalence of gingivitis was 34% [159]. Both are indicators of oral hygiene status.

<sup>60</sup> Free sugars are added sugars plus those naturally occurring in honey, fruit juice and fruit concentrate.

<sup>61</sup> Counting the number of surfaces of a person's tooth that are decayed, missing or filled, or the number of teeth that are decayed, missing or filled, gives an indication of oral health.

Dental services in the NT have been provided to Aboriginal and Torres Strait Islander children under the age of 16 years through a succession of programs funded by the Australian Government and delivered by the NT Government, most recently through the Northern Territory Remote Aboriginal Investment Oral Health Program [162]. In 2018, among the 2,719 service recipients (Derived from [162]) for whom complete data is available, tooth decay prevalence was highest among children aged 7 and 8 years (86%), and lowest among children aged 1-3 years (41%)<sup>62</sup> [162]. Children aged 5 years old had the highest average number of decayed, missing or filled primary teeth (5.6 teeth), and children aged 15 years had the highest average number of decayed, missing or filled permanent teeth (3.4 teeth).

### Adult oral health

The 2017–18 National Study of Adult Oral Health (NSAOH), which included a clinical examination component, found that 7.1% of Aboriginal and Torres Strait Islander people aged 15 years and over had complete tooth loss [163]. Of those who still had some natural teeth, 13% did not have adequate natural dentition (enough natural teeth<sup>63</sup> to chew or function properly) and 11% wore dentures. Over half (55%) had one or more filled teeth. For those who still had some natural teeth:

- the average number of missing teeth<sup>64</sup> was 5.7
- the average number of decayed, missing or filled teeth<sup>66</sup> was 7.5
- the average number of decayed, missing or filled tooth surfaces<sup>66</sup> was 18.7.

Of those people who still had some natural teeth, 35% said they experienced toothache and 29% rated their oral health as fair or poor [163]. Of all Aboriginal and Torres Strait Islander people aged 15 years and over, 45% said they were uncomfortable about their dental appearance and 36% said they avoided foods due to dental problems.

### Dentist visits and hospitalisation

In the 2018-19 NATSIHS, 44% of Aboriginal and Torres Strait Islander people aged 2 years and over reported having seen a dentist or dental professional in the 12 months prior to the survey [61]. The proportion of young people (aged 2-17 years) who had made a dental visit (57%) was higher than the proportion of adults (36%). The proportion of people who had made a dental visit was highest in Vic (51%) and lowest in WA (40%). People in remote areas were about as likely to have made a dental visit as people in non-remote areas (41% and 44% respectively).

In the 2017-18 NSAOH, 51% of Aboriginal and Torres Strait Islander people aged 15 years and over reported having seen a dentist in the 12 month prior to the survey [163]. The proportion decreased in older age groups from 63% for 15-34 years to 41% for 55-74 years. The proportion of people whose last dental visit was five or more years ago was 14%.

In the 2012-2014 NCOHS, 75% of Aboriginal and Torres Strait Islander children aged 5-14 years were reported as visiting a dental provider in the 12 months prior to the survey [159].

In 2018-19, there were 3,773 potentially preventable hospitalisations for dental conditions for Aboriginal and Torres Strait Islander people [51]. The crude hospitalisation rate was 4.5 per 1,000. In 2015-17, the crude rate of hospitalisation for dental problems was similar for males (2.6 per 1,000) and females (2.5 per 1,000) [34]. Age-specific rates were much higher for children aged 0-4 and 5-14 years (around 6 per 1,000) than for all other age-groups (all less than 1.0 per 1,000).

In 2017-18, after age-adjustment, the hospitalisation rate for acute dental conditions for Aboriginal and Torres Strait Islander people was highest in the NT (5.0 per 1,000) and lowest in Tas (2.9 per 1,000) [164].

In 2016-18, the crude rate of hospitalisation for potentially preventable dental conditions was highest in remote and very remote areas (6.3 per 1,000) and lowest in major cities (3.4 per 1,000) [51].

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

63 Twenty natural teeth are considered sufficient for chewing function [163].

64 Missing for any reason.



In 2015-17, the crude rate of hospitalisation for periodontal diseases for Aboriginal and Torres Strait Islander people was 1.1 per 1,000. Males and females were hospitalised at similar rates (1.1 per 1,000 and 1.2 per 1,000 respectively) [34]. Age-specific rates for periodontal hospitalisation were highest for 25-34 year olds (1.7 per 1,000) and lowest for those aged 65 and over (0.3 per 1,000).

## Disability

The word 'disability' does not have a direct translation in Aboriginal or Torres Strait Islander languages [165]. Within medical literature, disability is often defined as a limitation, restriction or impairment which has lasted, or is likely to last, for at least six months and restricts the everyday activities of an individual [166]. It can be considered in terms of: the nature of the impairment in body structure or function; a limitation in activities (such as mobility and communication); a restriction in participation (involvement in life situations, such as work, education and social interaction) and the interaction between an individual and their personal and environmental context [37, 167].

Understandings of disability by Aboriginal and Torres Strait Islander people are likely to focus on body function and be interwoven with the experience of disability, viewed within the context of their beliefs, attitudes and experiences of disability, and historic, social and economic disadvantages [51, 94, 165].

The main source of information about the level of disability at a population level in Australia is the periodic Survey of Disability, Ageing and Carers (SDAC)<sup>65</sup>, which collects information about the prevalence of disability as well as people's need for assistance with core activities by primary carers [166]. The SDAC categorises disabilities into six groups: (1) sensory, (2) intellectual, (3) physical, (4) psychosocial, (5) head injury, stroke or acquired brain injury, and (6) other [168]. 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 (self-care, mobility or communication). Information about disability within Aboriginal and Torres Strait Islander communities, at a population level, is usually collected in Australia's five-yearly censuses [169], and among Aboriginal and Torres Strait Islander people-specific surveys such as the National Aboriginal and Torres Strait Islander Social Survey (NATSISS) [94] and the NATSIHS [61].

The burden of disability experienced by Aboriginal and Torres Strait Islander people is often associated with poorer physical and mental health, increased exposure to risk factors and higher levels of socioeconomic disadvantage [37, 79, 94].

### *Extent of disability among Aboriginal and Torres Strait Islander people*

#### Prevalence

It was reported in the 2018-19 NATSIHS that 38% of Aboriginal and 35% of Torres Strait Islander people aged 15 years and over had a disability or restrictive long-term health condition [61]. The proportions for Aboriginal and Torres Strait Islander males was 39% and for females 37%. Disability was reported at similar frequencies in non-remote settings (38%) and remote settings (37%). The survey also found that 8.2% of Aboriginal people and 8.3% of Torres Strait Islander people reported a profound or severe disability: the proportion for Aboriginal and Torres Strait males was higher (8.6%) than females (7.6%). A profound/severe disability was reported more often in non-remote areas (8.6%) than in remote areas (5.7%).

For Aboriginal and Torres Strait Islander people with a disability, the most reported disability groups were physical (63%), sensory (47%), psychological (23%), intellectual (18%) and head injury, stroke or brain damage (3.4%), with 30% classified as 'other' [34].

The 2016 Census provided information on assistance for Australians with a profound or severe disability [169]. In 2016, 6.7% of Aboriginal and Torres Strait Islander people reported a need for assistance with either self-care, mobility or communication (for an additional 6.1% of respondents, a need for assistance was not stated). Within Aboriginal and Torres Strait Islander populations, of those who needed assistance, more males (53%) needed assistance than females (47%) and the need for assistance was highest among the 5-14 years and 65 years and over age-groups (both 19%) followed by the 45-54 and 55-64 years age-groups (both 15%).

<sup>65</sup> The SDAC does not include people living in discrete Indigenous communities and very remote areas [168].

In the 2015 SDAC, of the total number of Aboriginal and Torres Strait Islander people living with a disability in households, 60% reported needing assistance with at least one daily activity [170]. The highest reported areas of need were with cognitive and emotional tasks (28%), property maintenance (24%), health care (23%), mobility (22%) and household chores (21%).

### Services

The 2018-19 NATSIHS provides information for health service use (GP, specialist and hospital admissions) among Aboriginal and Torres Strait Islander people with a disability or restrictive long-term health condition [61]. In the last 12 months, 94% saw a GP or specialist and 27% were admitted to hospital.

Not all people who could benefit from the use of disability support services have access to, or utilise access to, services. To assess the level of use of disability services by Aboriginal and Torres Strait Islander people, attention is directed to the 'potential population' of users: 'the number of people with the potential to require disability support services, including individuals who meet the service eligibility criteria but who do not demand these services' [171]. In 2017-18, the rate of the 'potential population' of Aboriginal and Torres Strait Islander people who used the National Disability Agreement (NDA) services (excluding the ACT) was 28 per 1,000 potential population for accommodation support, 34 per 1,000 for community access services, 124 per 1,000 for community support services and 364 per 1,000 for employment services [171].

For disability services provided under the NDA for 2018-19, 5.3% of service users identified as Aboriginal and/or Torres Strait Islanders [172]. In 2018-19, service use was higher among Aboriginal and Torres Strait Islander males (58%) than females (42%) [172]. The majority (94%) of Aboriginal and Torres Strait Islander service users were aged under 60 years, with the average age for users being 35 years. When considering the living arrangements of users, 39% lived alone, 33% lived with others and 25% lived with family. It was reported that 21% of Aboriginal and Torres Strait Islander disability service users had an informal carer. For those whose informal carer was their primary carer, mother (52%) was the most common relationship to the service user.

In 2018-19, the proportion of Aboriginal and Torres Strait Islander service users who lived in major cities was 45% [172]. A further 28% lived in an inner regional area, 21% lived in an outer regional area and 4.6% lived in a remote or very remote area.

Similar to 'potential population' users, in 2018-19, the service group most commonly used by Aboriginal and Torres Strait Islander people was employment (80%), followed by community support (16%) [172]. The main disability groups accessing services were Aboriginal and Torres Strait Islander people with a psychiatric condition (37%), physical disability (24%) and intellectual disability (15%). Physical (21%) and psychiatric (18%) conditions were most commonly reported as 'other' significant disability groups for Aboriginal and Torres Strait Islander people with a main disability.

In 2018-19, 1,066 Aboriginal and/or Torres Strait Islander NDA service users transitioned to the National Disability Insurance Scheme [172]. This included 894 people who identified as Aboriginal, 82 who identified as a Torres Strait Islander and 90 who identified as both an Aboriginal and Torres Strait Islander.

In the 2019 *National Aboriginal and Torres Strait Islander Youth Report*, 75% of Aboriginal and Torres Strait Islander respondents (aged 15-19 years) reported feeling that their communities supported people living with a disability [173]. However, of the youth respondents who reported living with a disability, 62% reported that their disability made it hard for them to fit in (at school, work or socially), with this lived challenge more highly reported in Aboriginal and Torres Strait Islander young females (78%) than males (51%).

To best meet the needs of Aboriginal and Torres Strait Islander people living with disability, it is important that services understand Aboriginal and Torres Strait Islander concepts of disability, address the social determinants of health and disability, and provide culturally safe supports that are inclusive and work in partnership with Aboriginal and Torres Strait Islander communities [51, 173].



## Communicable diseases

Communicable diseases (caused by infectious agents including bacteria, viruses, parasites, fungi, or their toxic products) can be transmitted from a person or an animal to another [149]. Disease transmission may occur directly (e.g. via contact with bodily fluids), indirectly (e.g. by sharing a drinking glass), or through vectors (e.g. mosquitoes). While illnesses caused by communicable disease are often mild and brief (e.g. a common cold) and do not require medical care, risk factors may vary according to the type of disease. Improvements to sanitation and the increased use of vaccination and antibiotics have markedly reduced some infectious diseases in Australia [149, 174].

### Sexually transmitted infections

Sexually transmissible infections (STIs) include bacterial, viral and parasitic infections that are transmitted through sexual contact [175]. Young people are particularly vulnerable to STIs. The use of condoms is regarded as fundamental in preventing STI transmission. Most STIs are treatable and early detection is important in the management of STIs.

#### *Chlamydia*

Chlamydia is an infection caused by the bacterium *Chlamydia trachomatis* and symptoms mainly consist of an inflamed urethra, causing discharge for men and pain during urination and intermenstrual bleeding for women [176]. However, chlamydia is asymptomatic (showing no symptoms) in about 80% of cases. Chlamydia can also lead to reproductive issues for women such as infertility, pelvic inflammatory disease and ectopic pregnancies.

In 2018, there were 6,897 notifications of chlamydia for Aboriginal and Torres Strait Islander people, which is a 7.1% increase from 2014 [177]. The age-standardised notification rate<sup>66</sup> for chlamydia among Aboriginal and Torres Strait Islander people living in Qld, WA, SA and the NT was 1,242 per 100,000.

In 2017, for the jurisdictions where data are reported, the highest notifications were in Qld (48% of notifications), followed by WA (24%), NT (23%) and SA (5.1%) [176].

Chlamydia is typically diagnosed among young people [176]. In 2017, people aged 15-29 years accounted for 82% of chlamydia notifications in the Aboriginal and Torres Strait Islander population. The median age of diagnosis was 21 years of age. Aboriginal and Torres Strait Islander females accounted for a greater proportion of chlamydia diagnoses than males, with a male-to-female ratio of 0.5:1. The rates of chlamydia notifications in Aboriginal and Torres Strait Islander females aged 15-19 and 20-29 years were 7,450 per 100,000 and 4,957 per 100,000, 3.8 and 2.7 times higher respectively than in the non-Indigenous population. Higher notification rates for Aboriginal and Torres Strait Islander females aged 15-19 years may be due to greater health care attendance and subsequent testing.

There was a 7.9% decline in chlamydia notification rates for Aboriginal and Torres Strait Islander males from 952 per 100,000 in 2013 to 877 per 100,000 in 2017, and a 9.8% decline for females from 1,688 per 100,000 in 2013 to 1,523 per 100,000 in 2017 [176].

#### *Gonorrhoea*

Gonorrhoea is an infection caused by the bacterium *Neisseria gonorrhoeae* and displays similar symptoms to chlamydia [176]. Gonorrhoea is also largely asymptomatic in approximately 80% of female cases and 50% of male cases, and can lead to reproductive issues if left untreated [176, 178]. In 2018, there were 4,439 gonorrhoea notifications for Aboriginal and Torres Strait Islander people [177]. The age-standardised notification rate<sup>67</sup> for Aboriginal and Torres Strait Islander people living in Vic, Qld, WA, SA, Tas, the ACT and the NT was 717 per 100,000. Between 2013 and 2017, the notification rate declined by 12% from 714 per 100,000 in 2013 to 628 per 100,000 in 2017 [176].

<sup>66</sup> Chlamydia notifications were based on data from Qld, WA, SA and the NT where Aboriginal and Torres Strait Islander status was ≥50% complete per year between 2014-2018 [177].

<sup>67</sup> 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 between 2014-2018 [177].

In 2017, for the jurisdictions where data are reported, the highest notifications were in the NT (40% of notifications), followed by WA (29%) and Qld (22%) [176].

In 2017, one-third (31%) of gonorrhoea notifications for the Aboriginal and Torres Strait Islander population occurred in the 15-19 years age-group [176]. The median age of diagnosis in 2017 was 22 years of age which has remained the same over the period 2013-2017.

In 2017, 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 [176].

## Syphilis

Syphilis is an infection caused by the bacterium *Treponema pallidum* which can be contracted through sexual contact, blood-to-blood contact and from mother to child during pregnancy [176, 179]. If a fetus contracts syphilis during pregnancy it is called congenital syphilis, and often results in the fetus dying if left untreated. The primary symptom of syphilis is a painless ulcer located at the area of infection, which appears within the first couple of weeks after infection, followed by a rash, which usually appears on the palms or soles if left untreated and progresses into what is termed secondary syphilis. Following the secondary stage, the infection is asymptomatic.

From 2011, there has been an ongoing outbreak of syphilis recorded among young Aboriginal and Torres Strait Islander people, which began in Qld, followed by the NT, WA and SA [177].

In 2018, there were 791 syphilis notifications for Aboriginal and Torres Strait Islander people [177]. Between 2013 and 2017, the age-standardised notification rate<sup>68</sup> for Aboriginal and Torres Strait Islander people increased by approximately 426% from 20 per 100,000 in 2013 to 103 per 100,000 in 2017 [176]. However in 2018, the rate decreased to 101 per 100,000 [177].

In 2017, the syphilis notification rates for Aboriginal and Torres Strait Islander males were highest in the 30-39 years age-group (233 per 100,000) [176]. For females, rates were highest in the 15-19 years age-group (238 per 100,000). The median age of diagnosis for males and females combined was 27 years of age.

In 2017, the proportion of infectious syphilis notifications for Aboriginal and Torres Strait Islander people was 50% for males and females [176].

In 2017, Qld (45%) and the NT (35%) accounted for 80% of the syphilis notifications from all jurisdictions, with WA having the next highest reported notifications (9.2%) [176].

## The human immunodeficiency virus (HIV)

The human immunodeficiency virus (HIV) can be transmitted through certain body fluids such as blood, vaginal fluid, semen and breast milk [180]. It can also be transmitted during pregnancy or birth from mother to child. HIV affects a person's immune system and over time prevents their body's ability to overcome infections and illnesses. If untreated, HIV can progress to acquired immune deficiency syndrome (AIDS) [176].

The risk factors associated with contracting HIV include, engaging in unprotected sex (anal, oral or vaginal), having an STI, sharing injecting equipment, using unsterile piercing and tattooing equipment or accidental needle stick injuries [180, 181].

HIV symptoms often vary and develop over time, meaning it is common for people who are infected to be unaware they are HIV positive until the later stages of infection [180]. However, the most infectious time period is the first few months after infection.

In 2019, there were 903 cases of newly diagnosed HIV infection in Australia, of which 25 (3%) were among Aboriginal and Torres Strait Islander people [182]. This is the lowest number of HIV notifications recorded among Aboriginal and Torres Strait Islander people in the last five years. Age-standardised rates of HIV diagnosis for Aboriginal and Torres Strait Islander people were 3.3 per 100,000 population, down from 4.2 per 100,000 in 2018.

<sup>68</sup> Syphilis notification rates were based on data from all jurisdictions in Australia with Aboriginal and Torres Strait Islander status being  $\geq 50\%$  complete for 2017 [176].

Information for males and females and regions is only available for 2018. Aboriginal and Torres Strait Islander males accounted for 91% of new HIV cases among Aboriginal and Torres Strait Islander people [183]. HIV age-standardised notification rates among males were 8.0 per 100,000, and among females, 1.1 per 100,000. Rates were 5.3 per 100,000 for Aboriginal and Torres Strait Islanders 35 years of age and over, compared with 4.0 per 100,000 for under 35 years of age. The highest age-standardised notification rates were found in major cities (6.2 per 100,000), followed by remote areas (5.4 per 100,000) and regional areas (2.4 per 100,000). Among men who have sex with men the HIV notification rate for Aboriginal and Torres Strait Islander people in 2019 was 3.3 per 100,000 [182].

## Hepatitis

Hepatitis is an inflammation of the liver which can be caused by viral infections [37].

### Hepatitis C

Transmission of hepatitis C virus (HCV) mainly occurs via blood contact and from mother to newborn [176]. Treatment for HCV using direct-acting antiviral (DAA) therapies have been found to be highly effective [184]. There is no vaccine to protect people against HCV but due to the efforts to increase access to DAAs over recent years Australia is predicted to eliminate HCV by 2030 [185, 186].

In 2018, 739 HCV notifications for Aboriginal and Torres Strait Islander people were recorded, which was a 3% reduction from 2015 [177]. The age-adjusted notification rate for HCV was 164 per 100,000 population for Aboriginal and Torres Strait Islander people living in Qld, WA, SA, Tas, the ACT and the NT<sup>69</sup>. In 2017 the HCV notification rates for Aboriginal and Torres Strait Islander males were higher than for females (227 and 110 per 100,000 respectively) [176]. This pattern was evident across all age-groups from 15 years of age and above. The highest rates were in the 30-39 years age-group (males: 490 per 100,000; females 289 per 100,000) followed by the 20-29 years age-group (males: 489 per 100,000; females 205 per 100,000).

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

### Hepatitis B

Transmission of hepatitis B virus (HBV) may be from blood or sexual contact or from mother to child at birth [176].

In 2018, there 96 Aboriginal and Torres Strait Islander people recorded with HBV, a reduction of 31% from 2014 [177]. After age-adjustment, the HBV notification rate for Aboriginal and Torres Strait Islander people living in, WA, SA, Tas, ACT, Qld and the NT<sup>70</sup> was 27 per 100,000. In 2017, the HBV notification rate among Aboriginal and Torres Strait Islander males was higher than for females (64 and 27 per 100,000 respectively) [176]. The highest rates for males were in the 40-49 years age-group (88 per 100,000) followed by the 60 years and over age-group (84 per 100,000). The highest rates for females were in the 60 years and over age-group (75 per 100,000) followed by the 40-49 years age-group (28 per 100,000).

There has been a 40% decline in the HBV notification rates for Aboriginal and Torres Strait Islander people from 45 per 100,000 in 2014 to 27 per 100,000 in 2018 [177]. It is suggested that this reduction is due to 97% of the Aboriginal and Torres Strait Islander population being vaccinated against HBV in 2017 and 2018. While recommended [187], HBV vaccination for Aboriginal and Torres Strait Islander adults is not funded under the National Immunisation Program (NIP) [188].

<sup>69</sup> HCV notification rates were based on data from Qld, WA, SA, Tas, ACT and the NT where Aboriginal and Torres Strait Islander status was ≥50% complete for 2014-2018 [6].

<sup>70</sup> HBV notification rates were based on data from WA, SA, Tas, ACT and the NT where Aboriginal and Torres Strait Islander status was ≥50% complete for 2013-2017 [176].

## Pneumococcal disease

Pneumococcal disease results from infection by the bacterium *Streptococcus pneumoniae*, which may cause severe invasive disease including meningitis, pneumonia, bacteraemia and non-invasive disease, including OM [189]. Pneumococcal disease is most common in very young children and the elderly [190].

Nationally-funded vaccination for pneumococcal disease is available for Aboriginal and Torres Strait Islander infants and children, adults aged 50 years and older and those aged 15-49 years at high-risk [191]. Funded under the NIP, all Aboriginal and Torres Strait Islander children will receive a single dose at ages two, four and 12 months [192], and children living in WA, SA, the NT and Qld will receive an additional dose at six months of age.

For the period 2014-2016, 581 (12%) of the 4,727 cases of invasive pneumococcal disease (IPD) were identified as Aboriginal and Torres Strait Islander [193].

For 2011-2015, 1,152 (14%) of the 8,316 cases of invasive pneumococcal disease (IPD) were identified as Aboriginal and Torres Strait Islander [188]. The highest age-specific notification rate was for Aboriginal and Torres Strait Islander people aged 50 years and over (63 per 100,000 population), followed by the 0-4 years age-group (42 per 100,000), with the lowest rate in the 15-24 years age-group (13 per 100,000). Underlying medical conditions, household crowding, exposure to tobacco smoke and other non-vaccine factors may contribute to the transmission of IPD, which may explain the higher levels of IPD found in adults.

For 2014-15, Aboriginal and Torres Strait Islander children aged 0-4 years living in NSW, Vic, Qld, WA, SA and the NT were hospitalised for IPD at a rate of 0.4 per 100,000 [157].

For 2011-2015, there were 26 deaths (12% of the total of 223 deaths) attributed to IPD among Aboriginal and Torres Strait Islander people with 11 of the 26 deaths (42%) in the 50 years and over age-group [188].

## Meningococcal disease

Meningococcal disease is caused by the bacterium *Neisseria meningitidis* (also known as meningococcus) [194]. The most common clinical presentations of invasive meningococcal disease are septicaemia and/or meningitis. Meningococcal disease is more common in infants, young children, adolescents and adults aged over 45 years [195].

The most common serogroups<sup>71</sup> of meningococcus found in Australia are B, C, W and Y [195]. The MenACWY vaccination is now funded under the NIP as a single dose for all children aged 12 months and for adolescents aged 14 to 16 years via school-based immunisation and/or primary care providers [196]). This funding includes specific populations, including Aboriginal and Torres Strait Islander people. A vaccine for serogroup B<sup>72</sup> is available Australia-wide for Aboriginal and Torres Strait Islander infants aged from six weeks; a catch-up vaccine is also available until June 2023 for children aged up to 23 months [196, 197].

For the period 2014-2016, 63 (11%) of the 602 cases of meningococcal disease were identified as Aboriginal and Torres Strait Islander [193].

For 2011-2015, 101 (10%) of the 966 notified cases of meningococcal disease were identified as Aboriginal and Torres Strait Islander [188]. The age-specific notification rates decreased with age from 14 per 100,000 population in the 0-4 years age-group to 0.4 per 100,000 in the 50 years and over age-group. Serogroup B was responsible for most cases during this reporting period.

For 2006-2015, the incidence rate of meningococcal serogroup B (MenB) among Aboriginal and Torres Strait Islander people was 2.8 per 100,000, with the age-specific rate highest in infants less than 12 months of age (33 per 100,000) [198].

Detailed hospitalisation data for meningococcal disease are not available, however, for the 2011-2015 period, Aboriginal and Torres Strait Islander people experienced high levels of admissions, with the highest admissions being in the 0-4 and 5-14 years age-groups [188].

For 2011-2015, of the 53 reported deaths from meningococcal disease, six or 11% were recorded for Aboriginal and Torres Strait Islander people [188].

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

72 SA provides free vaccination for eligible children and young people.

## Tuberculosis

Tuberculosis (TB) is primarily a lung infection caused by the inhalation of *Mycobacterium tuberculosis* bacteria [194]. With high incidence rates in the NT, Qld and northern SA among Aboriginal and Torres Strait Islander people [194], the National Tuberculosis Advisory Committee recommends neonates in high incidence communities receive the Bacille Calmette-Guérin (BCG) vaccine [199].

In 2018, of the 1,438 notifications of TB in Australia, 29 (2.0%) were identified as Aboriginal and/or Torres Strait Islander [200].

It was reported that 29 (18%) of the 161 notifications of TB among Australian-born people in Australia in 2018 were identified as Aboriginal and Torres Strait Islander (Derived from [200]). The notification rate for TB among Aboriginal and Torres Strait Islander people was 3.6 per 100,000. The rate of TB for Aboriginal and Torres Strait Islander people was highest in the 35-44 and 65 years and over age-groups (10 and 12 per 100,000 respectively). By jurisdiction, the rate was highest for SA (7.1 cases per 100,000 population), followed by Qld (6.3 cases per 100,000 population) and the NT (5.4 cases per 100,000).

In 2018-19, Aboriginal and Torres Strait Islander people were hospitalised for TB at a crude rate of 8.8 per 100,000 [51]. During the period 2016-18, hospitalisation rates were highest for Aboriginal and Torres Strait Islander people in the 65 years and over age-group (26 per 100,000), followed by the 45-64 years age-group (23 per 100,000)<sup>73</sup>. The lowest hospitalisation rates for Aboriginal and Torres Strait Islander people during the same period were reported for the 15-24 years age-group (2.2 per 100,000).

## Haemophilus influenzae type b

*Haemophilus influenzae* type b (Hib) is a bacterium that can cause a number of conditions including meningitis, pneumonia, epiglottitis, septic arthritis and cellulitis [194]. Children are particularly susceptible to Hib, which is serious in its invasive form [188]. Vaccination has substantially reduced notifications of invasive Hib disease in Australia, with a reduction of more than 99% across both the Aboriginal and Torres Strait Islander and non-Indigenous populations compared with the pre-immunisation era. In 2018, it was estimated that 93% of Aboriginal and Torres Strait Islander children were vaccinated against Hib at one year of age [51].

For 2000-2017, 76 (22%) of the 345 cases of invasive Hib disease notified in all jurisdictions were identified as Aboriginal and/or Torres Strait Islander [201]. For the period of 2011 to 2015, the highest Hib notification rate was among Aboriginal and Torres Strait Islander children aged 0-4 years (3.3 per 100,000 population) [188]. The only other Aboriginal and Torres Strait Islander age-group to report cases was the 25-49 years age-group (0.2 per 100,000). Between 2007-2010 and 2011-2015 notification rates decreased by around 67%, from 0.9 per 100,000 to 0.3 per 100,000 [188, 202].

## Skin health

The most common skin infections affecting Aboriginal and Torres Strait Islander children are scabies and impetigo [203, 204]. Scabies is a skin disease caused by the mite *Sarcoptes scabiei* that produces skin inflammation and itching [205]. Scratching in response to a scabies infestation can result in impetigo<sup>74</sup>, a bacterial infection of the skin [205, 207]. Research suggests that scabies mites could also spread bacterial infection and promote bacterial growth [208, 209]. Crusted scabies can also occur when there are a high number of scabies mites present on the infected skin [210]. Impetigo in Aboriginal and Torres Strait Islander communities commonly involves GAS, which brings a risk of severe effects including kidney disease and, possibly, ARF [211-215].

Risk factors for skin infections include: perinatal risk factors (such as male sex and LBW) [216], low family income, overcrowding, quality of water supply and housing, access to affordable healthy food, poor hygiene and non-adherence to antibiotic treatments [217, 218]. Aboriginal and Torres Strait Islander children living in the high-rainfall, humid areas of northern Australia, are also vulnerable to a variety of other fungal and bacterial infections [219].

<sup>73</sup> Rates were not available for the 0-14 year age-group.

<sup>74</sup> Impetigo is also referred to as skin sores, or the broader term, pyoderma, and these terms are commonly used interchangeably [206].

Resource-poor environments [220, 221] and the ‘normalisation’ of infections in communities [217, 222] are associated with an increased burden of skin infections and infestations. The treatment and control of scabies and impetigo in remote Aboriginal communities has been a challenge for many years [217]. Preventative, focused and collaborative programs based within remote Aboriginal communities have had some positive outcomes [223, 224], however, these outcomes have not continued over the longer-term [225]. One current program, the SToP (See, Treat, Prevent) Skin Sores and Scabies Trial in WA, aims to address the issues of sustainability and the ethical aspects of Indigenous research so that the positive outcomes of this trial, and others that may follow, will extend beyond the life of the programs [225]. Traditional approaches, such as using bush medicines, have been highlighted as an effective method of treating scabies and skin sores by Aboriginal and Torres Strait Islander community members [217]. Additionally, research suggests that swimming in chlorinated swimming pools can have a positive effect on reducing skin infections among children [217, 218].

### Prevalence

Scabies is endemic in some remote central and northern Aboriginal and Torres Strait Islander communities, affecting both adults and children [226, 227]. Most prevalence data available is for children, with research indicating that the most frequent age of the first infection for both skin sores and scabies is at three to four months of age [228] and that children presenting with one of these conditions are more likely to also have the other [203, 229].

Aboriginal and Torres Strait Islander children under 15 years of age were screened between September 2004 and August 2007 in five remote NT communities for the East Arnhem Healthy Skin Project (EAHSP) [230]. Over the course of the study, the average monthly prevalence for pyoderma was 36% and for scabies 13%. However, scabies prevalence did decrease with age. For children aged 3-14 years, scabies prevalence was 11%, half that of children aged 0-3 years (23%). Nearly all participants (92%) had presented with pyoderma and 35% with scabies on at least one occasion during the study.

A study of medical records for children born between 2001-2006, participating in the EAHSP, found that 69% of children had presented with scabies and 82% had presented with skin sores during their first year of life [229].

A two-year study of crusted scabies notifications in the NT was conducted between 2016 and 2018 [210]. The study found 92 cases of crusted scabies, 80 patients were notified to the NT Health’s Centre for Disease Control during this period, with 95% of patients identifying as Indigenous Australian.

The 2018-19 NATSIHS provides some data for diseases of the skin and subcutaneous tissue<sup>75</sup> [61]. The proportion of Aboriginal and Torres Strait Islander people reporting a disease of the skin and subcutaneous tissue was 3.2% (males 2.4% and females 4.0%). The prevalence reported ranged from 2.1% in the 0-14 years age-group to 4.7% in the 25-34 years age-group.

### Hospitalisation and primary health care presentation

There were 11,707 hospital separations with a principal diagnosis of ‘diseases of the skin and subcutaneous tissue’ among Aboriginal and Torres Strait Islander people in 2018-19, at a rate of 16 per 100,000 Aboriginal and Torres Strait Islander people [49]. In 2018-19, there were 1,230 Aboriginal and Torres Strait Islander children, aged 0-4 years, who were hospitalised with a principal diagnosis of ‘diseases of the skin and subcutaneous tissue’, representing 4% of the total number of hospitalisations for this age-group [51].

A report by the Australasian College for Emergency Medicine examined the experiences of Aboriginal and Torres Strait Islander people presenting to public hospital emergency departments<sup>76</sup> [231]. For the period 2014-15, 6.7% of emergency presentations among Aboriginal and Torres Strait Islander people were for illness of the skin, subcutaneous tissue and breast. Such emergency presentations for skin related conditions were most common among the 0-14 years age-group, (7-10%). Emergency presentations in NSW, Qld, Vic, WA, SA and the NT for illness of skin, subcutaneous tissue and breast were highest in WA (10% of presentations in that state), followed by the NT (8.3%) and NSW (5.5%).

<sup>75</sup> Includes dermatitis, eczema, psoriasis and other diseases, symptoms and signs of the skin and subcutaneous tissue.

<sup>76</sup> The information presented utilises data obtained from the National Non-admitted Patient Emergency Department Care Database managed by the AIHW for reporting public hospitals.



## 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 broader context of the social and cultural determinants of health [149, 232] [233]. The WHO describes the social determinants of health as the conditions in which people are born, grow, live, work and age [234]. The cultural determinants of health have been described as originating from and promoting perspectives that are strength based, acknowledging that stronger connections to Country and culture, build stronger individual and collective identities [233]. These stronger connections also help build resilience, self-esteem and improved outcomes in education, community safety and economic stability and other health determinants. A life course approach to health and the risk of disease, known as life course epidemiology, integrates theories around the social determinants of health, fetal and developmental origins of disease, and the impact of lifestyle and individual behaviour on later life health and disease risk [235]. The social, cultural and other determinants of health some of which are discussed in the *Social and cultural concepts* section of this *Overview*, are further shaped by a wider set of forces and systems, including policies, political systems and social norms [234, 236].

To support a better quality of life and the health of Aboriginal and Torres Strait Islander people, reducing economic and social disadvantage needs to be considered, alongside modifiable and non-modifiable health risks as well as protective factors, which can reduce the burden of disease and improve health outcomes [233]. Generally, health risks are the behaviours, characteristics or exposures that may increase or decrease the likelihood of developing a particular condition or interfering with the treatment of an existing health condition [149]. High blood pressure, obesity and being overweight can be influenced by health behaviours, these are known as biomedical risk factors, bodily states that carry relatively direct and specific risks for health. Behavioural risk factors which can be modified more than any other determinants include; poor diet, obesity, excessive alcohol, tobacco smoking and physical inactivity, and can adversely affect health [149, 237]. Age, genetics, intergenerational influences such as psychological and physical makeup, are non-modifiable factors can also contribute to health risk. Protective factors, on the other hand, are health determinants that can influence health risks and/or outcomes in positive ways, such as a healthy diet, maintaining body weight and regular exercise, which can assist managing health conditions. It is important to note that risk is based on probability or likelihood so not everyone who is exposed to a known risk factor will have an adverse outcome [238, 239]. Similarly, while protective factors may be an indicator of the absence of a modifiable or non-modifiable factor, people may develop a health condition without ever having been exposed to an associated risk factor [238].

The selected health risk and protective factors summarised in the following sections are generally related to individual behaviours. However, these behavioural factors should be considered within the context of the social and cultural determinants of health, and the structural influences that shape behaviour and the ability to make changes over a person's lifespan [233, 240, 241]. For Aboriginal and Torres Strait Islander people with a strengthened identity, resilience and wellbeing, the cultural determinants of health are very important, as good health is strongly correlated to a strong connection with culture. Another important consideration is that any reinforcement of a deficit view of health, through a narrow focus on health inequities, prevents a strength based cultural determinants approach to health, for Aboriginal and Torres Strait Islander people and the strongly supported 'centrality of culture' in health and life [233, 242].

### **Nutrition**

The diets of Aboriginal and Torres Strait Islander people have changed since the time of colonisation, from traditional diets that were high in protein, fibre, polyunsaturated fat and complex carbohydrates to a more highly refined carbohydrate diet, with added sugars, saturated fat, sodium and low levels of fibre [243]. Traditional foods remain an important part of the diet for many people, and are strongly linked to culture, identity and country.

The nutritional status of Aboriginal and Torres Strait Islander people is influenced by many factors such as



socioeconomic status and environmental, geographical and social factors [244]. Poor diet is an important factor contributing to being overweight and obese, malnutrition, CVD, type 2 diabetes and tooth decay [244, 245]. The *Australian dietary guidelines* recommend that adults eat fruit and plenty of vegetables every day, selected from a wide variety of types and colours [245]. 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’<sup>77</sup> foods and drinks.

In 2018, a report by the AIHW stated that there is little difference between the food and nutrient intakes and health outcomes of Aboriginal and Torres Strait Islander people and non-Indigenous Australians [247].

### **Fruit consumption**

In the 2018-19 NATSIHS, participants self-reported their usual serves of fruit eaten per day, 39% of Aboriginal and Torres Strait Islander people (aged 15 years and over) met the recommended fruit intake guidelines (at least two serves per day) [61]. Females (aged 15 years and over) were more likely than their male counterparts to have eaten an adequate amount of fruit (44% and 35% respectively). The guidelines for daily fruit intake were met by 69% of Aboriginal and Torres Strait Islander children aged 2-14 years and 92% of 2-3 year olds. Slightly higher proportions of Aboriginal and Torres Strait Islander people living in remote areas compared with non-remote areas usually met the guidelines for daily serves of fruit (42% and 39% respectively). For children aged 2-17 years, this was reversed (61% and 66% respectively). When data from the 2018-19 NATSIHS and the 2017-18 National Health Survey (NHS) were combined, 69% of Aboriginal and Torres Strait Islander children aged 2-14 years met the guidelines for daily fruit intake. The proportions for remote and non-remote areas were 65% and 69% respectively [51].

### **Vegetable consumption**

In the 2018-19 NATSIHS, participants self-reported their usual serves of vegetables eaten per day, 4.2% of Aboriginal and Torres Strait Islander people (aged 15 years and over) met the recommendations for daily serves [61]. Females (aged 15 years and over) were more likely than their male counterparts to have eaten an adequate amount of vegetables (6.3% and 1.7% respectively). The guidelines for daily vegetable intake were met by 6.5% of Aboriginal and Torres Strait Islander children aged 2-14 years and 23% of 2-3 year olds. Similar proportions of Aboriginal and Torres Strait Islander people (aged 15 years and over) living in non-remote and remote areas usually met the guidelines for daily serves of vegetables (4.3% and 3.6% respectively). For children, (aged 2-17 years) this was also the case (6.2% and 5.6% respectively). When data from the 2018-19 NATSIHS and the 2017-18 NHS were combined, 6.5% of Aboriginal and Torres Strait Islander children aged 2-14 years met the guidelines for daily vegetable intake; the proportions for non-remote and remote areas were 6.6% and 5.8% respectively. In 2017-2019, 6.5% of all Aboriginal and Torres Strait Islander children (aged 2-14 years) reported adequate daily vegetable intake [51].

### **Fruit and vegetable dietary behaviour and labour force**

The 2012-13 AATSIHS examined associations between dietary behaviour and labour force status and educational attainment [248]. 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).

### **Discretionary foods**

According to the 2012-13 NATSINPAS, discretionary foods were consumed by a large proportion of Aboriginal and Torres Strait Islander people (aged 2 years and over) in the 24 hours prior to the survey, including confectionery (25%), snack foods (20%) and alcoholic beverages (11%) [249]. 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%

<sup>77</sup> Foods that are energy dense but do not provide many/any nutrients and that typically contain high levels of sugar, salt and fat [245, 246].

of daily energy as non-alcoholic beverages (such as soft drinks) [250]. Aboriginal and Torres Strait Islander children aged 2-3 years recorded a lower energy intake (32%) from discretionary foods than all other age-groups. 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) [249]. People in non-remote areas were more likely to consume all discretionary foods types than those in remote areas, except for non-alcoholic beverages (99% of people in both non-remote and remote locations).

In the 2018-19 NATSIHS, 24% of Aboriginal and Torres Strait Islander people (aged 15 years and over) reported that they usually consumed sugar sweetened drinks every day and 5.5% consumed diet drinks; 71% (75% of males and 67% of females) usually consumed sugar sweetened drinks or diet drinks at least once per week [61]. For children (aged 2-14 years), 20% usually consumed sugar sweetened drinks daily and 1.5% consumed diet drinks daily; 63% usually consumed sugar sweetened drinks or diet drinks at least once a week. The proportion of people (aged 15 years and over) who usually consumed sugar sweetened or diet drinks was higher for people living in remote areas (77%) than for non-remote areas (69%). The proportion was lowest for those aged 45-54 years (63%) and 55 years and over (49%), compared with 81% for people aged 18 to 24 years.

### **Sugar consumption**

The WHO recommends that both adults and children consume less than 10% of daily dietary energy from free sugars<sup>78</sup> [251]. According to the 2012-13 NATSINPAS, Aboriginal and Torres Strait Islander people consumed 111 grams (g) of total sugars per day on average [246]. Around two-thirds of this (75 g or 18 teaspoons of white sugar) was free sugars which equated to an average of 14% of daily dietary energy from free sugars. Ninety-one percent (91%) of the free sugars were added sugars (Derived from [246]). 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. Most free sugars consumed were from discretionary foods and beverages.

### **Sodium (salt) consumption**

According to the 2012-13 NATSINPAS, the average daily amount of sodium consumed from food by Aboriginal and Torres Strait Islander people was 2,379 mg (approximately one teaspoon of salt) [250]. This excludes salt added by consumers when preparing or eating 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 aged 51 years and older, had average intakes that exceeded the upper level of sodium intake recommended by the National Health and Medical Research Council (NHMRC).

### **Bush foods**

As a proxy measure of bush food consumption, participants in the 2012-13 NATSINPAS were asked about their consumption of foods that were naturally harvested or wild-caught, such as fish and seafood, wild harvested fruit and vegetables, reptiles and insects [249]. Aboriginal and Torres Strait Islander people (aged 2 years and over) in remote areas were more likely than those in non-remote areas 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). A recent study of dietary intakes of children aged 6-36 months in one remote community in the Top End of the NT described the frequency with which children consumed traditional food, including as the introduction to solids, as a positive practice [252].

### **Biomarkers of nutrition**

The 2012-13 AATSIHS collected information on biomarkers of nutrition, including vitamin D, anaemia and iodine [105]. It found that:

<sup>78</sup> Free sugars are added sugars plus those naturally occurring in honey, fruit juice and fruit concentrate [246].

- More than a quarter of Aboriginal and Torres Strait Islander adults (27%) had a vitamin D deficiency. The levels of vitamin D deficiency were similar for both Aboriginal and Torres Strait Islander males and females 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%. 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. Those living in remote areas had higher median levels than those living in non-remote areas.

### Food security

The 2012-13 NATSINPAS addressed the issue of food security by asking respondents if they had run out of food and couldn't afford to buy more in the last 12 months [253]. This had been a problem for 22% of respondents; 7.0% of respondents had run out and gone without food, while 15% had run out but not gone without food. People in remote areas were more likely to run out of food than people in non-remote areas (31% and 20% respectively) and slightly more likely to go without (9.2% and 6.4% respectively). A study conducted in 2018 in urban settings identified that food insecurity was intermittently experienced by Aboriginal and Torres Strait Islander families, occurring particularly when large household bills were due [254]. A study of five remote community stores on the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands of SA in June 2017 assessed food insecurity and found that nearly 50% of disposable household income was spent on food (compared with the international benchmark of 30%), with 62% of this food budget appearing to be allocated to discretionary foods and drinks (alcohol was not available in the communities) [255]. In the remote community study in the NT, mentioned above, it was found that pay cycle fluctuations of food insecurity impacted both the quantity and quality of children's diets<sup>79</sup> [252].

### Breastfeeding

Sustained breastfeeding was practiced by Aboriginal and Torres Strait Islander women prior to colonisation [256-259]. Descriptions of traditional practices align with the WHO and United Nations International Children's Emergency Fund (UNICEF) recommendations of exclusive breastfeeding for six months followed by complementary feeding with continued breastfeeding for up to two years or beyond [260]. The *Australian dietary guidelines* recommendation is to 'encourage, support and promote breastfeeding' [245]. The Victorian Consultative Council on Obstetric and Paediatric Mortality and Morbidity highlights the large number of babies given formula in hospital as an area for better practice to support breastfeeding for longer durations [261, 262].

Breast milk is the natural and optimum food for babies and provides all the energy and nutrients that a baby needs for the first six months of life [245, 260]. Breastfeeding promotes sensory and cognitive development, contributes to the development of the baby's microbiome and protects the baby against OM, SIDS, asthma, obesity, infectious diseases and some chronic diseases later in life [260, 263]. Exclusive breastfeeding aids a quicker recovery from illness and reduces infant deaths from common childhood illnesses such as pneumonia and diarrhoea. Where housing conditions are poor and do not support the sterilising of bottles, breastfeeding is additionally protective [34]. Breastfeeding contributes to the health of the mother by improving metabolic health, reducing the risk of ovarian and breast cancers and reducing maternal depression [256, 260, 263].

In the 2018-19 NATSIHS, it was reported that 87% of Aboriginal and Torres Strait Islander children aged 0-2 years had been breastfed [34]. The NATSIHS found that 13% of Aboriginal and Torres Strait Islander children aged 0-2 years had never been breastfed. Of those who had been breastfed, 30% of Aboriginal and Torres Strait Islander babies had been breastfed for one to less than six months and 12% for six to less than twelve months. Around 7% of Aboriginal and Torres Strait Islander babies were breastfed for 12 months or more.

In 2018-19, the proportion of Aboriginal and Torres Strait Islander children aged 0-2 years who had been breastfed ranged across jurisdictions: 97% in Qld, 87% in NT, 85% in NSW, 84% in WA, 79% in SA, 77% in

<sup>79</sup> The findings of this study are not generalisable to other communities.

Tas, 71% in the ACT and 64% in Vic [34]. Breastfeeding proportions for Aboriginal and Torres Strait Islander children were higher in remote areas (91%) compared with major cities (84%).

Alternative jurisdictional data on breastfeeding initiation or at discharge as recorded by health professionals, is available from NSW, the NT and Vic. In the 2018 NSW Perinatal Data Collection<sup>80</sup>, 61% of liveborn babies born to Aboriginal or Torres Strait Islander mothers were fully breastfed at discharge; 10% were partially breastfed and 26% received infant formula only [264]. In NSW Local Health Districts, rates of full breastfeeding by residence varied from 75% in the Mid North Coast to 48% in Murrumbidgee. In the 2017 NT Midwives' Collection, full-term singleton babies born in hospital to primipara (first baby) Aboriginal mothers were exclusively breastfed at a higher rate (89%) compared to those born to non-Aboriginal primipara mothers (81%) [265]. For all Aboriginal mothers of full-term singleton babies, 88% exclusively breastfed at discharge, 8.7% partially breastfed, 0.9% initiated breastfeeding but used formula at discharge and 2.5% never breastfed. In the 2016 Victorian Perinatal Data Collection<sup>81</sup>, 87% of Aboriginal women initiated breastfeeding [261].

A study<sup>82</sup> of women giving birth to an Aboriginal baby in SA between July 2011 and June 2013 found that while 86% initiated breastfeeding, this fell to 54% at 12 weeks and 33% at six months postpartum [266]. Exclusivity of breastfeeding was not recorded. The study also found that women living in remote or regional areas were more likely to breastfeed for longer. In another recent study (October 2017 to February 2018), in one remote NT community, responsive breastfeeding into the second year of life was practiced by most mothers [252].

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 [267]. However, the study in SA mentioned above concluded that Aboriginal Family Birthing program services – which provide care by Aboriginal women – have a beneficial impact on rates of breastfeeding of Aboriginal babies in urban areas [266, 268].

## Physical activity

Physical activity is important for maintaining good overall health and wellbeing [269]. Physical activity is considered a protective factor against disease and, by contrast, a lack of physical activity is considered a risk factor for ill-health and reduced life expectancy [51]. Regular physical activity reduces the risk of many health problems, such as CVD, type 2 diabetes, anxiety, depression and some cancers [270]. Low levels of physical activity, including sedentary behaviour, are a risk factor for a range of chronic conditions as well as being a strong contributor to obesity, which in itself is a risk factor for chronic disease [51, 269].

*Australia's physical activity and sedentary behaviour guidelines* ('the guidelines') for adults recommends a combination of moderate and vigorous intensity physical activity on most, preferably all, days of the week to improve health and reduce the risk of chronic disease and other conditions [270]. However, the health benefits of being physically active are accumulative so doing some physical activity is better than doing none at all [271].

In the 2018-19 NATSIHS (self-reported), 11% of Aboriginal and Torres Strait Islander people aged 15 years and over had met the guidelines<sup>83</sup> target of combining some or all of the following physical activities in the week prior to the survey: walking for transport, walking for fitness (recreation or sport), moderate or vigorous intensity exercise and strength or toning activities [61]. Prevalence varied by state and territory with the highest proportion of Aboriginal and Torres Strait Islander people who met the guidelines living in the ACT (21%) compared with the lowest proportion living in the NT (7.2%).

Nationally, 89% of Aboriginal and Torres Strait Islander people aged 15 years and over had not met the guidelines, and 22% had not participated in any physical activity in the week prior to the survey [61]. Prevalence varied across all states and territories for those people who did not meet the guidelines, with the highest proportions being in WA (92%) and the NT (93%) compared with the lowest proportion in the ACT (79%).

80 The NSW Perinatal Data Collection covers all births including public and private hospitals and home births [264].

81 The Victorian Perinatal Data Collection covers all births including public and private hospitals, birthing centres and home births [261].

82 The findings of this study should be treated with caution due to the small number of participants.

83 The NATSIHS used the 2014 *Australia's physical activity and sedentary behaviour guidelines* for Australian adults aged 18 years and over. The workplace component of the guidelines was excluded.

For Aboriginal and Torres Strait Islander adults living in non-remote areas, 12% had met the guidelines [61]. A larger proportion of these adults (20%) had done strength or toning activities on two or more days in the week prior to the survey.

Among Aboriginal and Torres Strait Islander adults living in non-remote areas, a higher proportion of males than females met the guidelines (13% compared with 10% respectively) and had done strength or toning activities on two or more days in the week prior to the survey (24% compared with 15% respectively) [61]. The proportion of Aboriginal and Torres Strait Islander adult males who participated in strength or toning activities on three or more days was 18%, while the proportion for adult females was 12%.

Levels of physical activity can be influenced by socioeconomic conditions such as education and employment [51]. The *Social determinants and Indigenous health report* [272] presents some analyses of the 2018-19 NATSIHS data collection about health risk factors among Aboriginal and Torres Strait Islander people, including physical activity. The data indicated a relationship between education and employment, and levels of physical activity. The proportion of adults who met physical activity guidelines were higher among those who were employed and those who had completed a higher level of education. Fifteen percent (15%) of adults who had completed Year 12 (or equivalent) met the guidelines compared to 9.1% of those whose education ended in Year 10 or below. Among adults who were in the workforce, 15% met the guidelines, compared to 8.5% of those who were not employed.

Addressing the gap in socioeconomic conditions, as well as increasing access to exercise programs and facilities that are culturally safe [51], may lead to increased levels of physical activity. This could consequently contribute to reducing the prevalence of obesity and chronic conditions, and increasing life expectancy among for Aboriginal and Torres Strait Islander people [51, 270, 273].

For information relating to physical activity among Aboriginal and Torres Strait Islander children, please refer to the *2018 Overview of Aboriginal and Torres Strait Islander Health status*.

## Bodyweight

The most common measure for classifying a person's weight status is body mass index (BMI) (BMI: weight in kilograms divided by height in metres squared) or by measuring their waist circumference (WC) [274]. Being overweight (BMI 25 to 29) or obese (BMI of 30 or more) [274] increases a person's risk for CVD, type 2 diabetes, certain cancers, CKD and some musculoskeletal conditions [275]. A high BMI can be a result of many factors, alone or in combination, such as poor nutrition, physical inactivity, socioeconomic disadvantage, genetic predisposition, increased age and alcohol use [245, 276]. Being underweight (BMI less than 18.5) [79] can also have adverse health consequences, including lower immunity (leading to increased susceptibility to some infectious diseases) and osteoporosis (bones becoming weak and brittle) [245].

Abdominal obesity, a risk factor for the development of metabolic syndrome, can be measured by WC alone (greater than 94 cm for males and greater than 80 cm for females), or waist-hip ratio (WHR) (greater than or equal to 0.90 for males and 0.85 for females) [277].

Obesity and abdominal obesity, as measured by BMI and WC, have been shown to be risk factors for hypertension [278] and type 2 diabetes in Aboriginal and Torres Strait Islander people [279]. 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 [280-282]. It has been suggested that a BMI of 22 might be more appropriate than 25 as a measure of acceptable BMI for Aboriginal people [282]. There is also evidence that measuring the WHR in Aboriginal people is more accurate and easier to measure than BMI. An equation has been developed for calculating fat free mass in Aboriginal and Torres Strait Islander adults using the easily acquired variables of resistance<sup>84</sup>, height, weight, age and sex for use in the clinical assessment and management of obesity [283].

Results from the 2018-19 NATSIHS indicated that 71% of Aboriginal and Torres Strait Islander people aged 15 years and over were either overweight or obese (Aboriginal people: 71% and Torres Strait Islander people: 75%) [61]. In the same age-group 15 years and over, 29% were overweight and 43% were obese. A further 25% of

<sup>84</sup> 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.

people were in the normal weight range and 3.9% were underweight. The survey found that the proportion of people measured who were obese, was higher for females (45%) than for males (40%). There was no marked difference between males and females who were overweight (31% compared with 27% respectively), normal weight (26% compared with 24% respectively) and underweight (3.2% compared with 4.5% respectively).

Between 2012-13 and 2018-19, the proportion of people who were overweight or obese increased for Aboriginal and Torres Strait Islander people aged 15 years and over (from 67% to 73%) in non-remote areas [61]. Overweight and obesity increased with age: 15-17 years age-group: 42%, 18-24 years age-group: 59%, 25-34 years age-group: 73%, 35-44 years age-group: 80%, 45-54 years age-group: 81% and for those over 55 years of age: 82%.

By jurisdiction (except the ACT where results had a high margin of error), the proportion of Aboriginal and Torres Strait Islander people, aged 15 years and over, who were overweight/obese was highest in Tas (76%) followed by NSW (74%) and Vic and WA (both 73%) [61]. The NT reported the highest proportion of people who were underweight/normal weight (41%), with Qld reporting 30% and Tas 24%.

Aboriginal and Torres Strait Islander people aged over 18 years living in major cities had a higher BMI than those living in very remote areas, (77% and 66% respectively). However, 80% of people living in inner regional areas were overweight or obese [61]. For respondents aged 15 years and over, those living in inner regional areas had the highest BMI (76%) followed by major cities (73%), with the overall proportion for non-remote areas (73%) compared with remote areas (64%). People living in remote areas were more likely to be underweight or have a normal BMI (36%) compared with non-remote residents (27%).

Waist circumference is used to determine if a person is of a healthy weight. Measurements of WC were taken in the 2018-19 NATSIHS to help determine levels of risk for developing certain chronic diseases, such as type 2 diabetes and heart disease [61]. Based on WC, 71% of Aboriginal and Torres Strait Islander people aged 18 years or older were at an increased risk of developing chronic diseases, a higher proportion of females (81%) than males (60%) were at risk. This risk was highest in the 55 years and over age-group for both males and females (86%).

According to the 2018-19 NATSIHS, based on BMI information reported for children aged 2-17 years, 38% were overweight or obese (overweight 24%, obese 14%); 53% were normal weight and 8.8% were underweight [61]. For males, the highest BMI (overweight/obese) was reported in the 12-13 years age-group (54%) and the lowest in the 2-3 years age-group (22%). For females, the highest proportion was reported in the 2-3 years age-group (44%) and the lowest in the 4-8 years age-group (35%). For normal weight, the highest proportions were reported for males in the 2-3 years age-group (68%) and for females in the 4-8 years age-group (57%). For the underweight category, the highest proportions for males was in the 4-8 years age-group (14%) and for females in the 14-17 years age-group (11%).

## 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 [284]. Tobacco use is also a risk factor for complications during pregnancy and is associated with preterm birth, LBW, and perinatal death. Environmental tobacco smoke (passive smoking) is of concern to health, with children particularly susceptible to resultant problems that include exacerbation of middle ear infections, asthma and increased risk of SIDS.

### *Extent of tobacco use among Aboriginal and Torres Strait Islander people*

#### **Prevalence**

The 2018-19 NATSIHS found 37% of Aboriginal and Torres Strait Islander people aged 15 years and over reported they were current daily smokers [61]; a reduction from levels reported in the 2012-13 AATSIHS (41%). This is consistent with findings from the 2019 National Drug Strategy Household Survey (NDSHS) which found 25% of Aboriginal and Torres Strait Islander people aged 14 years and over reported smoking daily, declining from 27% in 2016 and 32% in 2013 [285].



When comparing smoking prevalence between the 2018-19 NATSIHS and the 2012-13 AATSIHS, the highest reductions in daily smoking have been found in the younger age-groups [61]. Daily smoking rates among 15-17 year olds decreased from 18% in 2012-13, to 9.7% in 2018-19. Similarly, in the same period there was a reduction in daily smoking prevalence among the 18-24 years age-group (decreasing from 42% to 36%) and the 25-34 years age-group (decreasing from 52% to 44%). A 2017 survey among Aboriginal and Torres Strait Islander students aged from 12 to 17 years found that 10% had smoked tobacco in the past week, declining from 21% in 2005 [286]. It also found that 70% of the students had never smoked tobacco, a significant increase from 49% in 2005.

In 2018-19, the proportion of Aboriginal and Torres Strait Islander males who were current daily smokers (39%) was higher than the proportion of Aboriginal and Torres Strait Islander females (36%) [61]. Aboriginal and Torres Strait Islander males had the highest proportion of current daily smokers across all age-groups, most notably in the 25-34 years age-group (47% compared with 41% of females). For Aboriginal and Torres Strait Islander people, the age-group with the highest proportion of current daily smokers was 35-44 years (47%).

In 2018-19, Aboriginal and Torres Strait Islander people living in remote areas reported a higher proportion of current daily smokers (49%) than those living in non-remote areas (35%) [61]. While there has been a decrease in smoking rates for non-remote areas since 2012-13 (down from 39%), the overall proportion of current smokers in remote areas in 2018-19 has only seen a minor decrease since 2012-13 (49% and 50% respectively).

In 2018, 44% of Aboriginal and Torres Strait Islander mothers reported smoking during pregnancy (down from 52% in 2009) [51]. This decrease in smoking reported by pregnant women was evident in all areas of remoteness, with the exception of very remote areas, where there was an increase in smoking during pregnancy from 53% in 2011 to 57% in 2018. The proportion of Aboriginal and Torres Strait Islander women who reported quitting smoking after 20 weeks of pregnancy in 2018 was 10% [287].

In 2014-15, the NATSISS found 57% of Aboriginal and Torres Strait Islander children aged 0-14 years lived in households with a daily smoker (a decline from 63% in 2008) [94]. For those children living with a daily smoker, 13% were living in households where people smoked indoors.

### **Mortality**

A 2021 prospective study conducted among 1,388 Aboriginal and Torres Strait Islander people in NSW determined that smoking was the cause of 50% of deaths for people aged 45 years and above, and 37% of deaths among all ages [288]. However, it was found that quitting smoking at any age was beneficial compared to continuing to smoke. The study is the first to give direct estimates of deaths attributable to smoking for Aboriginal and Torres Strait Islander people by analysing linked questionnaire and mortality data from 2006-2009 to mid-2019. The Aboriginal and Torres Strait Islander participants were part of a larger longitudinal study tracking the health of 267,153 people from the NSW general population.

### **Alcohol use**

Drinking too much alcohol, both on single drinking occasions (binge drinking) and over a person's lifetime can lead to health and social harms including chronic diseases, injury and transport accidents, mental health disorders, intergenerational trauma and violence. This affects individuals, families and the wider community [289, 290]. Many common factors influence why people drink too much alcohol, for example, socioeconomic disadvantage, stress and negative early life experiences [291, 292]. With regard to Aboriginal and Torres Strait Islander people, it is important to understand the historical and social contexts of colonisation, the effects of dispossession of land, and culture and economic exclusion [289, 293, 294].

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 be at levels that cause harm [34, 290]. Evidence suggests that Aboriginal and Torres Strait Islander people have better health outcomes when there are adequately resourced and culturally safe alcohol and other drug (AOD) services provided by community controlled organisations [294, 295].



## Extent of alcohol use among Aboriginal and Torres Strait Islander people

### Assessing risks from use of alcohol

The 2020 NHMRC *Australian guidelines to reduce health risks from drinking alcohol* provide recommendations on reducing the risk of alcohol-related harm for adults, children and people under 18 years of age, and women who are pregnant or breastfeeding [296]:

- Guideline 1 recommends that to reduce the risk from alcohol-related disease or injury, men and women should drink no more than 10 standard drinks a week and no more than four standard drinks on any one day. Drinking less, lowers the risk of harm from alcohol.
- Guideline 2 recommends that to reduce the risk of alcohol-related harm and injury, children and people aged under 18 years should not drink alcohol.
- Guideline 3 recommends that to prevent alcohol-related harm to an unborn child, women who are planning a pregnancy, or who are pregnant, should not drink alcohol. For women who are breastfeeding, not drinking alcohol is the safest option for their baby.

### Abstinence or no consumption of alcohol in the last 12 months

The 2018-19 NATSIHS found that 26% of Aboriginal and Torres Strait Islander people aged 18 years or older had never drunk alcohol or had not done so for more than 12 months (26% of Aboriginal people and 23% of Torres Strait Islander people) [61]. The proportion was higher for females (31%) than males (19%). The proportion was lowest in younger age-groups, 18-24 years (19%) and 25-34 years (18%), and highest in people aged 55 years and older (42%). Across the jurisdictions, the proportion ranged from 44% in the NT, followed by SA (28%), WA and Qld (both 25%), with the lowest in the ACT (10%). It was higher for people living in very remote areas (43%) than major cities (19%).

### Single occasion risk

In the 2018-19 NATSIHS<sup>85</sup>, 18% of Aboriginal people and 22% of Torres Strait Islander people aged 18 years and over reported not exceeding the 2009 guidelines for drinking at risk on a single occasion<sup>86</sup> [61]. However, 54% of Aboriginal and Torres Strait Islander people reported exceeding the guidelines; a decrease from 57% since the 2012-13 survey [61, 106]. In 2018-19, males were 1.5 times more likely than females to exceed the guideline (65% compared with 43% respectively). Respondents in the younger age-groups (18-24 and 25-34 years) were more likely to exceed the guideline (65% and 62% respectively) and respondents in the 55 years and older were least likely to exceed the guideline (34%). In 2018-19, across Australia, WA reported the highest level of exceeding the guideline (61%) and NT the lowest (42%) [61]. The proportion exceeding the guidelines was similar for people living in remote (53%) or non-remote areas (54%).

### Lifetime risk

In the 2018-19 NATSIHS, 26% of Aboriginal and Torres Strait Islander (26% Aboriginal and 21% of Torres Strait Islander) people aged 18 years and over reported not exceeding the 2009 guideline for drinking at lifetime risk<sup>87</sup> [61]. In the survey, 20% of Aboriginal people and 24% of Torres Strait Islander people reported exceeding the guideline. Aboriginal and Torres Strait Islander males were three times more likely to exceed the guideline for lifetime risk (30%) compared with females (10%), and across all age-groups. Qld reported the highest proportion of people exceeding the guidelines (25%) among the jurisdictions and the NT the lowest (13%). The proportion was higher in non-remote areas (21%) compared with remote areas (17%).

<sup>85</sup> The 2018-2019 NATSIHS assessed a person's alcohol consumption for single occasion and lifetime risk using the previous National Health and Medical Research Council's 2009 guidelines [61].

<sup>86</sup> Four or less standard drinks on a single day for both males and females [61].

<sup>87</sup> No more than two standard drinks on any single day [61].

The 2019 National Drug Strategy Household Survey (NDSHS) reported that between 2010 and 2019 there was a decline (from 32% to 19%)<sup>88</sup> in the proportion of Aboriginal and Torres Strait Islander people aged 14 years and older exceeding the 2009 guidelines for lifetime risk<sup>89</sup> [285].

### Alcohol and pregnancy

Drinking alcohol in pregnancy can affect the unborn baby leading to fetal alcohol spectrum disorder (FASD), a diagnostic term that describes a range of conditions including central nervous system dysfunction, poor growth, characteristic facial features and developmental delay [297, 298]. In 2018-19, 90% of mothers of Aboriginal and Torres Strait Islander children aged 0-3 years self-reported they did not consume alcohol during their pregnancy [34]. In the 2019 NDSHS, 65% of pregnant women aged 14-49 years who were surveyed in the previous 12 months self-reported they had not consumed alcohol during pregnancy. Of the 35% who had consumed alcohol during pregnancy, 90% reported they drank infrequently (monthly or less) [285].

### Hospitalisation

In 2016-18, the crude alcohol-related hospitalisation rate for Aboriginal and Torres Strait Islander people was 7.6 per 1,000 [51]. The rate was higher for males than females (8.4 per 1,000 and 6.8 per 1,000 respectively). The highest crude rate of hospital separations related to alcohol use for Aboriginal and Torres Strait Islander people was for mental/behavioural disorders at 6.4 per 1,000 (males: 7.1 per 1,000 and females 5.6 per 1,000).

Hospital separation rates related to alcohol use due to acute intoxication for Aboriginal and Torres Strait Islander people in 2016-18 varied by level of remoteness. Aboriginal and Torres Strait Islander people living in remote and very remote areas had the highest crude rate of hospitalisation due to acute intoxication (11 per 1,000) while people in major cities had the lowest (2.4 per 1,000) [51]. In 2018-19, age-adjusted hospital separations due to acute intoxication for Aboriginal and Torres Strait Islander people was 5.3 per 1,000.

### Mortality

For 2014-2018 in NSW, Qld, WA, SA and NT, the Aboriginal and Torres Strait Islander age-adjusted death rate due to alcohol was 20 per 100,000 [51]. The alcohol-related death rate for Aboriginal and Torres Strait Islander males was 2.9 times higher compared with females (31 per 100,000 and 11 per 100,000 respectively). The main cause of alcohol-related deaths was from alcoholic liver disease.

## Illicit drug use

Illicit drug use describes the use of drugs that are illegal to possess (e.g. cannabis, heroin, cocaine and methamphetamine), and the non-medical use of prescribed drugs such as painkillers [289, 299]. Illicit drug use is associated with an increased risk of mental illness, poisoning, self-harm, infection with blood borne viruses from unsafe injection practices, chronic disease and death [55, 176, 300].

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

Surveys consistently show that most Aboriginal and Torres Strait Islander people do not use illicit drugs [61, 94, 285]. The two most recent national surveys to collect this data, the 2018-19 NATSIHS and the 2019 NDSHS found that 70% of people aged 15 years and over (NATSIHS) and 77% of people aged 14 years and over (NDSHS) reported either they had never used illicit drugs or had not used illicit drugs in the last 12 months (Derived from [61, 285]).

The 2018-19 NATSIHS found that 28% of people aged 15 years and over reported using illicit drugs in the last 12 months [61]. Similar proportions were reported in the 2019 NDSHS which found 23% of people aged 14 years and over reported using illicit drugs in the last 12 months [285].

The 2018-19 NATSIHS found that cannabis (marijuana, hashish or cannabis resin) was the most commonly used illicit drug, used by 24% of Aboriginal and Torres Strait Islander people in the previous 12 months [61].

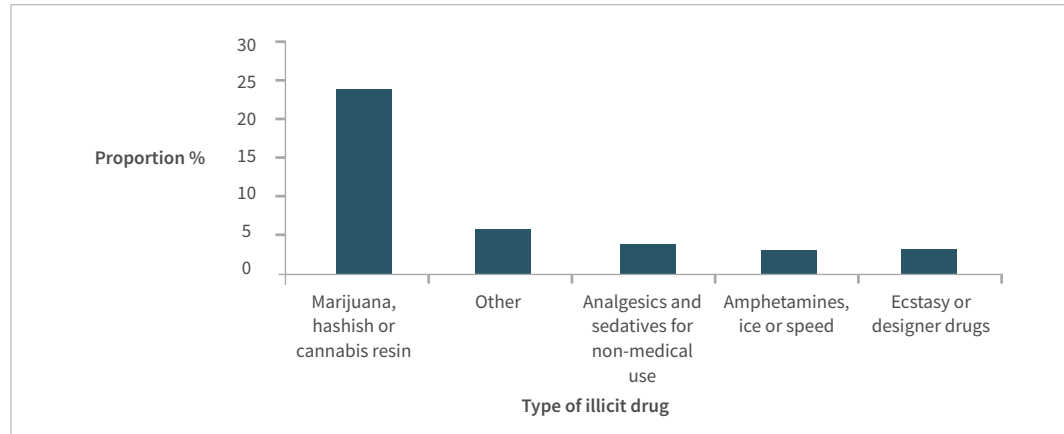
88 The calculation of drinking status and alcohol risk variable was updated for all years in 2019 [285].

89 Estimate should be interpreted with caution due to the small sample size [285].

90 Data are from public and private hospitals in all jurisdictions [51].

Slightly lower proportions were found in the NDSHS which reported 16% of Aboriginal and Torres Strait Islander respondents used cannabis in the last 12 months [285]. The NATSIHS reported that, after cannabis, the most commonly used illicit drugs were ‘other drugs’ (5.9%), analgesics and sedatives for non-medical use (3.8%), amphetamines, ice or speed (3.3%) and ecstasy or designer drugs (3.3%) (Figure 3).

**Figure 3. Proportion of Aboriginal and Torres Strait Islander people who reported illicit drug use in the last 12 months, 2018-19**



Note:

1 ‘Other’ includes heroin, cocaine, petrol, LSD/synthetic hallucinogens, naturally occurring hallucinogens, kava, methadone and other inhalants.  
Source: ABS, 2019 [61]

In 2018-19, Aboriginal and Torres Strait Islander males were more likely than females to have used an illicit drug in the previous 12 months (37% and 21% respectively) [61]. The higher proportions of use by males were found for all drug types. Almost three times as many males as females had used amphetamines (5.0% compared with 1.8%), and almost twice as many males had used cannabis (31% compared with 18%). Use of illicit drugs in the previous 12 months was similar for people aged 15 years or over living in non-remote areas and remote areas in 2018-19 (29% and 27%, respectively).

In 2018-19, 17% of clients seeking treatment for alcohol and drug use from general AOD treatment services were Aboriginal and Torres Strait Islander [301]. After alcohol, the most common principal drugs of concern that Aboriginal and Torres Strait Islander people sought treatment for were amphetamines, cannabis and heroin.

Use of amphetamines is associated with risky behaviour such as injecting drug use [302]. A 2020 report on the National Syringe Program (NSP) found that stimulants and hallucinogens (predominantly methamphetamines) were the most commonly injected drugs reported by attendees of NSPs [303]. Of those attending NSPs, 21% identified as Aboriginal or Torres Strait Islander.

### Hospitalisation

In 2018-19, the most common drug-related conditions resulting in hospitalisation for Aboriginal and Torres Strait Islander people were ‘poisoning’ and ‘mental and behavioural disorders’ [51]. The crude hospitalisation rate for Aboriginal and Torres Strait Islander people from poisoning due to drug use was 30 per 1,000 population and for mental and behavioural disorders due to drug use 4.7 per 1,000. In 2016-18, hospitalisation for mental/behavioural disorders from use of amphetamines<sup>91</sup> had the highest rate of separations due to drug use at 2.1 per 1,000. Cannabis use was the second highest cause of hospitalisation for mental and behavioural disorders due to drug use, at 1 per 1,000.

For the period of 2016-18, crude hospitalisation rates due to drug use were higher for Aboriginal and Torres Strait Islander people in major cities (9.2 per 1,000) than in inner and outer regional areas (6.59 per 100,000) and remote and very remote areas (4.3 per 1,000) [51].

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

## Mortality

For the period 2014-2018, SA recorded the highest age-standardised rate of drug-induced deaths for Aboriginal and Torres Strait Islander people (20 per 100,000), followed by NSW (18 per 100,000), and WA (17 per 100,000) [51]. Rates of drug induced deaths were higher for Aboriginal and Torres Strait Islander males (17 per 100,000) than for females (11 per 100,000).

## Volatile substance use

Volatile substance use (VSU) involves sniffing substances that give off fumes at room temperature such as petrol, paint, glue or deodorants [304]. They are also called 'inhalants' because of the way people use them by inhaling the fumes through the nose or mouth. Absorbing these substances into the lungs affects different parts of the body such as the liver, the brain and the heart [304, 305].

Most volatile substances such as solvents and aerosol sprays, are depressant drugs that slow down the central nervous system [304, 306]. Short-term effects include; slurred speech, lack of coordination, dizziness and euphoria [304, 307]. Sniffing volatile substances, particularly butane, propane and aerosols, can cause sudden death [306, 308]. This is known as sudden sniffing death; a syndrome where a lack of oxygen and an unexpected event that stimulates an adrenalin release causes heart failure [307, 308]. Sudden sniffing death can happen to a first-time user who is otherwise healthy. VSU can also cause a person to lose consciousness, increasing the risk of death by suffocation.

Unlike other forms of drug use, the products used in volatile substance use are readily available in common household and commercial products, posing a particular risk for young people [307]. Typically, use of volatile substances is initiated at a young age (around 12 years, and sometimes younger) which has implications for the developing brain and long-term health of young people using volatile substances [309, 310]. Exposure to toluene through sniffing petrol in adolescents has been shown to be associated with impaired growth for both height and weight and a 'failure to thrive' [310]. Excessive harmful inhalant use can also lead to permanent acquired brain injury [310-312]. Petrol is one of most dangerous volatile substances to sniff, especially when it contains tetraethyl lead (found in leaded petrol and no longer sold in Australia) which can result in damage to the brain [312, 313]. Long-term abstinence from inhalants however, may allow recovery of normal brain function, where encephalopathy from lead poisoning is not present [312].

Sniffing volatile substances repeatedly is also associated with damage to the peripheral nervous system (resulting in numbness, limb weakness), as well as damage to the respiratory system, injury to the digestive tract, kidney damage and anaemia [305, 306].

### *Extent of VSU use among Aboriginal and Torres Strait Islander people*

The 2014-15 NATSISS found that 0.7% of Aboriginal and Torres Strait Islander people aged 15 years and over reported using petrol and other inhalants in the last 12 months [314].

An overall decline in volatile substance use in communities has been reported with one study showing that in 17 communities the total number of people sniffing petrol has fallen, from 647 in 2005-06 to 78 in 2013-14, a reduction of 88% [315]. This decrease in prevalence of sniffing has been associated with the replacement of regular unleaded petrol with low aromatic fuel (LAF).

A follow up study on the effects of LAF found that in 25 communities, for which there is comparable data, the total estimated number of people sniffing petrol fell from 453 in 2006 to 22 in 2018, a decline of 95% [309]. The number of people sniffing petrol for these communities represented just under 1% of the population aged 5-39 years.

While overall the number of people using volatile substances is small, the issue of volatile substance use remains a potential for concern in some regions where opportunistic or casual sniffing of petrol and use of other volatile substances such as deodorants have been reported [309].

## Hospitalisation

In 2016-18, the crude rate of hospital separations for Aboriginal and Torres Strait Islander people from poisoning due to the toxic effect of organic solvents (e.g. petrol) was 0.04 per 1,000 [51]. Hospitalisation for accidental poisoning from organic solvents was 0.02 per 1,000. For males, hospitalisation rates from poisoning due to the toxic effect of organic solvents was 0.05 per 1,000 and for females 0.03 per 1,000. Hospitalisation for accidental poisoning was 0.03 per 1,000 for males, and 0.02 per 1,000 for females.

The age-standardised rate of hospital separations due to mental/behavioural disorders from use of volatile substances was 0.05 per 1,000 (males 0.06 per 1,000 and females 0.03 per 1,000) [51].

## Mortality

The systematic collection of VSU associated mortality data is very limited due to the practice of listing the medical explanation for death rather than the use of volatile substances as a cause [316]. For example, the death of a chronic petrol sniffer may be recorded as 'end-stage renal failure', not 'petrol sniffing'. This practice has most likely resulted in VSU mortality and morbidity rates being underestimated.

Early research using a combination of coronial and government reports, community death registers and personal communication identified 37 petrol sniffing deaths between 1998 and 2003 in Australia with the main reported causes of death being respiratory failure/asphyxia and suicide [308, 317, 318].

## Immunisation

In recent decades, vaccination has been very successful in contributing to improvements in Aboriginal and Torres Strait Islander health and child survival [194]. In September 2016, the Australian Government implemented the Australian Immunisation Register and in July 2017, a new National Partnership on Essential Vaccines; an agreement between the states and territories and the Commonwealth of Australia which would also ensure high immunisation coverage rates for Aboriginal and Torres Strait Islander people [319]. The National Immunisation Program (NIP) Schedule for the Australian population recommends vaccinations at different stages of life and additional vaccinations for specific high-risk populations [320]. The Australian Government has also made all vaccines that are listed in the NIP Schedule free to all Australians; however free vaccine eligibility is linked to Medicare benefits eligibility. From 1 July 2020 and over the next four years, the Australian Government announced as part of the 2020-2021 Federal Budget, it will be investing \$49 million towards the NIP to improve protection rates, and the meningococcal B vaccine will be free for Aboriginal and Torres Strait Islander children, aged 2 years or younger. Until 30 June 2023, a catch-up program, with a yearly target to vaccinate 20,000 Aboriginal and Torres Strait Islander children against meningococcal and pneumococcal diseases, will also be made available [321].

Due to some vaccine-preventable diseases still being experienced at higher rates among Aboriginal and Torres Strait Islander people and children, other supplementary vaccines<sup>92</sup> are also specifically prescribed under the NIP Schedule depending on age, location and health risk factors [194].

Successful vaccination programs have significantly reduced vaccine preventable diseases such as diphtheria, tetanus, poliomyelitis, hepatitis A, hepatitis B, measles, mumps and rubella among Aboriginal and Torres Strait Islander people. [189]. Aboriginal and Torres Strait Islander children were the first to achieve the target of 95% for national immunisation coverage rates, making significant gains during the 2013-2018 period as part of the National Immunisation Strategy (NIS) [319]. As at September 2020, for Aboriginal and Torres Strait Islander children aged five years, the national immunisation coverage rate was 97% [322].)

Actions that contributed to the success of the NIS in increasing vaccination rates in Aboriginal and Torres Strait Islander children at a national level include the development of culturally appropriate resources for Aboriginal and Torres Strait Islander people and the creation of follow-up programs specifically for Aboriginal and Torres Strait Islander children. At a state level, the employment of Aboriginal immunisation health workers in all local health districts of NSW, and the introduction and amendment of legislation in some states and territories also contributed to the success of the NIS in increasing vaccination rates in Aboriginal and Torres Strait Islander

92 For example: Bacille Calmette-Guérin (BCG) for newly born babies living in areas of high tuberculosis incidence in Qld, northern SA and NT [194].

children [319]. Vaccination providers played an important part in the success of immunisation programs and the increase of immunisation coverage rates among children, including Aboriginal Community Controlled Health Services, Aboriginal Medical Services, the Royal Flying Doctor Service, community health services and state and territory corrective services. [194]. However, it is critical that Aboriginal and Torres Strait Islander status is identified and recorded to inform any changes to vaccine recommendations, and to allow patients to receive reminders and for opportunistic vaccinations to be increased.

### Childhood vaccination

Nationally, in 2014 it was agreed by the Australian Chief Medical Officer and state and territory chief health officers, to set a goal of having 95% of all children fully immunised in line with the NIP Schedule's age-based recommendations [323]. As of 1 July 2020, the NIP Schedule requires the following vaccinations for Aboriginal and Torres Strait Islander children to be considered fully immunised by age 5 years: diphtheria, tetanus, pertussis (whooping cough), hepatitis B (HBV), polio, *Haemophilus influenzae type b* (Hib), pneumococcal, rotavirus, measles, mumps and rubella (MMR), meningococcal B, Meningococcal ACWY and chickenpox (varicella) [191].

Across primary health networks (PHNs), percentages for fully immunised Aboriginal and Torres Strait Islander children varied for all three age-groups. For the period October 2019 to September 2020, these were for:

- 1 year olds - 98% in the Northern Sydney, NSW to 86% in Perth North, WA
- 2 year olds - 95% in the Murrumbidgee, NSW to 83% in Perth North, WA
- 5 year olds - 99% in Grampians and Barwon South West, Vic to 93% in Northern Sydney, NSW [324].

For the period October 2019 to September 2020, the number of PHN areas with vaccination proportions that met the target of 95% for national immunisation coverage rate for 1, 2 and 5 year-old fully immunised Aboriginal and Torres Strait Islander children, were: 8, 0, and 28 (out of 31), respectively [324]. The rolling annualised percentage for fully immunised Aboriginal and Torres Strait Islander children (December 2019 to September 2020), at state and national level ranged from, for:

- 1 year olds - 97% in the Tas to 89% in WA (nationally 93%)
- 2 year olds<sup>93</sup> - 95% in the ACT to 85% in WA (nationally 91%)
- 5 year olds - 98% in Tas to 85% in the WA (nationally 97%) [325].

### Adolescent vaccination

Vaccinations for human papillomavirus (HPV), diphtheria, tetanus, and pertussis are recommended for Aboriginal and Torres Strait Islander young people aged 12 to 13 years and provided free under school programs [191]. Vaccinations for meningococcal ACWY are recommended for Aboriginal and Torres Strait Islander young people aged 14 to 16 years and are also provided free under school programs.

### Adult vaccination

Vaccinations for HBV (if non-immune or non-vaccinated), seasonal influenza (yearly), pneumococcal disease<sup>94</sup>, Japanese encephalitis (outer Torres Strait Islander residents) and MMR (non-pregnant women of child bearing age if seronegative for rubella), are recommended for Aboriginal and Torres Strait Islander adults [194]. Due to the high rates of mortality and morbidity associated with HBV in the Aboriginal and Torres Strait Islander population, it is important that people are tested for HBV infection, and offered vaccination if they are not immune.

As reported in the *National key performance indicators for Aboriginal and Torres Strait Islander primary health care: results to June 2018*, nationally 34% of Aboriginal and Torres Strait Islander regular clients<sup>95</sup> aged over

93 Dose 2 (MMR), and Meningococcal ACWY (given at 12 months) were included in the definition of fully immunised from 1 July 2020 for the 24 to 27 month cohort.

94 1 dose of 13vPCV at > 50 years of age, 1 dose of 23vPPV 12 months after 13vPCV, followed by a 2nd dose of 23vPPV at a minimum of 5 years later [194].

95 A regular client is a person who has an active medical record, that is, a client who attended the primary health care organisation at least three time in the last two years [326].

50 years, were immunised against influenza, compared with 32% in June 2017 [327]. The rates were lower in remote areas (38%) and in very remote areas (41%) compared with June 2017 (34% and 36% respectively) [327]. For Aboriginal Torres Strait Islander males and females, the proportions were similar, both 34% in June 2018, showing a slight decrease from June 2017 (both 32%). To June 2018, for clients aged 15-49 years, immunisation rates against influenza for those living with type 2 diabetes were 34%, and for those with COPD, 37%, compared with June 2017 (31% and 32% respectively).

The *Evaluation of the National Shingles Vaccination Program: process and early impact evaluation: final report* provides information on shingles vaccination for the period November 2016 to March 2018 [328]. The national vaccination coverage for Aboriginal and Torres Strait Islander people aged 70 years and over in the nationally funded program was 43%, and 33% in the 71–79 years age-group. In Vic, 71% of Aboriginal and Torres Strait Islander people aged 70 years were vaccinated for shingles, compared with 28% in WA (for the same period).

## Environmental health

Environmental health refers to the physical, chemical and biological factors which potentially impact a person's health and wellbeing such as: housing conditions; drinking water and air quality; sanitation; disease control and food safety [51, 329]. Health conditions associated with poor environmental health factors include; intestinal infectious diseases, skin infections (such as scabies, boils), middle ear infections and some chronic diseases, for example, ARF, respiratory issues (such as asthma, lung infections) and some cancers (such as lung cancer) [330, 331].

Aboriginal and Torres Strait Islander people are disproportionately affected by the diseases associated with poor environmental health due to a number of factors which are essential to support quality of life, including: the remoteness of some communities; lack of adequate housing; poor infrastructure; lack of functioning health and home hygiene hardware<sup>96</sup>; lack of access to tradespeople and repairs and the cost of maintenance [329-331, 333]. *The National Aboriginal and Torres Strait Islander Health Plan 2013-2020* also acknowledges environmental health as an important issue and that addressing housing, waste management and water security are key priorities [329]. The physical and emotional wellbeing of Aboriginal and Torres Strait Islander people and especially of children, can be enhanced by reducing the rates and spread of diseases that are commonly linked to environmental causes [51].

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

### Housing

Housing issues such as overcrowding<sup>97</sup> and poor infrastructure contribute significantly to the ill health and wellbeing of Aboriginal and Torres Strait Islander people [51, 94].

### Overcrowding

Cultural aspects need to be considered in relation to housing conditions and overcrowding for Aboriginal and Torres Strait Islander people [336]. Contributions to overcrowding include: visits to other households (to see relatives, for funerals or, ties to neighbourhoods or towns and to be closer to Country), the high importance placed on demand sharing<sup>98</sup> and the practice of mutual care, are deeply structured parts of Aboriginal and Torres Strait Islander culture.

In the 2016 Census, the ABS introduced a new housing suitability measure, which provides some data on overcrowding in Aboriginal and Torres Strait Islander communities [334]. In 2016, nationally, around one fifth

96 The kitchen, toilet, showers and laundry are recognised as home hygiene hardware, which can affect household health outcomes [332].

97 According to The Canadian National Occupancy Standard (CNOS), a measure widely used in Australia to estimate the proportion of dwellings that are overcrowded by assessing bedroom requirements [334, 335].

98 Demand sharing is mainly where resources and money are shared within an extended family group [336].



(18%) of Aboriginal and Torres Strait Islander population reported living in overcrowded housing. Overcrowding was higher in non-urban areas (28%) compared with urban areas (16%). The NT had the highest rates of overcrowding, with 53% of houses requiring one or more additional bedrooms. WA and Qld also had high levels of overcrowding (20% and 17% respectively), with the ACT reporting the lowest level (9%).

Survey data show there have been some small decreases in the levels of reported overcrowding in Aboriginal and Torres Strait Islander households in recent years [51]. In 2018-19, nationally, the proportion of Aboriginal and Torres Strait Islander people reported living in overcrowded households was 18%. Overcrowding prevalence by state and territory for Aboriginal and Torres Strait Islander people: NT (51%), Qld (20%) WA (19%), SA (15%), NSW and Tas (both 11%), Vic (10%) and the ACT (8%). Overcrowding increased with remoteness 26% of Aboriginal and Torres Strait Islander people in remote areas lived in overcrowded households, compared with 51% in very remote areas.

### Infrastructure

An important contributor to the health and wellbeing of Aboriginal and Torres Strait Islander people is access to sufficient, working and regularly maintained infrastructure in housing and communities; including health hardware, clean water supply, sewerage, and electricity which support and encourage healthy living practices for hygiene, safety and nutrition [51, 331, 337]. A recent evaluation of the NSW Housing for Health program, which for the last 20 years has been assessing and repairing Aboriginal and Torres Strait community housing, has shown a 40% reduction in infectious disease hospital separations, due to regular maintenance [338].

In the 2016 National Social Housing Survey, 72% of Aboriginal and Torres Strait Islander respondents reported living in a house of an 'acceptable'<sup>99</sup> standard [339]. In addition, 25% of Aboriginal and Torres Strait Islander people reported that their household facilities were of an acceptable standard, but the structure of the dwelling was not. The *Aboriginal and Torres Strait Islander people: a focus report on housing and homelessness* released in 2019, also reported infrastructure stress on bathrooms, sewerage systems, laundry facilities, and food preparation areas in overcrowded households [340].

More detailed information on household infrastructure is available for 2018-19, when 80% of Aboriginal and Torres Strait Islander households reported living in houses of an acceptable standard [51]. This proportion has remained relatively stable, with 82% of households living in houses of an acceptable standard in 2014-15. In 2018-19, 33% of Aboriginal and Torres Strait Islander households nationally, reported major structural issues within their dwelling, compared with 2014-15 (26%). Dwellings with major structural problems increased with remoteness. In 2014-15, for Aboriginal and Torres Strait Islander households living in very remote areas, 37% reported living in a house with major structural problems, compared with 26% for major cities. Nationally, in 2014-15, the most significant issues for Aboriginal and Torres Strait Islander dwellings reported were; major cracks in the walls/floors (11%), walls or windows not straight (6.1%), major plumbing problems (5.7%), sinking/moving foundations (5.6%), wood rot/termite damage (5.4%) and sagging floors (4.2%).

Nationally, in 2018-19 the majority of Aboriginal and Torres Strait Islander households living in major cities - over nine in ten households - reported access to household facilities (94%) [51]. This included access to functioning facilities for: washing people (97%); washing bedding and clothes (96%); preparing/storing food (91%) and sewerage facilities (98%). Access to functioning facilities was higher in remote areas (85%), compared to very remote areas (73%). Overall, access to household facilities has remained relatively stable since 2015.

### Remote housing funding

The Australian Government recognises that in remote areas overcrowding and poor quality housing impacts on education, employment opportunities, and the health and safety of Aboriginal and Torres Strait Islander communities [341]. As a result, the Australian Government announced through the 2020-2021 Federal Budget it will support reforms to address poor housing conditions, overcrowding, severe housing shortages and other housing issues, particularly for Aboriginal and Torres Strait Islander communities living in the NT [342]. The funding will also support the delivery of housing refurbishments, housing related infrastructure as

<sup>99</sup> Housing of an acceptable standard includes two components: having four working household facilities; and not more than two major structural problems [51].

well as incentives that aim to establish housing systems that are more sustainable for Aboriginal and Torres Strait Islander communities living in remote communities.

The *Pilyii Papulu Purrukaj-ji (good housing to prevent sickness)* report provides further insights, by collecting evidence and exploring the relationships between remote housing, crowding and infectious disease in the Tennant Creek and surrounding Barkly region of the NT. The report also provides actionable and evidence-based recommendations and a case for investment in more housing and better maintenance [331].

### **Hospitalisation**

In 2018-19, the crude hospitalisation rates for Aboriginal and Torres Strait Islander people for selected diseases associated to poor environmental health were 9.2 per 1,000 for influenza and pneumonia, 9.0 per 1,000 for intestinal infectious diseases, 8.0 per 1,000 for bacterial diseases, 4.6 per 1,000 for acute upper respiratory infections, 2.7 per 1,000 for asthma and 1.8 per 1,000 for scabies [51]. Hospitalisation rates for the selected diseases, for the 2016-18 period, increased with remoteness, in particular for bacterial diseases (22 per 1,000) compared with major cities (8.2 per 1,000).

### **Mortality**

For 2014-2018, the age-standardised death rates for Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT, from conditions associated with poor environmental health was for males 44 per 100,000, and females 40 per 100,000 [51].

## Concluding comments

This *Overview* describes the current health status of Aboriginal and Torres Strait Islander people in Australia. It provides a ‘snapshot’ of the most recent indicators of health. This year’s *Overview* has been produced in the most unusual of circumstances. In 2020 we faced one of the most challenging health crises in our history, indeed the history of the world. COVID-19 disrupted almost every aspect of our taken for granted lives. Globally, the impact of the pandemic has shattered lives, economies, and even political systems. Health systems have been placed under enormous pressure throughout the world. There is a general perception that Australia has responded to the crisis well. Aboriginal and Torres Strait Islander people were identified early in the pandemic as a potentially high risk, vulnerable population [343]. In the event, due to the early and strong response led by Aboriginal and Torres Strait Islander peak health sector agencies such as NACCHO and the state based ACCHOs, the impact was not as profound as feared. This is a commendable validation of the what can be achieved with strong proactive Aboriginal and Torres Strait Islander leadership within the sector.

Key to the success has been the provision of high quality evidence based information that is timely accessible and relevant [343-345]. The *Overview* is one such source. In our user experience survey conducted in mid to late 2019, 93% of workforce respondents, both Indigenous and non-Indigenous were satisfied or very satisfied with the HealthInfoNet as a source of information about Aboriginal and Torres Strait Islander health. In terms of workforce capacity and capability building, 92% agreed or strongly agreed that the HealthInfoNet helped them to find more information about Aboriginal and Torres Strait Islander health than other sources; 94% said that it improves their knowledge about Aboriginal and Torres Strait Islander health and 76% said that it helped them to develop more skills in their work, study and/or research in Aboriginal and Torres Strait Islander health. Importantly for the HealthInfoNet, 86% agreed or strongly agreed that the HealthInfoNet helped them to apply their health knowledge in a way that is more culturally safe and 92% felt that it demonstrates a good understanding of Aboriginal and Torres Strait Islander people and culture. Overwhelmingly, respondents agreed that the HealthInfoNet is up to date with the latest information (84%), is a comprehensive source of information (89%), is trusted (94%), that information is easy to find (88%), and that information is relevant (95%) and of high quality (93%). Early in the pandemic the HealthInfoNet established its COVID-19 Updates and Information portal. At the height of the emerging pandemic between March and June there were 7,052 pageviews on the portal. HealthInfoNet staff worked with staff from key workforce support peak bodies to ensure that high quality information was made available quickly and efficiently.

In this *Overview*, it is our earnest hope that we continue to realise our aspiration to make a strong, positive contribution to providing evidence-based information that is timely, accessible and relevant to the everyday practice of health sector workers throughout Australia. The HealthInfoNet was created over 23 years ago, with strong support from Aboriginal and Torres Strait Islander people and communities to do exactly what we have done throughout this pandemic: to stand behind the thousands of dedicated, professional, passionate and compassionate people striving to make an enduring difference to the health and wellbeing of the communities they serve.

## 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 [334]. Despite these efforts, there are impacts on data quality such as non-responses for identification. As at 30 June 2016, 88% of Aboriginal and Torres Strait Islander Australians were reported to be living in NSW, Qld, WA, SA and the NT [22] and the data from these jurisdictions are considered sufficient quality for reporting [1].

The ABS, the AIHW and state and territory authorities have worked together to improve the accuracy of Indigenous status in several health-related collections, including:

- birth and death registrations
- hospital administrative data
- maternal/perinatal collection
- pathology forms
- primary health care data
- AOD treatment services
- mental health services
- community services data collection [69](cited in [346]).

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. There is currently no national approach on how to determine Indigenous status where classification is inconsistent or missing across multiple data sets which may lead to different methodology being applied and difficulties in the interpretability and comparability of data [346]. In death registrations, for example, not all Aboriginal and Torres Strait Islander deaths are correctly identified as such [39, 346]. Due to concerns about the mortality rates of Aboriginal and Torres Strait Islander people relative to the total population, there has been ongoing data integration to investigate the quality of the data using health and death records by several state and territory government departments.

The ABS Death Registration collection collects information on Indigenous status from the 'death registration form'; some states and territories also collect this information from medical certificates of causes of death [38]. While, according to the ABS, most deaths of Aboriginal and Torres Strait Islander people are registered, the Indigenous status of some deaths is not registered, raising concerns about the accuracy of this information. 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 balances out the deaths that occurred in the previous year but were registered late.

Estimating the proportions of deaths identified correctly is not simple, so it is difficult to estimate the actual number of Indigenous deaths occurring and the corresponding rates. The ABS uses estimates of the proportions of registered deaths correctly identified as Indigenous in preparing its life tables, the source of life expectancy figures [39].

The Indigenous Mortality Study (now the 2016 Death Registrations to Census Linkage Project [347]) involved linking death registrations with 2006 Census records with the aim to assess the consistency of Indigenous status across the two datasets [39]. This was repeated for the 2011 Census and the 2016 Census. Based on the 2016 Census, of the 3,246 Aboriginal and Torres Strait Islander death records 2,315 (71%) were linked.

The ABS has estimated that the proportion of Indigenous births identified correctly was 96% in 2002-2006, a significant improvement over the level for previous years [348]. 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 [12]. This means that previously there was an underestimation of Aboriginal and/or Torres Strait Islander births. Indigenous status for around 6% of births is unknown, due to unknown status of the father. Identification of the father is not compulsory for birth registrations.

The level of identification in hospital admissions is variable, but overall it has been estimated that 88% of Aboriginal and Torres Strait Islander patients were correctly identified in Australian public hospital admission records (private hospitals were not included [49]) in 2011-12 [50]. It has been suggested that the more accurate number of admissions was approximately 9% higher than recorded [47]. The accuracy of the identification of Indigenous people varied between states and territories, from 98% in the NT to 58% in the ACT [50]. The accuracy of identification also varied with remoteness level, from 99% in very remote areas to 77% in major cities. Another limitation is that all hospitalisation data for Tas, the ACT and the NT include only public hospitals [49].

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

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

- There are deficiencies in the information available for some important areas. Probably the best example is cancer, a leading cause of death among Aboriginal and Torres Strait Islander people. National data on cancer incidence and mortality among Aboriginal and Torres Strait Islander people are not available and Indigenous-specific information about screening is only collected for breast cancer and bowel cancer (both self-reported) and not for cervical cancer [1, 71, 72, 349].
- COVID-19 has highlighted the poor level of identification on pathology forms used for testing [71, 350]. This has resulted in unreliable data on how many Aboriginal and Torres Strait Islander people have been tested and the accuracy of the infection rate among this population. Work is now being undertaken to improve Indigenous identification on forms used by both public and private laboratories. While this work is being undertaken in response to COVID-19, enhanced practices for Indigenous identification on pathology forms will also benefit screening and testing programs to enable accurate reporting of outcomes for Aboriginal and Torres Strait Islander people.
- Special reports related to Aboriginal and Torres Strait Islander health (see the *Sources of information* section) tend to be selective rather than comprehensive in their coverage of the various health topics.
- The time periods for which detailed information is available tend to vary substantially; this means that documents like this *Overview* need to draw on information from various time periods in attempting to compile a comprehensive picture.
- Important data sources, particularly major national surveys, are generally only conducted around every five years; this is inevitable, but it means that relevant information is often quite dated.
- Changes in aspects like methodology and levels of reporting in publications pose difficulties in the analysis and synthesis of information for periods of time and for comparisons.

## Glossary

### Aboriginal and Torres Strait Islander

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

### age-adjustment or age-adjusted

see **age-standardisation**

### age-specific rate

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

### age-specific death rate

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

### age-specific fertility rate

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

### age-standardisation

a method of removing the influence of age when comparing populations with different age structures. This is necessary because the rates of many diseases increase with age. The age structures of the different populations are converted to the same 'standard' structure; then the disease rates that would have occurred with that structure are calculated and compared. This method is used when making comparisons for different periods of time, different geographic areas and/or different population sub-groups (e.g. between one year and the next and/or states and territories, Indigenous and non-Indigenous populations). They have been included for users to make comparisons that may not be available in this report. 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

### 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+)

### 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

### direct standardisation

the procedure for adjusting rates in which the specific rates for a study population are averaged using as weights the distribution of a standard population. This form of standardisation is used when the populations under study are large and the age-specific rates are reliable

### expectation of life

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

### 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

**non-Indigenous**

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

**other Australians**

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

**potentially preventable hospitalisations**

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

**prevalence**

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

**rate**

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

**rate ratio**

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

**risk factor**

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

**self-reported data**

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

**standardised mortality ratio**

the ratio of the observed number of deaths in a study population to the number expected if the study population had the same age-specific rates as a standard population. The standardised mortality ratio is expressed sometimes as the ratio multiplied by 100. See **age-standardisation**

**standardised rate**

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

**total fertility rate**

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



## Abbreviations

<b>AAATSIHS</b> - Australian Aboriginal and Torres Strait Islander Health Survey	<b>NCOHS</b> - National Child Oral Health Study
<b>ABS</b> - Australian Bureau of Statistics	<b>NACCHO</b> - National Aboriginal Community Controlled Health Organisation
<b>ACCHOs</b> - Aboriginal Community Controlled Health Organisations	<b>NATSIHS</b> - National Aboriginal and Torres Strait Islander Health Survey
<b>ACT</b> - Australian Capital Territory	<b>NATSINPAS</b> - National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey
<b>AHMAC</b> - Australian Health Ministers' Advisory Council	<b>NATSISS</b> - National Aboriginal and Torres Strait Islander Social Survey
<b>AIHW</b> - Australian Institute of Health and Welfare	<b>NDA</b> - National Disability Agreement
<b>AMA</b> - Australian Medical Association	<b>NDSHS</b> - National Drug Strategy Household Survey
<b>ANZDATA</b> - Australia and New Zealand Dialysis and Transplant Registry	<b>NEHS</b> - National Eye Health Survey
<b>AOD</b> - Alcohol and other drug	<b>NHMRC</b> - National Health and Medical Research Council
<b>ARF</b> - Acute rheumatic fever	<b>NHS</b> - National Health Survey
<b>BMI</b> - Body mass index	<b>NIP</b> - National Immunisation Program
<b>CKD</b> - Chronic kidney disease	<b>NIS</b> - National Immunisation Strategy
<b>COAG</b> - Council of Australian Governments	<b>NSAOH</b> - National Study of Adult Oral Health
<b>COPD</b> - Chronic obstructive pulmonary disease	<b>NSP</b> - National Syringe Program
<b>CSOM</b> - Chronic suppurative otitis media	<b>NSW</b> - New South Wales
<b>CVD</b> - Cardiovascular disease	<b>NT</b> - Northern Territory
<b>DR</b> - Diabetic retinopathy	<b>OM</b> - Otitis media
<b>EAHSP</b> - East Arnhem Healthy Skin Program	<b>PD</b> - Peritoneal dialysis
<b>ERP</b> - Estimated resident population	<b>PHN</b> - Primary Health Networks
<b>ESKD</b> - End-stage kidney disease	<b>Qld</b> - Queensland
<b>ESRD</b> - End-stage renal disease	<b>RHD</b> - Rheumatic heart disease
<b>GAS</b> - Group A streptococci	<b>SA</b> - South Australia
<b>GDM</b> - Gestational diabetes mellitus	<b>SCRGSP</b> - Steering Committee for the Review of Government Service Provision
<b>GP</b> - General practitioner	<b>SDAC</b> - Survey of Disability, Ageing and Carers
<b>HBV</b> - Hepatitis B virus	<b>SEWB</b> - Social and emotional wellbeing
<b>HCV</b> - Hepatitis C virus	<b>SIDS</b> - Sudden infant death syndrome
<b>HD</b> - Haemodialysis	<b>STI</b> - Sexually transmitted infection
<b>Hib</b> - Haemophilus influenzae type b	<b>Tas</b> - Tasmania
<b>HIV</b> - Human immunodeficiency virus	<b>TB</b> - Tuberculosis
<b>ICD</b> - International Classification of Diseases - the World Health Organization's internationally accepted classification of death and disease	<b>VI</b> - Vision impairment
<b>IHD</b> - Ischaemic heart disease	<b>Vic</b> - Victoria
<b>IMR</b> - Infant mortality rate	<b>VSU</b> - Volatile substance use
<b>IPD</b> - Invasive pneumococcal disease	<b>WA</b> - Western Australia
<b>LAF</b> - Low aromatic fuel	<b>WC</b> - Waist circumference
<b>LBW</b> - Low birthweight	<b>WHO</b> - World Health Organization
<b>MMR</b> - Maternal mortality ratio	<b>WHR</b> - Waist to hip ratio
<b>MMR</b> - Measles, mumps and rubella	

## References

1. Australian Institute of Health and Welfare. (2019). *Cancer in Australia 2019*. Canberra, Australian Capital Territory: Australian Institute of Health and Welfare.
2. National Aboriginal Community Controlled Health Organisation. (2013). *Healthy Futures 2013-2030: NACCHO 10 point plan*. Canberra: National Aboriginal Community Controlled Health Organisation.
3. World Health Organization. (2008). *The World Health Report 2008 - primary health care (now more than ever)*. Geneva: World Health Organization.
4. Australian Institute of Health and Welfare. (2009). *Measuring the social and emotional wellbeing of Aboriginal and Torres Strait Islander peoples* (AIHW Catalogue no. IHW 24). Canberra: Australian Institute of Health and Welfare.
5. Osborne, K., Baum, F., & Brown, L. (2013). *What works? A review of actions addressing the social and economic determinants of Indigenous health* (Issues paper no 7). Canberra: Closing the Gap Clearinghouse.
6. Dudgeon, P., Wright, M., Paradies, Y., Garvey, D., & Walker, I. (2014). Aboriginal social, cultural and historical contexts. In P. Dudgeon, H. Milroy & R. Walker (Eds.), *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice* (2nd ed., pp. 3-24). Canberra: Telethon Institute for Child Health Research.
7. Zubrick, S. R., Shepherd, C. C. J., Dudgeon, P., Gee, G., Paradies, Y., Scrine, C., & Walker, R. (2014). Social determinants of social and emotional wellbeing. In P. Dudgeon, H. Milroy & R. Walker (Eds.), *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice* (2nd edition ed., pp. 93-112 (chapter 116)). Canberra: Department of The Prime Minister and Cabinet.
8. Ganesharajah, C. (2009). *Indigenous health and wellbeing: the importance of country* (Native Title Research Report No. 1/2009). Canberra: Australian Institute for Aboriginal and Torres Strait Islander Studies.
9. New South Wales Department of Health. (2019). *Communicating positively: a guide to appropriate Aboriginal terminology*. Sydney: New South Wales Department of Health.
10. Gee, G., Dudgeon, P., Schultz, C., Hart, A., & Kelly, K. (2014). Aboriginal and Torres Strait Islander social and emotional wellbeing. In P. Dudgeon, H. Milroy & R. Walker (Eds.), *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice* (2nd ed., pp. 55-68). Canberra: Department of The Prime Minister and Cabinet.
11. Parliament of Australia. (2017). *Indigenous parliamentarians, federal and state: a quick guide*. Retrieved 11 July 2017 from [https://www.aph.gov.au/About\\_Parliament/Parliamentary\\_Departments/Parliamentary\\_Library/pubs/rp/rp1718/Quick\\_Guides/IndigenousParliamentarians](https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1718/Quick_Guides/IndigenousParliamentarians)
12. Steering Committee for the Review of Government Service Provision. (2016). *Overcoming Indigenous disadvantage: key indicators 2016 report*. Canberra: Productivity Commission.
13. Davis, M. (2013). Community control and the work of the National Aboriginal Community Controlled Health Organisation: putting meat on the bones of the 'UNDRIP'. *Indigenous Law Bulletin*, 8(7), 11-14.
14. Cleary, P. (2019). *In good hands: the people and communities behind Aboriginal-led solutions*. Melbourne: Oxfam Australia.
15. Australian Bureau of Statistics. (2017). *Census of population and housing: reflecting Australia - stories from the Census, 2016: Aboriginal and Torres Strait Islander population*. Retrieved 28 June 2017 from <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/2071.02016?OpenDocument>
16. Australian Bureau of Statistics. (2020). *Schools, Australia, 2019*. from <https://www.abs.gov.au/statistics/people/education/schools/2019>
17. Australian Bureau of Statistics. (2021). *Schools, Australia, 2020*. Retrieved from <https://www.abs.gov.au/statistics/people/education/schools/2020>
18. Australian Curriculum Assessment and Reporting Authority. (2020). *National Assessment Program - Literacy and Numeracy: achievement in reading, writing, language conventions and numeracy: national report for 2019*. Sydney: Australian Curriculum Assessment and Reporting Authority.
19. Australian Bureau of Statistics. (2012). *Census of population and housing: characteristics of Aboriginal and Torres Strait Islander Australians, 2011* (ABS Catalogue no 2076.0). Canberra: Australian Bureau of Statistics.

20. Australian Bureau of Statistics. (2020). *National, state and territory population*. Retrieved 19 December 2020 from <https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/latest-release#methodology>
21. Australian Bureau of Statistics. (2019). *Estimates and projections, Aboriginal and Torres Strait Islander Australians, 2006 to 2031*. Canberra: Australian Bureau of Statistics.
22. Australian Bureau of Statistics. (2018). *Estimates of Aboriginal and Torres Strait Islander Australians, June 2016*. Retrieved 31 August 2018 from <https://www.abs.gov.au/ausstats/abs@.nsf/mf/3238.0.55.001>
23. Australian Bureau of Statistics. (2016). *Australian Statistical Geography Standard (ASGS): Volume 2 - Indigenous Structure, July 2016*. Retrieved 13 September 2016 from <https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1270.0.55.002~July%202016~Main%20Features~Overview~1>
24. Australian Bureau of Statistics. (2017). *Census of population and housing - counts of Aboriginal and Torres Strait Islander Australians, 2016*. Canberra: Australian Bureau of Statistics.
25. Australian Institute of Health and Welfare. (2020). *Australia's mothers and babies 2018 - in brief*. Canberra: Australian Institute of Health and Welfare.
26. Poche Indigenous Health Network. (2018). *Birthing on Country*, Sydney.
27. Kildea, S. (2012). *'Birthing on Country' maternity service delivery models: a rapid review*. Sydney: Sax Institute.
28. Australian Bureau of Statistics. (2020). *Births, Australia, 2019*. Retrieved 9 December 2020 from <https://www.abs.gov.au/statistics/people/population/births-australia/2019>
29. Australian Institute of Health and Welfare. (2020). *Antenatal care use and outcomes for Aboriginal and Torres Strait Islander mothers and their babies 2016-2017*. Canberra: Australian Institute of Health and Welfare.
30. Australian Government Department of Health. (2019). *Clinical practice guidelines: pregnancy care*. Canberra: Australian Government Department of Health.
31. World Health Organization. (2016). *International Statistical Classification of Diseases and Related Health Problems 10th Revision*. Retrieved 2016 from <http://apps.who.int/classifications/icd10/browse/2016/en#/XIX>
32. Australian Institute of Health and Welfare. (2014). *Birthweight of babies born to Indigenous mothers* (AIHW Catalogue no IHW 138). Canberra: Australian Institute of Health and Welfare.
33. Clarke, M., & Boyle, J. (2014). Antenatal care for Aboriginal and Torres Strait Islander women. *Australian Family Physician*, 43(1/2), 20-24.
34. Australian Institute of Health and Welfare, & National Indigenous Australians Agency. (2020). *Aboriginal and Torres Strait Islander Health Performance Framework report*. Retrieved 9/12/2020 from <https://www.indigenoushpf.gov.au/>
35. McInerney, C., Ibiebele, I., Ford, J. B., Randall, D., Morris, J. M., Meharg, D., . . . Torvaldsen, S. (2019). Benefits of not smoking during pregnancy for Australian Aboriginal and Torres Strait Islander women and their babies: a retrospective cohort study using linked data. *BMJ Open*, 9(11). Retrieved from: <https://doi.org/10.1136/bmjopen-2019-032763>
36. Australian Bureau of Statistics. (2019). *Causes of Death, Australia, 2018*. Canberra: Australian Bureau of Statistics.
37. Australian Institute of Health and Welfare. (2018). *Australia's health 2018* (Australia's health series no. 16, Cat. no: AUS 221). Canberra: Australian Institute of Health and Welfare.
38. Australian Bureau of Statistics. (2020). *Deaths, Australia, 2019*. Canberra: Australian Bureau of Statistics.
39. Australian Bureau of Statistics. (2018). *Life tables for Aboriginal and Torres Strait Islander Australians, 2015-2017* (ABS Cat. no. 3302.0.55.003). Canberra: Australian Bureau of Statistics.
40. Australian Bureau of Statistics. (2019). *Deaths, Australia, 2018*. Canberra: Australian Bureau of Statistics.
41. Australian Bureau of Statistics. (2020). *Causes of death, Australia, 2019*. Retrieved 23 October 2020 from <https://www.abs.gov.au/statistics/health/causes-death/causes-death-australia>
42. Australian Institute of Health and Welfare. (2020). *Aboriginal and Torres Strait Islander Health Performance Framework 2020 summary report*. Canberra: Australian Institute of Health and Welfare.
43. Australian Institute of Health and Welfare. (2020). *Maternal deaths in Australia 2015-2017* (Cat. no. PER 106). Canberra: Australian Institute of Health and Welfare.

44. Australian Institute of Health and Welfare. (2020). *Maternal deaths in Australia [web report]*. Retrieved 14 December 2020 from <https://www.aihw.gov.au/reports/mothers-babies/maternal-deaths-in-australia/contents/maternal-deaths-in-australia>
45. Australian Institute of Health and Welfare. (2010). *National Healthcare Agreement: P20-Potentially avoidable deaths, 2010*. Retrieved 16 December 2020 from <https://meteor.aihw.gov.au/content/index.phtml/itemId/394495>
46. Australian Institute of Health and Welfare, & Australasian Association of Cancer Registries. (2012). *Cancer in Australia: an overview 2012* (AIHW Catalogue no CAN 70, cancer series no 74). Canberra: Australian Institute of Health and Welfare.
47. Australian Institute of Health and Welfare. (2019). *Data quality statement: Admitted Patient Care 2017-18*. Retrieved 27 November 2019 from <https://meteor.aihw.gov.au/content/index.phtml/itemId/724188>
48. Australian Institution of Health and Welfare. (2016). *Data quality statement: National Hospital Morbidity Database 2014-15*. Canberra: Australian Institute of Health and Welfare.
49. Australian Institute of Health and Welfare. (2020). *Admitted patient care 2018-19*. Canberra: Australian Institute of Health and Welfare.
50. Australian Institute of Health and Welfare. (2013). *Indigenous identification in hospital separations data: quality report* (AIHW Catalogue No IHW 90). Canberra: Australian Institute of Health and Welfare.
51. Steering Committee for the Review of Government Service Provision. (2020). *Overcoming Indigenous disadvantage: key indicators 2020*. Canberra: Productivity Commission.
52. Australian Institute of Health and Welfare. (2020). *National Healthcare Agreement: PI 18 - Selected potentially preventable hospitalisations, 2021*. Retrieved 16 September 2020 from <https://meteor.aihw.gov.au/content/index.phtml/itemId/725793>
53. Australian Institute of Health and Welfare. (2020). *Disparities in potentially preventable hospitalisations across Australia, 2012-13 to 2017-18* (AIHW cat. no. HPF 50). Canberra: Australian Institute of Health and Welfare.
54. World Health Organization. (2017). *Cardiovascular diseases (CVDs) [factsheet]*. Retrieved 17 May 2017 from [https://www.who.int/news-room/factsheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/factsheets/detail/cardiovascular-diseases-(cvds))
55. Australian Institute of Health and Welfare. (2016). *Australian Burden of Disease Study: impact and causes of illness and death in Aboriginal and Torres Strait Islander people 2011* (Australian Burden of Disease Study series no. 6, Cat no. BOD 7). Canberra: Australian Institute of Health and Welfare.
56. Agostino, J. W., Wong, D., Paige, E., Wade, V., Connell, C., Davey, M. E., . . . Banks, E. (2020). Cardiovascular disease risk assessment for Aboriginal and Torres Strait Islander adults aged under 35 years: a consensus statement. *Medical Journal of Australia*, 212(9), 422-427.
57. Australian Institute of Health and Welfare. (2015). *Cardiovascular disease, diabetes and chronic kidney disease - Australian facts: risk factors* (AIHW Catalogue no CDK 004, cardiovascular, diabetes and chronic kidney disease series no 4). Canberra: Australian Institute of Health and Welfare.
58. World Heart Federation. (2017). *Cardiovascular risk factors*. Retrieved 30 May 2017 from <https://www.world-heart-federation.org/resources/risk-factors/>
59. Wyber, R., Noonan, K., Halkon, C., Enkel, S., Ralph, A., Bowen, A., . . . Carapetis, J. (2020). *The RHD Endgame Strategy: The blueprint to eliminate rheumatic heart disease in Australia by 2031*. Perth: The END RHD Centre of Research Excellence, Telethon Kids Institute.
60. Rheumatic Heat Disease Australia. (2020). *The 2020 Australian guideline for prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease (3rd edition)*. Darwin: Menzies School of Health Research.
61. Australian Bureau of Statistics. (2019). *National Aboriginal and Torres Strait Islander Health Survey, 2018-19*. Canberra: Australian Bureau of Statistics.
62. Katzenellenbogen, J. M., Bond-Smith, D., Seth, R. J., Dempsey, K., Cannon, J., Stacey, I., . . . Ralph, A. P. (2020). Contemporary incidence and prevalence of rheumatic fever and rheumatic heart disease in Australia using linked data: the case for policy change. *Journal of the American Heart Association*, 9. Retrieved from: <https://doi.org/10.1161/JAHA.120.016851>
63. Francis, J. R., Fairhurst, H., Hardefeldt, H., Brown, S., Ryan, C., Brown, K., . . . Baartz, R. (2020). Hyperendemic rheumatic heart disease in a remote Australian town identified by echocardiographic screening. *Medical Journal of Australia*, 213(3), 118-123.

64. Roberts, K. V., Maguire, G. P., Brown, A., Atkinson, D. N., Remenyi, B., Wheaton, G., . . . Carapetis, J. (2015). Rheumatic heart disease in Indigenous children in northern Australia: differences in prevalence and the challenges of screening. *Medical Journal of Australia*, 203(5), 221e221-221e227.
65. National Heart Foundation of Australia. (2016). *Australian Heart Maps*. Retrieved 2016 from <http://www.heartfoundation.org.au/for-professionals/australian-heart-maps>
66. National Cancer Institute. (2015). *What is cancer?* Retrieved 2017 from <https://www.cancer.gov/about-cancer/understanding/what-is-cancer>
67. Australian Cancer Research Foundation. (2018). *What is cancer?* Retrieved 2018 from <https://www.acrf.com.au/support-cancer-research/what-is-cancer/>
68. Cancer Australia. (2015). *National Aboriginal and Torres Strait Islander cancer framework*. Sydney: Cancer Australia.
69. Australian Institute of Health and Welfare. (2013). *Towards better Indigenous health data* (AIHW Cat. no. IHW 93). Canberra: Australian Institute of Health and Welfare.
70. Australian Institute of Health and Welfare. (2020). *National Bowel Cancer Screening Program: monitoring report 2020*. Canberra: Australian Institute of Health and Welfare.
71. Australian Institute of Health and Welfare. (2020). *National Cervical Screening Program monitoring report 2020* (Cancer series 130. Cat. no. CAN 138). Canberra: Australian Institute of Health and Welfare.
72. Australian Institute of Health and Welfare. (2020). *BreastScreen Australia monitoring report 2020* (Cancer series no. 129. Cat. no. CAN 135). Canberra: Australian Institute of Health and Welfare.
73. Harvey, J., Budd, A., Tanevska, B., Ng, F., & Meere, D. (2018). *Cervical screening in Australia 2018*. Canberra: Australian Institute of Health and Welfare.
74. Tapia, K. A., Garvey, G., Mc Entee, M., Rickard, M., & Brennan, P. (2017). Breast cancer in Australian Indigenous women: incidence, mortality, and risk factors. *Asian Pacific Journal of Cancer Prevention*, 18(4), 873-884.
75. Breast Cancer Network Australia. (2018). *Breast Cancer Network Australia's state of the nation report*. Camberwell, Vic: Breast Cancer Network Australia.
76. Australian Institute of Health and Welfare, & Cancer Australia. (2013). *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: an overview* (AIHW Catalogue no CAN 75, cancer series no78). Canberra: Australian Institute of Health and Welfare.
77. Cunningham, J., Rumbold, A. R., Zhang, X., & Condon, J. R. (2008). Incidence, aetiology, and outcomes of cancer in Indigenous peoples in Australia. *The Lancet Oncology*, 9(6), 585-595.
78. Moore, S. P., Green, A. C., Bray, F., Garvey, G., Coory, M., Martin, J., & Valery, P. C. (2014). Survival disparities in Australia: an analysis of patterns of care and comorbidities among Indigenous and non-Indigenous cancer patients. *BMC Cancer*, 14. Retrieved from: <http://dx.doi.org/10.1186/1471-2407-14-517>
79. Australian Institute of Health and Welfare. (2016). *Australia's health 2016*. Canberra: Australian Institute of Health and Welfare.
80. Australian Institute of Health and Welfare. (2009). *Insulin-treated diabetes in Australia 2000-2007* (AIHW Catalogue no. CVD 45). Canberra: Australian Institute of Health and Welfare.
81. Australian Institute of Health and Welfare. (2015). *Cardiovascular disease, diabetes and chronic kidney disease- Australian facts: Aboriginal and Torres Strait Islander people*. Canberra: Australian Institute of Health and Welfare.
82. Australian Institute of Health and Welfare. (2011). *Prevalence of Type 1 diabetes in Australian children, 2008* (AIHW Catalogue no CVD 54, Diabetes series no.15). Canberra: Australian Institute of Health and Welfare.
83. Australian Bureau of Statistics. (2014). *Australian Aboriginal and Torres Strait Islander health survey: biomedical results, 2012-13 - Australia: table 6.3 [data cube]*. Retrieved 10 September 2014 from [http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&4727.0.55.003\\_6.xls&4727.0.55.003&Data%20Cubes&F653985C855EA253CA257D4E00170316&0&2012-13&10.09.2014&Latest](http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&4727.0.55.003_6.xls&4727.0.55.003&Data%20Cubes&F653985C855EA253CA257D4E00170316&0&2012-13&10.09.2014&Latest)
84. Australian Institute of Health and Welfare. (2020). *Incidence of insulin-treated diabetes in Australia*. Retrieved 9 December 2020 from <https://www.aihw.gov.au/reports/diabetes/incidence-of-insulin-treated-diabetes/contents/incidence-of-insulin-treated-diabetes-in-australia>
85. Australian Institute of Health and Welfare. (2019). *Diabetes*. Retrieved 30 August 2019 from <https://www.aihw.gov.au/reports/diabetes/diabetes/contents/what-is-diabetes>



86. Australian Institute of Health and Welfare. (2019). *Incidence of gestational diabetes in Australia [web report]*. Retrieved 4 September 2019 from <https://www.aihw.gov.au/reports/diabetes/incidence-of-gestational-diabetes-in-australia/data>
87. Australian Institute of Health and Welfare. (2020). *Diabetes indicators for the Australian National Diabetes Strategy 2016-2020*. Retrieved 9 December 2020 from <https://www.aihw.gov.au/reports/diabetes/diabetes-indicators-strategy-2016-2020/contents/summary>
88. Dudgeon, P., Bray, A., Smallwood, G., Walker, R., & Dalton, T. (2020). *Wellbeing and healing through connection and culture*. Sydney: Lifeline.
89. Griffiths, K., Coleman, C., Lee, V., & Madden, R. (2016). How colonisation determines social justice and Indigenous health - a review of the literature. *Journal of Population Research*, 33(1), 9–30.
90. Adams, M., Adams, Y., & Drew, N. (2019). Indigenous psychology in Australia. In W. Wen Li, D. Hodgetts & K. Hean Foo (Eds.), *Asia-Pacific Perspectives on Intercultural Psychology* (pp. 175-197). Abingdon, United Kingdom: Routledge.
91. World Health Organization. (2012). *Risks to mental health: an overview of vulnerabilities and risk factors. Background paper by WHO secretariat for the development of a comprehensive mental health action plan*. Geneva: World Health Organization.
92. Clark, Y., Gee, G., Ralph, N., Atkinson, C., Brown, S., Glover, K., . . . The Healing the Past by Nurturing the Future Co-Design Group. (2020). The Healing the Past by Nurturing the Future: cultural and emotional safety framework. *Journal of Indigenous Wellbeing*, 5(1), 38-57.
93. Sutherland, S., & Adams, M. (2019). Building on the definition of social and emotional wellbeing: an Indigenous (Australian, Canadian, and New Zealand) viewpoint. *ab-Original*, 3(1), 48-72.
94. Australian Bureau of Statistics. (2016). *National Aboriginal and Torres Strait Islander Social Survey, 2014-15*. Canberra: Australian Bureau of Statistics.
95. Australian Institute of Health and Welfare. (2019). *Admitted patient care 2017-18* (AIHW Cat. no: HSE 225). Canberra: Australian Institute of Health and Welfare.
96. University of Western Australia Graduate School of Education, Rural Clinical School Western Australia, Kimberley Aboriginal Medical Service, & Kimberley Aboriginal Suicide Prevention Trial. (2020). *A profile of suicide and self-harm in the Kimberley*. Perth: Rural Clinical School Western Australia.
97. Kidney Health Australia. (2020). *Know your kidneys*. from <https://kidney.org.au/your-kidneys/know-your-kidneys>
98. Kidney Health Australia. (2021). *About kidney disease*. Retrieved 18 January 2021 from <https://kidney.org.au/your-kidneys/what-is-kidney-disease>
99. Australian Institute of Health and Welfare. (2020). *Chronic kidney disease*. Retrieved 15 July 2020 from <https://www.aihw.gov.au/reports/chronic-kidney-disease/chronic-kidney-disease/contents/what-is-chronic-kidney-disease>
100. Kidney Health Australia. (2020). *Chronic kidney disease (CKD) management in primary care: 4th edition*. Melbourne: Kidney Health Australia.
101. National Aboriginal Community Controlled Health Organisation, & Royal Australian College of General Practitioners. (2018). *National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people: 3rd edition*. East Melbourne: Royal Australian College of General Practitioners.
102. Hughes, J. T., Dembski, L., Kerrigan, V., Majoni, S. W., Lawton, P. D., & Cass, A. (2018). Gathering Perspectives - finding solutions for chronic and end stage kidney disease. *Nephrology*, 23(S1), 5-13.
103. Schwartzkopff, K. M., Kelly, J., & Potter, C. (2020). Review of kidney health among Aboriginal and Torres Strait Islander people. *Australian Indigenous Health Bulletin*, 20(4). Retrieved from: <http://healthbulletin.org.au/articles/review-of-kidney-health-among-aboriginal-and-torres-strait-islander-people/>
104. Garrard, E., & McDonald, S. (2019). *Improving access to and outcomes of kidney transplantation for Aboriginal and Torres Strait Islander people in Australia: performance report*. Sydney: The Transplantation Society of Australia and New Zealand.
105. Australian Bureau of Statistics. (2014). *Australian Aboriginal and Torres Strait Islander health survey: biomedical results, 2012-13* (ABS Catalogue no 4727.0.55.003). Canberra: Australian Bureau of Statistics.
106. Australian Bureau of Statistics. (2013). *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13* (ABS Catalogue no. 4727.0.55.001). Canberra: Australian Bureau of Statistics.
107. Australian Institute of Health and Welfare. (2020). *Profiles of Aboriginal and Torres Strait Islander people with kidney disease* (Cat. no. IHW 229). Canberra: Australian Institute of Health and Welfare.

108. Australia and New Zealand Dialysis and Transplant Registry. (2019). *The forty-second annual Australia and New Zealand Dialysis and Transplant Registry report 2019*. Adelaide: Australia and New Zealand Dialysis and Transplant Registry.
109. Australian and New Zealand Dialysis and Transplant Registry. (2019). *End stage renal disease notifications, by Indigenous status, age, jurisdiction and year [2014 to 2018, unpublished]*. Australian and New Zealand Dialysis and Transplant Registry. Adelaide.
110. Australian Bureau of Statistics. (2003). *Australian demographic statistics quarterly: September quarter 2002* (ABS catalogue no. 3101.0). Canberra: Australian Bureau of Statistics.
111. Australia and New Zealand Dialysis and Transplant Registry. (2020). *The forty-third annual Australia and New Zealand Dialysis and Transplant Registry report 2020*. Adelaide: Australia and New Zealand Dialysis and Transplant Registry.
112. Australian Government Productivity Commission. (2021). *Report on government services 2021, part E: health*. Canberra: Australian Government Productivity Commission.
113. National Public Health Partnership. (2005). *The national Aboriginal and Torres Strait Islander safety promotion strategy*. Canberra: National Public Health Partnership.
114. National Public Health Partnership. (2005). *The national injury prevention and safety promotion plan: 2004-2014*. Canberra: National Public Health Partnership.
115. Clapham, K., O'Dea, K., & Chenhall, R. (2007). Interventions and sustainable programs. In B. Carson, T. Dunbar, R. D. Chenhall & R. Bailie (Eds.), *Social determinants of Indigenous health* (pp. 271-295). Crows Nest, NSW: Allen and Unwin.
116. Moller, J. (1996). Understanding national injury data regarding Aboriginal and Torres Strait Islander peoples. *Australian Injury Prevention Bulletin*, 14(December), 1-8.
117. WHO. (2016). *Q&As: injuries*. Retrieved 2016 from <http://www.who.int/topics/injuries/qa/en/>
118. Australian Institute of Health and Welfare. (2016). *Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011*. Canberra: Australian Institute of Health and Welfare.
119. World Health Organization. (2017). *About chronic respiratory diseases*. Retrieved 2017 from [http://www.who.int/respiratory/about\\_topic/en/](http://www.who.int/respiratory/about_topic/en/)
120. Australian Institute of Health and Welfare. (2005). *Chronic respiratory diseases in Australia: their prevalence, consequences and prevention* (AIHW Catalogue no PHE 63). Canberra: Australian Institute of Health and Welfare.
121. Australian Institute of Health and Welfare. (2010). *Asthma, chronic obstructive pulmonary disease and other respiratory diseases in Australia* (AIHW Catalogue no ACM 20). Canberra: Australian Institute of Health and Welfare.
122. Janu, E. K., Annabattula, B. I., Kumariah, S., Zajackowska, M., Whitehall, J. S., Edwards, M. J., . . . Masters, I. B. (2014). Paediatric hospitalisations for lower respiratory tract infections in Mount Isa. *Medical Journal of Australia*, 200(10), 591-594.
123. Hall, K. K., Chang, A. B., Anderson, J., Dunbar, M., Arnold, D., & O'Grady, K. F. (2017). Characteristics and respiratory risk profile of children aged less than 5 years presenting to an urban, Aboriginal-friendly, comprehensive primary health practice in Australia. *Journal of Paediatrics and Child Health*, 53(7), 636-643.
124. Australian Institute of Health and Welfare. (2014). *Mortality from asthma and COPD in Australia* (AIHW Catalogue no ACM 30). Canberra: Australian Institute of Health and Welfare.
125. Australian Institute of Health and Welfare. (2020). *Indigenous eye health measures 2020* (Cat. no. IHW 231). Canberra: Australian Institute of Health and Welfare.
126. Kirby Institute. (2021). *Australian trachoma surveillance report 2019*. Sydney: Kirby Institute.
127. Taylor, H. R., Anjou, M. D., Boudville, A. I., & McNeil, R. J. (2012). *The roadmap to close the gap for vision: full report*. Melbourne: Indigenous Eye Health Unit, the University of Melbourne.
128. George Institute for Global Health. (2017). *Low vision, quality of life and independence: a review of the evidence on aids and technologies*. Sydney: Macular Disease Foundation Australia.
129. Access Economics. (2010). *Clear focus: the economic impact of vision loss in Australia in 2009*. Melbourne: Vision 2020 Australia.
130. Estevez, J., Kaidonis, G., Henderson, T., Craig, J. E., & Landers, J. (2018). Association of disease-specific causes of visual impairment and 10-year mortality among Indigenous Australians: the Central Australian Ocular Health Study. *Clinical & Experimental Ophthalmology*, 46(1), 18-24.
131. Taylor, H. R., Boudville, A., Anjou, M., & McNeil, R. (2011). *The roadmap to close the gap for vision: summary report*. Melbourne: Indigenous Eye Health Unit, the University of Melbourne.



132. Taylor, H. R., & National Indigenous Eye Health Survey Team. (2009). *National Indigenous eye health survey: minum barreng (tracking eyes): summary report*. Melbourne: Indigenous Eye Health Unit, The University of Melbourne.
133. Foreman, J., Keel, S., Xie, J., van Wijngaarden, P., Crowston, J., Taylor, H. R., & Dirani, M. (2016). *The National Eye Health Survey 2016 report*. Melbourne: Vision 2020 Australia.
134. Australian Department of Health and Ageing, & Victorian Department of Human Services. (2005). *Eye health in Australia: a background paper to the national framework for action to promote eye health and prevent avoidable blindness and vision loss*. Canberra: Australian Government Department of Health and Ageing.
135. Keel, S., Xie, J., Foreman, J., van Wijngaarden, P., Taylor, H., , & Dirani, M. (2017). The prevalence of diabetic retinopathy in Australian adults with self-reported diabetes: The National Eye Health Survey. *Ophthalmology*, 124(7), 977-984.
136. Keel, S., Xie, J., Foreman, J., Taylor, H. R., & Dirani, M. (2017). The prevalence of vision loss due to ocular trauma in the Australian National Eye Health Survey. *Injury*, 48(11), 2466-2469.
137. Foreman, J., Xie, J., Keel, S., van Wijngaarden, P., Taylor, H. R., & Dirani, M. (2017). The validity of self-report of eye diseases in participants with vision loss in the National Eye Health Survey. *Scientific Reports*, 7. Retrieved from: <http://dx.doi.org/10.1038/s41598-017-09421-9>
138. The Kirby Institute. (2018). *Australian trachoma surveillance report 2017*. Sydney: The Kirby Institute, University of New South Wales.
139. The Kirby Institute. (2019). *Australian trachoma surveillance report 2018*. Sydney: The Kirby Institute.
140. Centre of Research Excellence in Ear and Hearing Health of Aboriginal and Torres Strait Islander Children, Australian Government Department of Health and Ageing, & Menzies School of Health Research. (2017). *Otitis media guidelines*. Retrieved 2020 from <https://otitismediaguidelines.com/#/start-main>
141. Australian Medical Association. (2017). *2017 AMA report card on Indigenous health: a national strategic approach to ending chronic otitis media and its life long impacts in Indigenous communities*. Canberra: Australian Medical Association.
142. Coates, H., Kong, K., Mackendrick, A., Bumbak, P., Perry, C., Friedland, P., . . . Chungheyon, O. (2019). *Aboriginal, Torres Strait Islander and Pacific Islander ear health manual [4th edition]*. Melbourne: The Garnett Passe and Rodney Williams Memorial Foundation.
143. Leach, A. (2016). *Bulging ear drums and hearing loss: Aboriginal kids have the highest otitis media rates in the world*. Retrieved 16 September 2016 from <https://theconversation.com/bulging-ear-drums-and-hearing-loss-aboriginal-kids-have-the-highest-otitis-media-rates-in-the-world-64165>
144. House of Representatives Standing Committee on Health, A. C. a. S. (2017). *Still waiting to be heard... report on the Inquiry into the Hearing Health and Wellbeing of Australia*. Canberra: Parliament of Australia.
145. Howard, D., & Barney, J. (2018). Minced words: the importance of widespread hearing loss as an issue in the mental health of Indigenous Australians. *Australian Indigenous Health Bulletin*, 18(1). Retrieved from: <http://healthbulletin.org.au/articles/minced-words-the-importance-of-widespread-hearing-loss-as-an-issue-in-the-mental-health-of-indigenous-australians>
146. Australian Institute of Health and Welfare. (2020). *Australia's health 2020: in brief*. Canberra: Australian Institute of Health and Welfare.
147. Poche Indigenous Health Network. (2019). *Indigenous ear health*, Sydney.
148. Burrow, S., Galloway, A., & Weissföner, N. (2009). Review of educational and other approaches to hearing loss among Indigenous people. *Australian Indigenous Health Bulletin*, 9(2). Retrieved from: <http://healthbulletin.org.au/articles/review-of-educational-and-other-approaches-to-hearing-loss-among-indigenous-people/>
149. Australian Institute of Health and Welfare. (2020). *Australia's health 2020*. Canberra: Australian Institute of Health and Welfare.
150. Burns, J., & Thomson, N. (2013). *Review of ear health and hearing among Indigenous Australians* (Australian Indigenous HealthReviews no. 15). Perth, WA: Australian Indigenous HealthInfoNet.
151. WHO/CIBA. (2000). *Prevention of hearing impairment from chronic otitis media* (WHO/PDH/98.4). Geneva: WHO.
152. Morris, P. S., Leach, A. J., Silberberg, P., Mellon, G., Wilson, C., Hamilton, E., & Beissbarth, J. (2005). Otitis media in young Aboriginal children from remote communities in Northern and Central Australia: a cross-sectional survey. *BMC Pediatrics*, 5. Retrieved from: <http://dx.doi.org/10.1186/1471-2431-5-27>

153. Leach, A. J., Wigger, C., Andrews, R., Chatfield, M., Smith-Vaughan, H., & Morris, P. S. (2014). Otitis media in children vaccinated during consecutive 7-valent or 10-valent pneumococcal conjugate vaccination schedules. *BMC Pediatrics*, *14*. Retrieved from: <http://dx.doi.org/10.1186/1471-2431-14-200>
154. Leach, A. J., Wigger, C., Beissbarth, J., Woltring, D., Andrews, R., Chatfield, M. D., . . . Morris, P. S. (2016). General health, otitis media, nasopharyngeal carriage and middle ear microbiology in Northern Territory Aboriginal children vaccinated during consecutive periods of 10-valent or 13-valent pneumococcal conjugate vaccines. *International Journal of Pediatric Otorhinolaryngology*, *86*, 224-232.
155. Australian Bureau of Statistics. (2020). *Under-reporting of hearing impairment in the Aboriginal and Torres Strait Islander population*. from <https://www.abs.gov.au/articles/under-reporting-hearing-impairment-aboriginal-and-torres-strait-islander-population>
156. Australian Institute of Health and Welfare. (2019). *Hearing health outreach services for Aboriginal and Torres Strait Islander children in the Northern Territory: July 2012 to December 2018*. Canberra: Australian Institute of Health and Welfare.
157. Australian Institute of Health and Welfare. (2017). *Aboriginal and Torres Strait Islander Health Performance Framework*. Retrieved 30 May 2017 from <https://webarchive.nla.gov.au/awa/20200605165124/https://www.aihw.gov.au/reports/indigenous-health-welfare/health-performance-framework/contents/overview>
158. FDI World Dental Federation. (2016). *FDI unveils new universally applicable definition of 'oral health'*. Retrieved 6 September 2016 from <http://www.fdiworldental.org/media/press-releases/latest-press-releases/06092016-fdi-unveils-new-universally-applicable-definition-of-%E2%80%98oral-health%E2%80%99.aspx>
159. Do, L. G., & Spencer, A. J. (Eds.). (2016). *Oral health of Australian children: The National Child Oral Health Study 2012-14*. Adelaide: University of Adelaide Press.
160. Australian Health Policy Collaboration, & Australian Dental Association. (2018). *Australia's oral health tracker*. Melbourne: Victoria University.
161. Australian Medical Association. (2019). *2019 AMA report card on Indigenous health- no more decay: addressing the oral health needs of Aboriginal and Torres Strait Islander Australians*. Canberra: Australian Medical Association.
162. Australian Institute of Health and Welfare. (2019). *Northern Territory Remote Aboriginal Investment: Oral Health Program July 2012 to December 2018*. Canberra: Australian Institute of Health and Welfare.
163. Australian Research Centre for Population Oral Health. (2019). *Australia's oral health: national study of adult oral health 2017-18*. Adelaide: Australian Research Centre for Population Oral Health.
164. Australian Government Productivity Commission. (2020). *Report on government services 2020, part E: health*. Canberra: Australian Government Productivity Commission.
165. Dew, A., Vaughan, P., McEntyre, E., & Dowse, L. (2019). 'Our ways to planning': preparing organisations to plan with Aboriginal and Torres Strait Islander people with disability. *Australian Aboriginal Studies*(2), 3-18.
166. Australian Bureau of Statistics. (2019). *Disability, ageing and carers, Australia: summary of findings, 2018*. Canberra: Australian Bureau of Statistics.
167. World Health Organization. (2015). *WHO global disability action plan 2014-2021: better health for all people with disability*. Geneva: World Health Organization.
168. Australian Bureau of Statistics. (2019). *Disability, Ageing and Carers, Australia: Summary of Findings methodology*. from <https://www.abs.gov.au/methodologies/disability-ageing-and-carers-australia-summary-findings/2018>
169. Australian Bureau of Statistics. (2017). *2016 Census community profiles: Aboriginal and Torres Strait Islander peoples profile*. Retrieved 23 October 2017 from [http://www.censusdata.abs.gov.au/census\\_services/getproduct/census/2016/communityprofile/036?opendocument](http://www.censusdata.abs.gov.au/census_services/getproduct/census/2016/communityprofile/036?opendocument)
170. Australian Bureau of Statistics. (2017). *Disability, ageing and carers, Australia: summary of findings, 2015*. Canberra: Australian Bureau of Statistics.
171. Australian Productivity Commission. (2020). *Report on government services 2020, part F: community services*. Canberra: Australian Productivity Commission.
172. Australian Institute of Health and Welfare. (2020). *Disability support services: services provided under the National Disability Agreement 2018-19*. Canberra: Australian Institute of Health and Welfare.
173. Hall, S., Fildes, J., Tiller, E., Di Nicola, K., & Plummer, J. (2020). *National Aboriginal and Torres Strait Islander youth report: youth survey 2019*. Sydney: Mission Australia.

174. Williams, S. (2014). *National framework for communicable disease control*. Canberra: Australian Department of Health.
175. Australian Government Department of Health. (2018). *Fourth National Sexually Transmissible Infections Strategy 2018-2022*. Canberra: Australian Government Department of Health.
176. The Kirby Institute. (2018). *Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people: annual surveillance report 2018*. Sydney: The Kirby Institute.
177. Kirby Institute. (2020). *National update on HIV, viral hepatitis and sexually transmissible infections in Australia 2009-2018*. Sydney: Kirby Institute.
178. World Health Organization. (2016). *WHO guidelines for the treatment of neisseria gonorrhoeae*. Geneva, Switzerland: World Health Organization.
179. World Health Organization. (2016). *WHO guidelines for the treatment of Treponema pallidum (syphilis)*. Geneva, Switzerland: World Health Organization.
180. World Health Organization. (2020). HIV/AIDs: key facts. Geneva, Switzerland: World Health Organization.
181. Western Australian AIDS Council. (2020). *HIV*. from <https://waaids.com/hiv.html>
182. The Kirby Institute. (2019). *HIV: what's new in 2018?* from <https://data.kirby.unsw.edu.au/hiv>
183. The Kirby Institute. (2019). *Australia's annual report card: Aboriginal & Torres Strait Islander people report*. from <https://data.kirby.unsw.edu.au/atsi-report>
184. Hepatitis C Virus Infection Consensus Statement Working Group. (2018). *Australian recommendations for the management of hepatitis C virus infection: a consensus statement (September 2018)*. Melbourne: Gastroenterological Society of Australia.
185. Australian Government Department of Health. (2018). *Fifth National Hepatitis C Strategy 2018-2022*. Canberra: Australian Government Department of Health.
186. Burnet Institute, & Kirby Institute. (2020). *Australia's progress towards hepatitis C elimination: annual report 2020*. Canberra: Burnet Institute.
187. Australian Department of Health. (2019). *Australian Immunisation Handbook*. Retrieved 2019 from <https://immunisationhandbook.health.gov.au/>
188. Ioannides, S., Beard, F., Larter, N., Clark, K., Wang, H., Hendry, A., . . . McIntyre, P. (2019). Vaccine preventable diseases and vaccination coverage in Aboriginal and Torres Strait Islander people, Australia, 2011–2015. *Communicable Diseases Intelligence*, 43, 111.
189. Australian Department of Health. (2018). *Australian Immunisation Handbook*. Retrieved 18 September 2018 from [immunisationhandbook.health.gov.au](https://immunisationhandbook.health.gov.au)
190. National Centre for Immunisation Research and Surveillance. (2020). Pneumococcal vaccines for Australians (pp. 12). Sydney: National Centre for Immunisation Research and Surveillance.
191. Australian Government Department of Health, & National Immunisation Program. (2020). National Immunisation Program schedule 1 July 2020 - for all Indigenous people (pp. 2). Canberra: Australian Government Department of Health.
192. National Immunisation Program. (2020). Pneumococcal vaccination schedule from 1 July 2020: clinical advice for vaccination providers (pp. 2). Canberra: Australian Government Department of Health.
193. Australian Institute of Health and Welfare. (2018). Vaccine preventable disease among Aboriginal and Torres Strait Islander people (pp. 4). Canberra: Australian Institute of Health and Welfare.
194. Australian Government Department of Health. (2019). *Australian Immunisation Handbook*. Retrieved 2019 from <https://immunisationhandbook.health.gov.au/>
195. Lahra, M. M., & Hogan, T. R. (2020). Australian Meningococcal Surveillance Programme annual report, 2019. *Communicable Diseases Intelligence*, 44.
196. National Centre for Immunisation Research and Surveillance. (2020). Meningococcal vaccines for Australians: information for immunisation providers (pp. 12). Sydney: National Centre for Immunisation Research and Surveillance.
197. Australian Government Department of Health. (2020). National Immunisation Program - Meningococcal vaccination schedule from 1 July 2020 - Clinical advice for vaccination providers (pp. 2). Canberra: Australian Government Department of Health.
198. Archer, B. N., Chiu, C. K., Jayasinghe, S. H., Richmond, P. C., McVernon, J., Lahra, M. M., . . . McIntyre, P. B. (2017). Epidemiology of invasive meningococcal B disease in Australia, 1999-2015: priority populations for vaccination. *Medical Journal of Australia*, 207(9), 382-387.

199. National Tuberculosis Advisory Committee. (2013). The BCG vaccine: information and recommendations for use in Australia. *Communicable Diseases Intelligence*, 37(1), E65-E72.
200. Bright, A., Denholm, J. T., Coulter, C., Waring, J., & Stapledon, R. (2020). Tuberculosis notifications in Australia, 2015-2018. *Communicable Diseases Intelligence*, 44. Retrieved from: <https://doi.org/10.33321/cdi.2020.44.88>
201. Maguire, J. E., Beard, F., Méder, K., Dey, A., Macartney, K., & McIntyre, P. (2020). Australian vaccine preventable disease epidemiological review series: invasive Haemophilus influenzae type b disease, 2000–2017. *Communicable Diseases Intelligence*, 44. Retrieved from: <https://doi.org/10.33321/cdi.2020.44.11>
202. Naidu, L., Chiu, C., Habig, A., Lowbridge, C., Jayasinghe, S., Wang, H., . . . Menzies, R. (2013). Vaccine preventable diseases and vaccination coverage in Aboriginal and Torres Strait Islander people, Australia 2006–2010. *Communicable Diseases Intelligence*, 37(December 2013 supplement), S1-S92.
203. Tasani, M., Tong, S. Y. C., Andrews, R., Holt, D. C., Currie, B. J., Carapetis, J. R., & Bowen, A. C. (2016). The importance of scabies coinfection in the treatment considerations for impetigo. *Pediatric Infectious Disease Journal*, 35(4), 374-378.
204. Australian Healthy Skin Consortium. (2018). *National healthy skin guideline: for the prevention, treatment and public health control of impetigo, scabies, crusted scabies and tinea for Indigenous populations and communities in Australia - 1st edition*. Perth: Telethon Kids Institute.
205. Centre for Disease Control. (2015). *Healthy Skin Program: guidelines for community control of scabies, skin sores, tinea and crusted scabies in the Northern Territory [3rd ed.]*. Darwin: Northern Territory Department of Health.
206. McMeniman, E., Holden, L., Kearns, T., Clucas, D. B., Carapetis, J. R., Currie, B. J., . . . Andrews, R. M. (2011). Skin disease in the first two years of life in Aboriginal children in East Arnhem Land. *Australasian Journal of Dermatology*, 52(4), 270-273.
207. Aung, P. T. Z., Cuningham, W., Hwang, K., Andrews, R. M., Carapetis, J., Kearns, T., . . . Campbell, P. T. (2018). Scabies and risk of skin sores in remote Australian Aboriginal communities: a self-controlled case series study. *PLOS Neglected Tropical Diseases*, 12(7). Retrieved from: <https://doi.org/10.1371/journal.pntd.0006668>
208. Mika, A., Reynolds, S. L., Pickering, D., McMillan, D., & Sriprakash, K. S. (2012). Complement inhibitors from scabies mites promote streptococcal growth - a novel mechanism in infected epidermis? *PLOS Neglected Tropical Diseases*, 6(7), e1563.
209. Swe, P. M., & Fischer, K. (2014). A scabies mite serpin interferes with complement-mediated neutrophil functions and promotes staphylococcal growth. *PLOS Neglected Tropical Diseases*, 8(6). Retrieved from: <http://dx.doi.org/10.1371/journal.pntd.0002928>
210. Hasan, T., Krause, V. L., James, C., & Currie, B. J. (2020). Crusted scabies; a 2-year prospective study from the Northern Territory of Australia. *PLOS Neglected Tropical Diseases*, 14(12). Retrieved from: <https://doi.org/10.1371/journal.pntd.0008994>
211. Central Australian Rural Practitioners Association. (2017). *CARPA standard treatment manual: a clinic manual for primary health care practitioners in remote and Indigenous health services in central and northern Australia* (7th ed.). Alice Springs, NT: Centre for Remote Health.
212. Howarth, T. (2016). *Strongyloidiasis, scabies and impetigo - household clustering in a Northern Territory community*. Charles Darwin University, Darwin.
213. Bowen, A. C., Tong, S. Y. C., Andrews, R. M., O'Meara, I. M., McDonald, M. I., Chatfield, M. D., . . . Carapetis, J. R. (2014). Short-course oral co-trimoxazole versus intramuscular benzathine benzylpenicillin for impetigo in a highly endemic region: an open-label, randomised, controlled, non-inferiority trial. *The Lancet*, 384(9960), 2132-2140.
214. Hoy, W. E., White, A. V., Dowling, A., Sharma, S. K., Bloomfield, H., Tipiloura, B. T., . . . McCredie, D. A. (2012). Post-streptococcal glomerulonephritis is a strong risk factor for chronic kidney disease in later life. *Kidney International*, 81(2), 1026-1032.
215. May, P. J., Bowen, A. C., & Carapetis, J. R. (2016). The inequitable burden of group A streptococcal diseases in Indigenous Australians. *Medical Journal of Australia*, 205(5), 201-203.
216. Barnes, R., Bowen, A. C., Walker, R., Tong, S. Y. C., McVernon, J., Campbell, P. T., . . . Moore, H. C. (2019). Perinatal risk factors associated with skin infection hospitalisation in Western Australian Aboriginal and Non Aboriginal children. *Paediatric and Perinatal Epidemiology*, 33(5), 374-383.
217. Amgarth-Duff, I., & Hendrickx, D. (2019). Talking skin: attitudes and practices around skin infections, treatment options, and their clinical management in a remote region in Western Australia. *Rural and Remote Health*, 19(3). Retrieved from: <https://doi.org/10.22605/RRH5227>

218. Nepal, S., Thomas, S. L., Franklin, R. C., Taylor, K. A., & Massey, P. D. (2018). Systematic literature review to identify methods for treating and preventing bacterial skin infections in Indigenous children. *Australasian Journal of Dermatology*, 59(3), 194-200.
219. Marquardt, T. (2014). Managing skin infections in Aboriginal and Torres Strait Islander children. *Australian Family Physician*, 43(1/2), 16-19.
220. Parks, T., Smeesters, P. R., & Steer, A. C. (2012). Streptococcal skin infection and rheumatic heart disease. *Current Opinion in Infectious Diseases*, 25(2), 145-153.
221. Romani, L., Steer, A. C., Whitfeld, M. J., & Kaldor, J. M. (2015). Prevalence of scabies and impetigo worldwide: a systematic review. *The Lancet Infectious Diseases*, 15(8), 960-967.
222. Thomas, S., Crooks, K., Taylor, K., Massey, P. D., Williams, R., & Pearce, G. (2017). Reducing recurrence of bacterial skin infections in Aboriginal children in rural communities: new ways of thinking, new ways of working. *Australian Journal of Primary Health*, 23(3), 229-235.
223. Lokuge, B., Kopczyński, A., Woltmann, A., Alvoen, F., Connors, C., Guyula, T., . . . Prince, S. (2014). Crusted scabies in remote Australia, a new way forward: lessons and outcomes from the East Arnhem Scabies Control Program. *Medical Journal of Australia*, 200(11), 644-648.
224. Hendrickx, D., Stephen, A., Lehmann, D., Silva, D., Boelaert, M., Carapetis, J., & Walker, R. (2016). A systematic review of the evidence that swimming pools improve health and wellbeing in remote Aboriginal communities in Australia. *Australian and New Zealand Journal of Public Health*, 40(1), 30-36.
225. Mullane, M. J., Barnett, T. C., Cannon, J. W., Carapetis, J. R., Christophers, R., Coffin, J., . . . Bowen, A. C. (2019). SToP (See, Treat, Prevent) skin sores and scabies trial: study protocol for a cluster randomised, stepped-wedge trial for skin disease control in remote Western Australia. *BMJ Open*, 9. Retrieved from: <https://doi.org/10.1136/bmjopen-2019-030635>
226. Fischer, K., & Kemp, D. J. (2009). Scabies and bacterial skin infections at a molecular level. *Microbiology Australia*, 30(5), 177-180.
227. Clucas, D. B., Carville, K. S., Connors, C., Currie, B., Carapetis, J., & Andrews, R. (2008). Disease burden and health-care clinic attendances for young children in remote Aboriginal communities of northern Australia. *Bulletin of the World Health Organization*, 86(4), 275-281.
228. Lydeamore, M. J., Campbell, P. T., Cuningham, W., Andrews, R. M., Kearns, T., Clucas, D., . . . McVernon, J. (2018). Calculation of the age of the first infection for skin sores and scabies in five remote communities in northern Australia. *Epidemiology and Infection*, 146(9), 1194-1201.
229. Kearns, T., Clucas, D., Connors, C., Currie, B. J., Carapetis, J. R., & Andrews, R. M. (2013). Clinic attendances during the first 12 months of life for Aboriginal children in five remote communities of Northern Australia. *PLOS ONE*, 8(3). Retrieved from: <https://doi.org/10.1371/journal.pone.0058231>
230. Andrews, R. M., Kearns, T., Connors, C., Parker, C., Carville, K., Currie, B. J., & Carapetis, J. R. (2009). A regional initiative to reduce skin infections amongst Aboriginal children living in remote communities of the Northern Territory, Australia. *PLOS Neglected Tropical Diseases*, 3(11), 1-9.
231. Australasian College for Emergency Medicine. (2018). *Aboriginal and Torres Strait Islander and non-Indigenous presentations to Australian emergency departments*. Melbourne: Australasian College for Emergency Medicine.
232. Solar, O., & Irwin, A. (2010). *A conceptual framework for action on social determinants of health: social determinants of health discussion paper 2 (policy and practice)*. Geneva: World Health Organization.
233. Australian Government Department of Health. (2017). *My Life My Lead - opportunities for strengthening approaches to the social determinants and cultural determinants of Indigenous health: report on the national consultations*. Canberra: Australian Government Department of Health.
234. World Health Organization. (2016). *What are social determinants of health?* Retrieved 2016 from [http://www.who.int/social\\_determinants/sdh\\_definition/en/](http://www.who.int/social_determinants/sdh_definition/en/)
235. Kuh, D., Ben-Shlomo, Y., Tilling, K., & Hardy, R. (2015). Life course epidemiology and analysis. In R. Detels, M. Gulliford, K. Q. Abdool & C. C. Tan (Eds.), *Oxford textbook of global public health* (6th ed., pp. 5.20). Oxford, UK: Oxford University Press.
236. World Health Organization. (2010). *A conceptual framework for action on social determinants of health: SDH discussion paper 2*. Geneva: World Health Organization.
237. Australian Institute of Health and Welfare. (2016). *Behaviours & risk factors*. Retrieved 28 January 2016 from <https://www.aihw.gov.au/risk-factors>



238. Australian Institute of Health and Welfare. (2012). *Risk factors contributing to chronic disease* (AIHW Catalogue no PHE 157). Canberra: Australian Institute of Health and Welfare.
239. Rickwood, D. (2006). *Pathways of recovery: preventing further episodes of mental illness (monograph)*. Canberra: Commonwealth of Australia.
240. Pratt, B. A., & Frost, L. J. (2016). *The life course approach to health: a rapid review of the literature (focusing on conceptual and operational considerations)*. Geneva: World Health Organization.
241. Jacob, C. M., Baird, J., Barker, M., Cooper, C., & Hanson, M. (2017). *The importance of a life course approach to health: chronic disease risk from preconception through adolescence and adulthood*. Geneva: World Health Organization.
242. Fisher, M., Battams, S., Mcdermott, D., Baum, F., & Macdougall, C. (2019). How the social determinants of Indigenous health became policy reality for Australia's National Aboriginal and Torres Strait Islander Health Plan. *Journal of Social Policy, 48*(1), 169-189.
243. Ferguson, M., Brown, C., Geoga, C., Miles, E., Wilson, A., & Brimblecombe, J. (2017). Traditional food availability and consumption in remote Aboriginal communities in the Northern Territory, Australia. *Australian and New Zealand Journal of Public Health, 41*(3), 294-298.
244. National Health and Medical Research Council. (2000). *Nutrition in Aboriginal and Torres Strait Islander peoples: an information paper*. Canberra: National Health and Medical Research Council.
245. National Health and Medical Research Council. (2013). *Australian Dietary Guidelines: providing the scientific evidence for healthier Australian diets*. Canberra: National Health and Medical Research Council.
246. Australian Bureau of Statistics (ABS). (2016). *Australian Aboriginal and Torres Strait Islander Health Survey: consumption of added sugars, 2012-13* (4727.0.55.009). Canberra: Australian Bureau of Statistics (ABS).
247. Craig, P., & Watson, M. (2018). *Nutrition across the life stages*. Canberra: Australian Institute of Health and Welfare.
248. Australian Bureau of Statistics. (2014). *Australian Aboriginal and Torres Strait Islander health survey: updated results, 2012-13* (ABS Catalogue no. 4727.0.55.006). Canberra: Australian Bureau of Statistics.
249. Australian Bureau of Statistics. (2015). *Australian Aboriginal and Torres Strait Islander health survey: nutrition results - food and nutrients, 2012-13: Table 4 [data cube]*. Retrieved 20 March 2015 from [http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&4727055005\\_201213\\_04.xls&4727.0.55.005&Data%20Cubes&F3E8C224BFBA2FE0CA257E0D000EC970&0&2012-13&20.03.2015&Latest](http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&4727055005_201213_04.xls&4727.0.55.005&Data%20Cubes&F3E8C224BFBA2FE0CA257E0D000EC970&0&2012-13&20.03.2015&Latest)
250. Australian Bureau of Statistics. (2015). *Australian Aboriginal and Torres Strait Islander health survey: nutrition results - food and nutrients, 2012-13* (ABS cat. no. 4727.0.55.005). Canberra: Australian Bureau of Statistics.
251. World Health Organization. (2015). *Guideline: sugars intake for adults and children*. Geneva, Switzerland: World Health Organization.
252. Tonkin, E., Kennedy, D., Hanieh, S., Biggs, B. A., Kearns, T., Gondarra, V., . . . Brimblecombe, J. (2020). Dietary intake of Aboriginal Australian children aged 6–36 months in a remote community: a cross-sectional study. *Nutrition Journal, 19*. Retrieved from: <https://doi.org/10.1186/s12937-020-00550-y>
253. Australian Bureau of Statistics. (2015). *Australian Aboriginal and Torres Strait Islander health survey: nutrition results - food and nutrients, 2012-13: Table 14.1 [data cube]*. Retrieved 20 March 2015 from <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4727.0.55.0052012-13?OpenDocument>
254. McCarthy, L., Chang, A. B., & Brimblecombe, J. (2018). Food security experiences of Aboriginal and Torres Strait Islander families with young children in an urban setting: influencing factors and coping strategies. *International Journal of Environmental Research and Public Health, 15*(12). Retrieved from: <https://doi.org/10.3390/ijerph15122649>
255. Lee, A., & Lewis, M. (2018). Testing the price of healthy and current diets in remote Aboriginal communities to improve food security: development of the Aboriginal and Torres Strait Islander Healthy Diets ASAP (Australian Standardised Affordability and Pricing) methods. *International Journal of Environmental Research and Public Health, 25*(12). Retrieved from:
256. Longmore, D. K., Barr, E. L. M., Wilson, A. N., Barzi, F., Kirkwood, M., Simmonds, A., . . . Maple-Brown, L. J. (2020). Associations of gestational diabetes and type 2 diabetes during pregnancy with breastfeeding at hospital discharge and up to 6 months: the PANDORA study. *Diabetologia, Early view*(<https://doi.org/10.1007/s00125-020-05271-9>).

257. Eades, S. J., Read, A. W., McAullay, D., McNamara, B., O'Dea, K., & Stanley, F. J. (2010). Modern and traditional diets for Noongar infants. *Journal of Paediatrics and Child Health*, 46(7-8), 398-403.
258. Gracey, M. (2000). Historical, cultural, political, and social influences on dietary patterns and nutrition in Australian Aboriginal children. *American Journal of Clinical Nutrition*, 72(5), 1361S-1367S.
259. Scott J.A., & Binns C.W. (2011). Infant feeding in Indigenous Australian communities. In L. P. (Ed.), *Infant feeding practices: a cross-cultural perspective* (pp. 265-276). New York: Springer.
260. World Health Organization. (2020). *Breastfeeding*. Retrieved 16 January 2020 from [https://www.who.int/nutrition/topics/exclusive\\_breastfeeding/en/](https://www.who.int/nutrition/topics/exclusive_breastfeeding/en/)
261. Consultative Council on Obstetric and Paediatric Mortality and Morbidity. (2017). *Victoria's mothers, babies and children 2016*. Melbourne: Victorian Department of Health & Human Services.
262. Parry, J. E., Ip, D. K. M., Chau, P. Y. K., Wu, K. M., & Tarrant, M. (2013). Predictors and consequences of in-hospital formula supplementation for healthy breastfeeding newborns. *Journal of Human Lactation*, 29(4), 527-536.
263. COAG Health Council. (2019). *Australian national breastfeeding strategy: 2019 and beyond*. Canberra: COAG Health Council.
264. Centre for Epidemiology and Evidence. (2019). *NSW mothers and babies 2018*. Sydney: New South Wales Health.
265. Li, L., & O'Neil, L. (2020). *Mothers and babies 2017: Northern Territory Midwives' Collection*. Darwin: Northern Territory Department of Health.
266. Brown, S., Stuart-Butler, D., Leane, C., Glover, K., Mitchell, A., Deverix, J., . . . Yelland, J. (2019). Initiation and duration of breastfeeding of Aboriginal infants in South Australia. *Women and Birth*, 32(3), e315-e322.
267. Helps, C., & Barclay, L. (2015). Aboriginal women in rural Australia; a small study of infant feeding behaviour. *Women and Birth*, 28(2), 129-136.
268. Brown, S., Stuart-Butler, D., Leane, C., Ah Kit, J., Glover, K., Mitchell, A., . . . Gartland, D. (2017). Aboriginal Family Birthing Program in South Australia: making a difference to breastfeeding of Aboriginal infants? [conference abstract]. *Journal of Paediatrics and Child Health*, 53(S2), 14.
269. Australian Bureau of Statistics. (2014). *Australian Aboriginal and Torres Strait Islander health survey: physical activity, 2012-13* (ABS cat. no. 4727.0.55.004). Canberra: Australian Bureau of Statistics.
270. Australian Government Department of Health. (2014). *Australia's physical activity and sedentary behaviour guidelines*. Canberra: Australian Government Department of Health.
271. Australian Government Department of Health. (2014). *Australia's physical activity and sedentary behaviour guidelines- guidelines evidence summary*. Canberra: Australian Government Department of Health.
272. Australian Institute of Health and Welfare. (2020). *Social determinants and Indigenous health*. from <https://www.aihw.gov.au/reports/australias-health/social-determinants-and-indigenous-health>
273. Whiteman, D. C., Webb, P. M., Green, A. C., Neale, R. E., Fritschi, L., Bain, C. J., . . . Carey, R. N. (2015). Cancers in Australia in 2010 attributable to modifiable factors: introduction and overview. *Australian and New Zealand Journal of Public Health*, 39(5), 403-407.
274. Dawson, J., Morland, R., & Brooks, R. (2017). *A picture of overweight and obesity in Australia: 2017*. Canberra: Australian Institute of Health and Welfare.
275. Dunford, M., & Prescott, V. (2017). *Impact of overweight and obesity as a risk factor for chronic conditions*. Canberra: Australian Institute of Health and Welfare.
276. National Health and Medical Research Council. (2013). *Eat for Health: Australian dietary guidelines summary*. Canberra: National Health and Medical Research Council.
277. World Health Organization. (2011). *Waist circumference and waist-hip ratio: report of a WHO expert consultation* Geneva.
278. Li, M., & McDermott, R. (2015). Obesity, albuminuria, and gamma-glutamyl transferase predict incidence of hypertension in Indigenous Australians in rural and remote communities in northern Australia. *Journal of Hypertension*, 33(4), 704-710.
279. Adegbiya, O., Hoy, W. E., & Wang, Z. (2015). Corresponding waist circumference and body mass index values based on 10-year absolute type 2 diabetes risk in an Australian Aboriginal community. *BMJ Open Diabetes Research & Care*, 3(1). Retrieved from: <https://doi.org/10.1136/bmjdr-2015-000127>
280. Daniel, M., Rowley, K., McDermott, R., & O'Dea, K. (2002). Diabetes and impaired glucose tolerance in Aboriginal Australians: prevalence and risk. *Diabetes Research and Clinical Practice*, 57(1), 23-33.
281. Li, M., & McDermott, R. A. (2010). Using anthropometric indices to predict cardio-metabolic risk factors in Australian Indigenous populations. *Diabetes Research and Clinical Practice*, 87(3), 401-406.



282. Gracey, M., Burke, V., Martin, D. D., Johnston, R. J., Jones, T., & Davis, E. A. (2007). Assessment of risks of “lifestyle” diseases including cardiovascular disease and type 2 diabetes by anthropometry in remote Australian Aborigines. *Asia Pacific Journal of Clinical Nutrition*, 16(4), 688-697.
283. Hughes, J. T., Maple-Brown, L. J., Piers, L. S., Meerkin, J., O’Dea, K., & Ward, L. C. (2015). Development of a single-frequency bioimpedance prediction equation for fat-free mass in an adult Indigenous Australian population. *European Journal of Clinical Nutrition*, 69(1), 28-33.
284. Australian Health Ministers’ Advisory Council. (2017). *Aboriginal and Torres Strait Islander Health Performance Framework: 2017 report*. Canberra: Department of the Prime Minister and Cabinet.
285. Australian Institute of Health and Welfare. (2020). *National Drug Strategy Household Survey 2019* (Drug Statistics series no. 32. PHE 270). Canberra: Australian Institute of Health and Welfare.
286. Heris, C. L., Guerin, N., Thomas, D. P., Eades, S. J., Chamberlain, C., & White, V. M. (2020). The decline of smoking initiation among Aboriginal and Torres Strait Islander secondary students: implications for future policy. *Australian and New Zealand Journal of Public Health*, 44(5), 397-403.
287. Australian Institute of Health and Welfare. (2020). *Alcohol, tobacco & other drugs in Australia [web report]*. Retrieved 15 December 2020 from <https://www.aihw.gov.au/reports/alcohol/alcohol-tobacco-other-drugs-australia/contents/introduction>
288. Thurber, K. A., Banks, E., Joshy, G., Soga, K., Marmor, A., Benton, G., . . . Lovett, R. (2021). Tobacco smoking and mortality among Aboriginal and Torres Strait Islander adults in Australia. *International Journal of Epidemiology*, Early view(<https://doi.org/10.1093/ije/dyaa274>).
289. Australian Government Department of Health. (2017). *National drug strategy 2017-2026*. Canberra: Australian Government Department of Health.
290. Australian Institute of Health and Welfare. (2017). *National Drug Strategy Household Survey 2016: detailed findings*. Canberra: Australian Institute of Health and Welfare.
291. Roche, A., Kostadinov, V., Fischer, J., & Nicholas, R. (2015). *The social determinants of inequities in alcohol consumption and alcohol-related health outcomes*. Adelaide: National Centre for Education and Training on Addiction.
292. Australian Government Department of Health. (2019). *Alcohol and Aboriginal and Torres Strait Islander peoples*. Retrieved 14 May 2019 from <https://www.health.gov.au/health-topics/alcohol/alcohol-throughout-life/alcohol-and-aboriginal-and-torres-strait-islander-peoples>
293. Gray, D., Cartwright, K., Stearne, A., Siggers, S., Wilkes, E., & Wilson, M. (2018). Review of the harmful use of alcohol among Aboriginal and Torres Strait Islander people. *Australian Indigenous Health Bulletin*, 18(1), 42.
294. Intergovernmental Committee on Drugs. (2015). *National Aboriginal and Torres Strait Islander peoples’ drug strategy 2014-2019*. Canberra: National Drug Strategy.
295. Gray, D., & Wilkes, E. (2010). *Reducing alcohol and other drug related harm* (Resource sheet no. 3). Canberra: Closing the Gap Clearinghouse.
296. National Health and Medical Research Council. (2020). *Australian guidelines to reduce health risks from drinking alcohol*. Canberra: National Health and Medical Research Council.
297. Watkins, R. E., Elliott, E. J., Wilkins, A., Mutch, R. C., Fitzpatrick, J. P., Payne, J. M., . . . Bower, C. (2013). Recommendations from a consensus development workshop on the diagnosis of fetal alcohol spectrum disorders in Australia. *BMC Pediatrics*, 13. Retrieved from: <http://dx.doi.org/10.1186/1471-2431-13-156>
298. Bower, C., & Elliott, E. J. (2020). Australian guide to the diagnosis of FASD (pp. 103). Perth: Telethon Kids Institute.
299. Stafford, J., & Breen, C. (2016). *Australian drug trends 2015: findings from the Illicit Drug Reporting System (IDRS)* (Australian Drug Trend Series no. 145). Sydney: National Drug and Alcohol Research Centre.
300. Degenhardt, L., & Hall, W. (2012). Extent of illicit drug use and dependence, and their contribution to the global burden of disease. *The Lancet*, 379(9810), 55-70.
301. Australian Institute of Health and Welfare. (2020). *Alcohol and other drug treatment services in Australia, 2018-19*. Canberra: Australian Institute of Health and Welfare.
302. Butler, T., & Simpson, M. (2017). *National Prison Entrants’ Bloodborne Virus and Risk Behaviour Survey Report 2004, 2007, 2010, 2013 and 2016: prevalence of HIV, hepatitis C, hepatitis B, sexually transmissible infections, and risk behaviours among Australian prison entrants: national report*. Sydney: Kirby Institute.

303. Heard, S., Iversen, J., Geddes, L., Kwon, J. A., & Maher, L. (2020). *Needle Syringe Program National Minimum Data Collection national data report 2020*. Sydney: The Kirby Institute.
304. National Drug and Alcohol Research Centre. (2016). What are inhalants? (pp. 2). Sydney: National Drug and Alcohol Research Centre.
305. Ford, J. B., Sutter, M. E., Owen, K. P., & Albertson, T. E. (2014). Volatile substance misuse: an updated review of toxicity and treatment. *Clinical Reviews in Allergy & Immunology*, 46(1), 19-33.
306. National Institute on Drug Abuse. (2012). *NIDA InfoFacts: inhalants*. Retrieved 2010 from <https://www.drugabuse.gov/drug-topics/inhalants>
307. European Monitoring Centre for Drugs and Drug Addiction. (2020). *Volatile substances drug profile*. Retrieved 2020 from <https://www.emcdda.europa.eu/publications/drug-profiles/volatile>
308. Marel, C., MacLean, S., & Midford, R. (2016). *Review of volatile substance use among Aboriginal and Torres Strait Islander people* (Australian Indigenous HealthReviews no. 15). Perth: Australian Indigenous HealthInfoNet.
309. d'Abbs, P., Gillick, V., Hodson, S., Kavanagh, M., Payne, S., & Ray, T. (2019). *Longitudinal research into petrol sniffing and other substance abuse trends in Indigenous communities: final report*. Brisbane: The University of Queensland.
310. Crossin, R., Cairney, S., Lawrence, A. J., & Duncan, J. R. (2017). Adolescent inhalant abuse leads to other drug use and impaired growth; implications for diagnosis. *Australian and New Zealand Journal of Public Health*, 41(1), 99-104.
311. Wilkes, E., Gray, D., Casey, W., Stearne, A., & Dadd, L. (2014). Harmful substance use and mental health. In P. Dudgeon, H. Milroy & R. Walker (Eds.), *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice* (2nd edition ed., pp. 125-146 (chapter 128)). Canberra: Department of the Prime Minister and Cabinet.
312. Cairney, S., O'Connor, N., Dingwall, K. M., Maruff, P., Shafiq-Antonacci, R., Currie, J., & Currie, B. J. (2013). A prospective study of neurocognitive changes 15 years after chronic inhalant abuse. *Addiction*, 108(6), 1107-1114.
313. Cairney, S., Maruff, P., Burns, C. B., Currie, J., & Currie, B. J. (2005). Neurological and cognitive recovery following abstinence from petrol sniffing. *Neuropsychopharmacology*, 30(5), 1019-1027.
314. Australian Institute of Health and Welfare. (2018). *Aboriginal and Torres Strait Islander Health Performance Framework (HPF) report 2017*. Retrieved 5 December 2018 from <https://webarchive.nla.gov.au/awa/20190508233549/https://www.aihw.gov.au/reports/indigenous-health-welfare/health-performance-framework/contents/overview>
315. d'Abbs, P., & Shaw, G. (2016). *Monitoring trends in the prevalence of petrol sniffing in selected Australian Aboriginal communities 2011-2014: final report*. Darwin: Menzies School of Health Research.
316. Parliament of Victoria Drugs and Crime Prevention Committee. (2002). *Inquiry into the inhalation of volatile substances: final report*. Melbourne: Parliament of Victoria.
317. Shaw, G., Biven, A., Gray, D., Mosey, A., Stearne, A., & Perry, J. (2004). *An evaluation of the Comgas scheme: they sniffed it and they sniffed it but it just wasn't there*. Canberra: Department of Health and Ageing.
318. South Australian Centre for Economic Studies. (2010). *Cost benefit analysis of legislation to mandate the supply of opal fuel in regions of Australia: final report*. Adelaide: Australian Government Department of Health and Ageing.
319. Australian Government Department of Health. (2019). *National immunisation strategy for Australia 2019 to 2024*. Canberra: Australian Government Department of Health.
320. Australian Government Department of Health. (2019). *National Immunisation Program Schedule*. Canberra: Australian Government Department of Health.
321. Australian Government Department of Health. (2020). *Budget 2020-21: Health Portfolio budget statements* (Budget Related Paper no. 1.7). Canberra: Australian Government Department of Health.
322. Australian Government Department of Health. (2020). *Immunisation coverage rates for Aboriginal and Torres Strait Islander children*. from <https://www.health.gov.au/health-topics/immunisation/childhood-immunisation-coverage/immunisation-coverage-rates-for-aboriginal-and-torres-strait-islander-children>
323. Australian Institute of Health and Welfare. (2017). *Healthy Communities: immunisation rates for children in 2015-16*. Canberra: Australian Institute of Health and Welfare.

324. Australian Government Department of Health. (2020). *Australian Immunisation Register Primary Health Network coverage by age group - Aboriginal and Torres Strait Islander children and all children*. Canberra: Australian Government Department of Health.
325. Australian Government Department of Health. (2019). *Current coverage data tables for Aboriginal and Torres Strait Islander children*. Retrieved 1 December 2019 from <https://www.health.gov.au/health-topics/immunisation/childhood-immunisation-coverage/current-coverage-data-tables-for-aboriginal-and-torres-strait-islander-children>
326. Evans, R., Liu, J., Miller, D., Harvey, M., Howle, T., & Seebus, I. (2018). *National Key Performance Indicators for Aboriginal and Torres Strait Islander primary health care: results for 2017*. Canberra: Australian Institute of Health and Welfare.
327. Australian Institute of Health and Welfare. (2019). *National key performance indicators for Aboriginal and Torres Strait Islander primary health care: results to June 2018*. Retrieved 8 July 2019 from <https://www.aihw.gov.au/reports/indigenous-australians/nkpi-indigenous-australians-health-care-2018/contents/indigenous-primary-health-care-organisations>
328. National Centre for Immunisation Research and Surveillance. (2019). *Evaluation of the National Shingles Vaccination Program: process and early impact evaluation: final report*. Sydney: National Centre for Immunisation Research and Surveillance.
329. Australian Government Department of Health. (2019). *Report card for the implementation plan for the National Aboriginal and Torres Strait Islander Health Plan 2013-2023*. Canberra: Australian Government Department of Health.
330. Clifford, H. D., Pearson, G., Franklin, P., Walker, R., & Zosky, G. R. (2015). Environmental health challenges in remote Aboriginal Australian communities: clean air, clean water and safe housing. *Australian Indigenous Health Bulletin*, 15(2), 1-14.
331. Lansbury Hall, N., Memmott, P., Barnes, S., Redmond, A., Go-Sam, C., Nash, D., . . . Simpson, P. (2020). *Pilyii papulu purrukaj-ji (good housing to prevent sickness): a study of housing, crowding and hygiene-related infectious diseases in the Barkly Region, Northern Territory*. Brisbane: University of Queensland Global Change Institute.
332. Queensland Health. (2019). *Aboriginal and Torres Strait Islander environmental health plan 2019-2022*. Brisbane: Queensland Health.
333. enHealth. (2010). *Environmental health practitioner manual: a resource manual for environmental health practitioners working with Aboriginal and Torres Strait Islander communities*. Canberra: Australian Government Department of Health.
334. Australian Bureau of Statistics. (2018). *Census of population and housing: characteristics of Aboriginal and Torres Strait Islander Australians, 2016*.
335. Australian Institute of Health and Welfare. (2020). *Housing assistance in Australia 2020*. from <https://www.aihw.gov.au/reports/housing-assistance/housing-assistance-in-australia-2020/contents/summary>
336. Memmott, P., Greenop, K., & Birdsall-Jones, C. (2014). *How is crowding in Indigenous households managed?* (Research and Policy Bulletin no. 180). Melbourne: Australian Housing and Urban Research Institute.
337. Ware, V.-A. (2013). *Housing strategies that improve Indigenous health outcomes* (Resource sheet no 25). Canberra: Closing the Gap Clearinghouse.
338. Standen, J. C., Morgan, G. G., Sowerbutts, T., Blazek, K., Gugusheff, J., Puntsag, O., . . . Torzillo, P. (2020). Prioritising housing maintenance to improve health in Indigenous communities in NSW over 20 years. *International Journal of Environmental Research and Public Health*, 17(16). Retrieved from: <https://doi.org/10.3390/ijerph17165946>
339. Australian Institute of Health and Welfare. (2017). *National Social Housing Survey: detailed results 2016*. Canberra: Australian Institute of Health and Welfare.
340. Australian Institute of Health and Welfare. (2019). *Aboriginal and Torres Strait Islander people: a focus report on housing and homelessness*. Canberra: Australian Institute of Health and Welfare.
341. Infrastructure Australia. (2019). *Infrastructure priority list: Australian Infrastructure Plan project and initiative summaries*. Sydney: Infrastructure Australia.
342. Commonwealth of Australia. (2020). *Budget 2020-21: Federal financial relations budget paper no. 3 2020-21*. Canberra: Commonwealth of Australia.
343. Finlay, S., & Wenitong, M. (2020). Aboriginal Community Controlled Health Organisations are taking a leading role in COVID-19 health communication. *Australian and New Zealand Journal of Public Health*, 44(4), 251-252.
344. Fitts, M. S., Russell, D., Mathew, S., Liddle, Z., Mulholland, E., Comerford, C., & Wakerman, J. (2020). Remote health service vulnerabilities and responses to the COVID 19 pandemic. *Australian Journal of Rural Health*, 28(6), 613-617.

345. Dudgeon, P., Derry, K. L., & Wright, M. (2020). *A national COVID-19 pandemic issues paper on mental health and wellbeing for Aboriginal and Torres Strait Islander peoples*. Perth: The University of Western Australia Poche Centre for Indigenous Health.
346. Australian Institute of Health and Welfare. (2019). *Improving Indigenous identification in mortality estimates* (Cat. no. IHW 215). Canberra: Australian Institute of Health and Welfare.
347. Australian Bureau of Statistics. (2018). *Linking death registrations to the 2016 Census, 2016-17*. Canberra: Australian Bureau of Statistics.
348. Australian Institute of Health and Welfare. (2010). *National best practice guidelines for collecting Indigenous status in health data sets* (AIHW Catalogue no IHW 29). Canberra: Australian Institute of Health and Welfare.
349. Australian Institute of Health and Welfare. (2019). *National Bowel Cancer Screening Program screening data 2016–2018; quality statement*. Retrieved 2 December 2019 from <https://meteor.aihw.gov.au/content/index.phtml/itemId/724637>
350. National Aboriginal Community Controlled Health Organisation. (2020). *The Australian Government's response to the COVID-19 pandemic: submission*. Canberra: National Aboriginal Community Controlled Health Organisation.

