Australian Indigenous
Health*InfoNet*

Overview of Aboriginal and Torres Strait Islander health status in Western Australia

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The Australian Indigenous Health*InfoNet*

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

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

Recognition statement

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

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

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Preface

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

The initial sections of this *Overview* provide information about the context of Aboriginal and Torres Strait Islander health, population, and various measures of population health status. Most of the subsequent sections about specific health conditions comprise an introduction about the condition and evidence of the current burden of the condition among Aboriginal and Torres Strait Islander people. Information is provided for Western Australia when it is available; otherwise more general information is provided for selected jurisdictions and Australia. Information is also available 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 Health*InfoNet*'s website (https://healthinfonet.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 Health*InfoNet*'s website (https://healthinfonet.ecu.edu.au). Information specifically about Western Australia is available at https://healthinfonet.ecu.edu.au/learn/locations/wa.

For more information on accessing and using the Health*InfoNet* resource, please view our instructional videos accessible from the web resource and also located on You Tube at https://www.youtube.com/channel/UCftVbk_1fVQz2i_9TyQ1E2Q.

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

Neil Drew, Director, on behalf of the Health*InfoNet* team

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- members of the Health*InfoNet* Advisory Board and Health*InfoNet* Consultants.
- users of the Health*InfoNet* resource for their ongoing support and feedback.

Tell us what you think

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

Connections by Mick Adams

Dr Mick Adams (Uncle Mick to most) is an Aboriginal Elder who lives in Western Australia and works at the Health*InfoNet*. He is a descendent of the Yadhiagana/Wuthathi peoples of Cape York Peninsula in Queensland, having traditional family ties with the Gurindji people of Central Western Northern Territory with extended family relationship with the people of the Torres Straits, Warlpiri (Yuendumu), and East Arnhem Land (Gurrumaru) communities.

The artwork is about connecting tribal groups through songlines and story lines. Explanation: the bigger circles represent country, people are placed within the centre of the circles; the oblong multi-coloured shapes represent the songlines and storylines. The different colours: blue/grey green = water: brownish orange = land/country: dots in middle = people.

Introduction

This *Overview of Aboriginal and Torres Strait Islander health status in Western Australia (Overview)* provides a comprehensive summary of the most recent indicators of the health of Aboriginal and Torres Strait Islander people[1] in Western Australia. Information is detailed for Western Australia (WA) where available: otherwise more general information is provided for jurisdictions which also may include 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) or for Australia. The *Overview* draws largely on previously published information, some of which has been re-analysed to provide clearer comparisons between Aboriginal and Torres Strait Islander people and non-Indigenous people (for more details of statistics and methods, readers should refer to the original sources). We continue our strong commitment to developing strengths based approaches to assessing and reporting the health of Aboriginal and Torres Strait Islander people and communities.

Sources of information

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

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

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

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

Key facts for WA

Population

- In 2018, the estimated Western Australian Aboriginal and Torres Strait Islander population was 101,753 (50,983 males and 50,770 females).
- WA's Aboriginal and Torres Strait Islander population accounts for 3.9% of the total WA population and 13% of the total Australian Aboriginal and Torres Strait Islander population.
- In 2016, 40% of Aboriginal and Torres Strait Islander people lived in major cities, 21% lived in inner and outer regional areas, 13% in remote areas, and 25% in very remote areas.
- The Aboriginal and Torres Strait Islander population is much younger than the non-Indigenous population.

Births and pregnancy outcomes

- In 2017, there were 2,783 births registered in WA with one or both parents identified as Aboriginal and/or Torres Strait Islander (14% of all births registered in Australia).
- In 2017, Aboriginal and Torres Strait Islander mothers were generally younger than non-Indigenous mothers; the median age was 26 years for Aboriginal and Torres Strait Islander mothers.

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

- In 2017, total fertility rates were 2,527 births per 1,000 for Aboriginal and Torres Strait Islander women and 1,825 per 1,000 for all women.
- In 2016, the average birthweight of babies born to Aboriginal and Torres Strait Islander mothers was 3,142 grams compared with 3,326 grams for babies born to non-Indigenous mothers.
- In 2016, around 14% of babies born to Aboriginal and Torres Strait Islander mothers were of low birthweight (LBW), compared with 6.5% of babies of non-Indigenous mothers.

Mortality

- In 2015-2017, after age-adjustment, the death rate for Aboriginal and Torres Strait Islander people in WA was 12 per 1,000; this was 2.1 times the rate for non-Indigenous people.
- Between 1998 and 2015, there was a 30% reduction in the death rates for Aboriginal and Torres Strait Islander people.
- For Aboriginal and Torres Strait Islander people born 2015-2017 in WA, life expectancy was estimated to be 66.9 years for males and 71.8 years for females, around 13.4 - 12.0 years less than the estimates for non-Indigenous males (80.3 years) and females (83.8 years).
- For 2015-2017, age-specific death rates were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people across all age-groups, and were much higher in the middle-adult years.
- The Aboriginal and Torres Strait Islander infant mortality rate decreased from 17 per 1,000 in 1998-2000 to 5.7 per 1,000 in 2013-2015.
- In 2017, the leading causes of death among Aboriginal and Torres Strait Islander people were coronary heart disease, diabetes, intentional self-harm and lung and related cancers.
- For 2011-2015, after age-adjustment, the rate of avoidable deaths for Aboriginal and Torres Strait Islander people was 4.9 times higher than the rate for non-Indigenous people.

Hospitalisation

- In 2016-17, 9.6% of all hospital separations in WA were for Aboriginal and Torres Strait Islander people.
- In 2016-17, the age-adjusted separation rate for Aboriginal and Torres Strait Islander people was 4.5 times higher than for non-Indigenous people.
- In 2013-15, the main cause of hospitalisation for Aboriginal and Torres Strait Islander people was for ‘care involving dialysis’, with an age-adjusted rate 20 times higher than that for non-Indigenous people.

Burden of disease

- In 2011, Aboriginal and Torres Strait Islander people living in WA compared with those living in NSW, Qld and the NT, experienced the second highest rate of total burden of disease (BOD) (498 per 1,000), highest non-fatal BOD (193 per 1,000) and second highest rate of fatal BOD (305 per 1,000).
- In 2011, injury (20%) was the highest contributor to BOD, followed by mental/substance use (17%) and CVD (14%).
- In 2011, injury accounted for 28% of fatal BOD, CVD 21% and cancer 16%.
- In 2011, mental/substance use accounted for 38% of non-fatal BOD, diseases of the musculoskeletal system 11% and respiratory diseases 10%.
- In 2011, Aboriginal and Torres Strait Islander people experienced total BOD at 2.8 times the rate of non-Indigenous people, for fatal BOD, 3.6 times higher and non-fatal BOD 2.0 times higher.
- The total BOD for kidney/urinary diseases was 9.4 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people, diseases of the endocrine 8.7 times higher and infectious disease 6.4 times higher.

Selected health conditions

Cardiovascular health

- In 2012-2013, 12% of Aboriginal and Torres Strait Islander people reported having a long-term heart or related condition; after age-adjustment, these conditions were reported as being 1.3 times more common for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- There were 308 cases of ARF reported for Aboriginal and Torres Strait Islander people in 2011-2015.
- In 2013-15, after age-adjustment, Aboriginal and Torres Strait Islander people were hospitalised for CVD at 2.2 times the rate of non-Indigenous people.

- In 2013-15, of specific types of CVD, CHD accounted for the biggest proportion of Aboriginal and Torres Strait Islander CVD hospitalisations (40%), followed by pulmonary ‘and other forms of heart disease’ (34%) and cerebrovascular disease (8.2%) and ARF/RHD (4.4%).
- In 2017, ischaemic heart disease or CHD was the leading cause of death of Aboriginal and Torres Strait Islander people, the age-adjusted death rate due to ischaemic heart disease for Aboriginal and Torres Strait Islander people was 2.6 times the rate for non-Indigenous people.

Cancer

- For 2009-2013, age-adjusted cancer incidence rates were similar for both Aboriginal and Torres Strait Islander people and non-Indigenous people.
- For 2009-2013, the most common cancer diagnosed among Aboriginal and Torres Strait Islander people was breast cancer (females).
- In 2013-15, age-adjusted hospitalisation rates for cancer were lower for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- For 2011-2015, the age-adjusted death rate for cancer for Aboriginal and Torres Strait Islander people was 1.4 times higher than for non-Indigenous people.

Diabetes

- In 2012-2013, after age-adjustment, Aboriginal and Torres Strait Islander people were 4.8 times more likely to report having some form of diabetes than non-Indigenous people.
- In 2015-16, Aboriginal and Torres Strait Islander people were more likely to have diabetes recorded as the principal cause of hospital admission compared with non-Indigenous people.
- Diabetes was the second leading cause of death for Aboriginal and Torres Strait Islander people in 2017.

Social and emotional wellbeing

- In 2012-2013, after age-adjustment, Aboriginal and Torres Strait Islander people were 2.6 times as likely as non-Indigenous people to feel high or very high levels of psychological distress.
- In 2012-2013, 72% of Aboriginal and Torres Strait Islander people experienced one or more significant stressors in the previous 12 months.
- In 2014-2015, Aboriginal and Torres Strait Islander people reported that for all/some/most of the time: 90% felt happy; 82% felt calm and peaceful, 83% felt full of life and 79% had lots of energy.
- In 2014-2015, 92% of Aboriginal and Torres Strait Islander people aged 15 years and over, reported being able to obtain help from someone else, not in their household, during a time of crisis.
- In 2016-17, there were 1,203 hospital separations with a principal diagnosis of mental health care identified as Aboriginal and/or Torres Strait Islander.
- In 2017, the death rate for ICD 'intentional self-harm’ for Aboriginal and Torres Strait Islander people was 1.8 times the rate reported for non-Indigenous people.

Kidney health

- For 2011-2015, after age-adjustment, the notification rate of end-stage renal disease was 12.7 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2016-17, ‘care involving dialysis’ was the most common reason for hospitalisation among Aboriginal and Torres Strait Islander people.
- For 2012-2016, the age-adjusted death rate from kidney disease was 3.1 times higher for Aboriginal and Torres Strait Islander than non-Indigenous people.

Injury, including family violence

- In 2012-2013, 18% of Aboriginal and Torres Strait Islander people reported an injury in the last four weeks.
- In 2013-15, after age-adjustment, Aboriginal and Torres Strait Islander people were hospitalised for injury and poisoning at 2.5 times the rate of non-Indigenous people.

- In 2013-15, 30% of injury-related hospitalisations among Aboriginal and Torres Strait Islander people were for assaults and 17% for falls.
- For 2011-2015, after age-adjustment, Aboriginal and Torres Strait Islander people in WA died from injury at 2.7 times the rate of non-Indigenous people.

Respiratory health

- In 2012-2013, 28% of Aboriginal and Torres Strait Islander people reported having a long-term respiratory condition.
- In 2012-2013, 15% of Aboriginal and Torres Strait Islander people reported having asthma.
- In 2014-15, age-adjusted hospitalisation rates for Aboriginal and Torres Strait Islander people were 3.8 times higher than for non-Indigenous people.
- In 2017, chronic lower respiratory disease was the fourth highest cause of death overall for Aboriginal and Torres Strait Islander people.

Eye health

- In 2015-2016, after age-adjustment, vision impairment among Indigenous adults was 2.7 times higher than in non-Indigenous adults.
- In 2014-2015, 15% of Aboriginal and Torres Strait Islander children, aged 15 years and over reported having eye or sight problems.
- In 2012-2013, eye and sight problems were reported by 30% of Aboriginal people and 34% of Torres Strait Islander people.
- In 2017, 91 cases of trachoma were detected among Aboriginal and Torres Strait Islander children aged 5-9 years living in at-risk communities in WA (47), SA (15) and the NT (29).
- For 2014-16 and 2013-15, Aboriginal and Torres Strait Islander people were hospitalised for disease of the eyes at a lower rate than non-Indigenous people.

Ear health and hearing

- In 2014-2015, ear and hearing problems were reported for 10% of Aboriginal and Torres Strait Islander children aged 0-14 years.
- In 2012-2013, ear and hearing problems were reported by 13% of Aboriginal and Torres Strait Islander people.
- In 2013-15, the hospitalisation rate for middle ear and mastoid conditions for Aboriginal and Torres Strait Islander children, aged 0-14 years, was 1.9 times higher than the rate for non-Indigenous children. Rates for Aboriginal and Torres Strait Islander people aged 15 years and over were 1.2 times higher than for non-Indigenous people.

Oral health

- In 2014, the average number of decayed, missing or filled baby teeth for Aboriginal and Torres Strait Islander children aged 5-10 years was 1.9 times the average number for non-Indigenous children.
- In 2014, the average number of decayed, missing or filled adult teeth for Aboriginal and Torres Strait Islander children aged 6-15 years was twice the average number for non-Indigenous children.
- In 2014-2015 in WA, the proportion of 0-14 year-old children with reported tooth or gum problems was 26%, compared with 28% nationally.
- In 2012-2013 in WA, the proportion of people aged 15 years and over with complete tooth loss was 2.9%, which was lower than the national level (4.7%).
- In 2015-16, after age-adjustment, hospitalisation rates for acute dental conditions in WA were 1.2 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people; nationally it was 1.4 times higher.

Disability

- In 2016, 4.9% of Aboriginal and Torres Strait Islander people with a profound or severe disability reported a need for assistance.
- In the 2014-2015, 43% of Aboriginal and Torres Strait Islander people aged 15 years and over reported having a disability or restrictive long-term health condition. After age-adjustment this was 1.6 times that of non-Indigenous people.
- In 2016-17, 6.7% of disability service users were Aboriginal and Torres Strait Islander people, with most aged under 50 years (90%).

Communicable diseases

- In 2017, Aboriginal and Torres Strait Islander people had higher crude notification rates for chlamydia, gonorrhoea and syphilis than non-Indigenous people.

- For 2013-2017, there were 17 cases of newly diagnosed human immunodeficiency virus (HIV) infection among Aboriginal and Torres Strait Islander people.
- In 2017, there were 294 Aboriginal and Torres Strait Islander people diagnosed with hepatitis C (HCV). The age-adjusted notification rate for HCV was 8.5 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- In 2017, there were 33 Aboriginal and Torres Strait Islander people diagnosed with hepatitis B (HBV). The age-adjusted notification rate for HBV was 2.5 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.
- For 2018, there were 50 Aboriginal and Torres Strait Islander people diagnosed with invasive pneumococcal disease (IPD).
- For 2010-2014, there were 9 notifications of TB identified as Indigenous. The age-adjusted notification rate for tuberculosis was 4.0 times higher for Aboriginal and Torres Strait Islander people than for Australian-born non-Indigenous people living in WA.
- In 2014-15, the age-specific hospitalisation rates of 'diseases of the skin and subcutaneous tissue' among Aboriginal and Torres Strait Islander children aged four years and under was 6.0 times higher than for non-Indigenous children.

Factors contributing to Aboriginal and Torres Strait Islander health

Environmental health

- In 2016, 20% of Aboriginal and Torres Islander people were reported to be living in overcrowded households.
- In 2014-2015, 79% of Aboriginal and Torres Strait Islander households reported living in houses of an acceptable standard.
- In 2014-2015, 25% of Aboriginal and Torres Strait Islander households reported structural issues within their dwelling.
- In 2014-2015, Aboriginal and Torres Strait Islander households reported that they had access to working facilities for: washing people (96%), clothes and bedding (89%); preparing food (92%); and sewerage facilities (96%).
- In 2014-15, after age-adjustment, Aboriginal and Torres Strait Islander people nationally were hospitalised for diseases related to environmental health at 2.3 times the rate of non-Indigenous people.
- For 2010-2014, Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT died as a result of diseases associated with poor environmental health at 1.7 times the rate of non-Indigenous people.

Nutrition and breastfeeding

- In 2012-2013, 61% of Aboriginal and Torres Strait Islander people did not meet the recommended daily servings of fruit.
- In 2012-2013, 95% of Aboriginal and Torres Strait Islander people did not meet the recommended daily servings of vegetables.
- In 2014, an assessment of sugar sweetened carbonated beverages (SSCBs) in two remote communities in WA found that the average daily SSCB consumption per person was 335 mls.
- In WA, food costs substantially more in very remote areas compared with the Perth area; in 2010 the mean cost of a healthy food basket was 24% higher in very remote areas than in Perth.
- In 2014-15, 76% of Aboriginal and Torres Strait Islander children aged 0-3 years were reported to have been, or were currently breastfed.

Physical activity

- In 2012-2013, 43% of Aboriginal and Torres Strait Islander adults reported they had undertaken a sufficient level of physical activity in the past week.
- In 2014-2015, 79% of Aboriginal and Torres Strait Islander children aged 4-14 were reported to have undertaken at least 60 minutes of physical activity each day.
- In 2012-2013, 12% of Aboriginal and Torres Strait Islander patients talked to health professionals about a range of lifestyle issues including increasing their physical activity.

Bodyweight

- In 2012-2013, 67% of Western Australian Aboriginal and Torres Strait Islander adults were classified as overweight (28%) or obese (39%).
- Nationally, in 2012-2013, around 30% of Aboriginal and Torres Strait Islander children aged 2-14 years were overweight or obese; after age-adjustment, the level of obesity/overweight was 1.2 times higher for Aboriginal and Torres Strait Islander children than for non-Indigenous children.

Immunisation

- In December 2018, 95% of Aboriginal and Torres Strait Islander 5 year old children were fully immunised against the recommended vaccine-preventable diseases, compared with 93% for all 5 year old children.

Tobacco use

- In 2014-2015, 45% of Aboriginal and Torres Strait Islander people aged 18 years and over reported they were current smokers; after age-adjustment, this proportion was 3.1 times higher than the proportion among non-Indigenous people.
- In 2014, 49% of Aboriginal and Torres Strait Islander mothers reported smoking during pregnancy, 4.6 times higher than non-Indigenous mothers.

Alcohol use

- In 2014-2015, 40% of Aboriginal and Torres Strait Islander adults reported abstaining from alcohol.
- In 2014-2015, 33% of Aboriginal and Torres Strait Islander people 15 years and over who drank alcohol, reported drinking at levels exceeding the 2009 guidelines for single occasion risk.
- In 2014-2015, 17% of Aboriginal and Torres Strait Islander people 15 years and over who drank alcohol, reported drinking at levels exceeding the 2009 guidelines for lifetime risk.
- In 2014-2015, 81% of mothers of Indigenous children aged 0-3 years reported they did not drink alcohol during pregnancy.
- For 2013-15, the age-standardised rate of hospitalisations with a principal diagnosis related to alcohol use for Aboriginal and Torres Strait Islander people was 8.9 times that of non-Indigenous people.

Illicit drug use

- In 2014-2015, 32% of Aboriginal and Torres Strait Islander people aged 15 years and over reported that they had used an illicit substance in the previous 12 months.
- In 2014-15, the hospitalisation rate for Aboriginal and Torres Islander people from poisoning due to drug use was 3.5 times the rate for non-Indigenous people.
- In 2010-2014, the rate of drug-induced deaths was 1.3 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Volatile substance use

- A study of petrol sniffing in 41 Aboriginal and Torres Strait Islander communities in Far North Qld, WA, SA and the NT found that the number of people sniffing petrol in WA decreased by 76%, from 72 in 2011-12 to 17 in 2013-14.
- Nationally, in 2014-15, hospitalisation rates for poisoning and accidental poisoning from the toxic effects of organic solvents (e.g. petrol) were between 3.9 and 5.1 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Social and cultural concepts

Aboriginal people have lived in Australia for at least 45,000 years [1] and possibly up to 120,000 years [2]. They have lived through droughts and floods for thousands of years, demonstrating the resilience of their culture [3]. Torres Strait Islander people have occupied 270 or so islands in the Torres Straits and now live across mainland Australia and the Torres Straits [2].

There are distinctive ethnic and cultural differences within Aboriginal and Torres Strait Islander societies, each having their own language and traditions [4]. However, both Aboriginal people and Torres Strait Islander people enjoyed a semi-nomadic lifestyle in family and community groups, moving across a defined area following seasonal changes [2].

In WA, the Nyoongar people are believed to have arrived around 50,000 years ago and were the first Aboriginal inhabitants of the south-west corner of WA, where many lived a traditional lifestyle until the 1900s [5].

Aboriginal and Torres Strait Islander people experience persistent challenges to their health and wellbeing [6]. Past policy decisions have impacted negatively on their quality of life and their health [7]. Racism, discrimination, the forced removal of children, and loss of identity, language, culture and land, are some of the negative impacts that Aboriginal and Torres Strait Islander people continue to face [8].

However, there have been a number of positive changes in Aboriginal and Torres Strait Islander self-governance. Aboriginal and Torres Strait Islander members of the House of Representatives, senators and other senior political leaders work daily to improve the health and wellbeing outcomes of their people [9]. These developments come after years of leadership from Aboriginal Community Controlled Health

Organisations (ACCHOs). As Megan Davis, Professor of Law, University of NSW, said of ACCHOs, ‘It is apparent when we look to the Aboriginal community controlled 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’ [10].

In June 2016, 25 years after former Prime Minister, Paul Keating, delivered the Redfern Statement, the National Congress of Australia’s First Peoples gathered to deliver a new statement, noting some key observations:

- First People continue to experience disadvantage, which is unacceptable
- challenges to the health of Aboriginal and Torres Strait Islander people continue to be marginalised in national debate
- Federal Government policies are often made for Aboriginal and Torres Strait Islander people and delivered to them, rather than being made with them, and delivered by them [11].

There has been a marked and burgeoning 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 strengths based approaches that more accurately reflect the aspirations and resilience of the First Peoples of Australia [8, 12].

Social indicators

Key Western Australian 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 [13] indicated that for WA 41% of Aboriginal and Torres Strait Islander people aged 20 to 24 years and 25% aged 25 to 64 years reported completing year 12.

In 2016, 32% of Aboriginal and Torres Strait Islander people aged 15 years and over from WA had completed vocational or tertiary studies (a non-school qualification) [13]. Nationally, the highest proportions of Aboriginal and Torres Strait Islander people with vocational or tertiary qualifications were in the ACT (52%), Vic (45%), NSW (40%) and Tas (40%). The NT had the lowest proportion (22%).

The number of Aboriginal and Torres Strait Islander people studying at university in WA in 2016 was 1,239 [13]. Nationally, a total of 15,395 Aboriginal and Torres Strait Islander students were attending university in 2016.

An ABS school report [14] showed that in 2018 for WA:

- there were 27,368 school students who identified as Aboriginal and/or Torres Strait Islander, an increase of 2.6 % from 2017
- the retention rate for Aboriginal and Torres Strait Islander students who started secondary school in year 7/8 and continued through to year 12, rose from 51% in 2017 to 55% in 2018, a 3.2% rise
- the retention rate for Aboriginal and Torres Strait Islander students from year 10 to year 12, rose 6.2%, from 58% in 2017 to 64% in 2018.

A national report on schooling in Australia [15] showed that in 2018 for WA:

- 74% of year 3 Aboriginal and Torres Strait Islander students and 69% of year 5 Aboriginal and Torres Strait Islander students were at or above the national minimum standard for reading, compared with 97% of year 3 non-Indigenous students and 96% of year 5 non-Indigenous students
- 68% of year 3 Aboriginal and Torres Strait Islander students and 54% of year 5 Aboriginal and Torres Strait Islander students were at or above the national minimum standard for writing, compared with 95% of year 3 non-Indigenous students and 92% of year 5 non-Indigenous students
- 69% of year 3 Aboriginal and Torres Strait Islander students and 75% of year 5 Aboriginal and Torres Strait Islander students were at or above the national minimum standard for spelling, compared with 95% of year 3 non-Indigenous students and 96% of year 5 non-Indigenous students
- 71% of year 3 Aboriginal and Torres Strait Islander students and 67% of year 5 Aboriginal and Torres Strait Islander students were at or above the national minimum standard for grammar and punctuation, compared with 96% of year 3 non-Indigenous students and 96% of year 5 non-Indigenous students
- 78% of year 3 Aboriginal and Torres Strait Islander students and 75% of year 5 Aboriginal and Torres Strait Islander students were at or above the national minimum standard for numeracy, compared with 97% of year 3 non-Indigenous students and 97% of year 5 non-Indigenous students.

Employment

According to the 2016 Australian Census, for WA:

- 47% of Aboriginal and Torres Strait Islander people aged 15 years and over were participating in the labour force (employed or unemployed looking for work) [16]
- 48% of Aboriginal and Torres Strait Islander people aged 15 years and over were not in the labour force [16]
- 62% of Aboriginal and Torres Strait Islander people aged 15 to 24 years were either fully or partly engaged in employment, education and training [13].

Income

In the 2016 Census [16], for WA:

- approximately 30% of Aboriginal and Torres Strait Islander people reported an equivalised[2] weekly income of $1,000 or more compared to approximately 25% in 2011
- 20% of Aboriginal and Torres Strait Islander people 15 years and over reported a total personal weekly income of $1,000 or more.

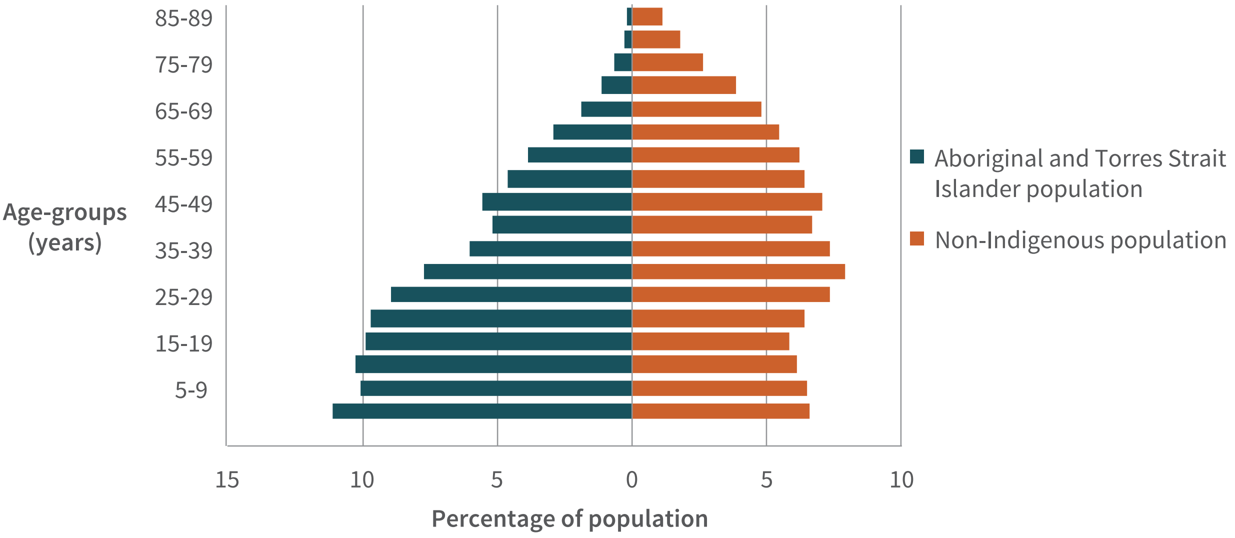
Aboriginal and Torres Strait Islander population

The ABS has estimated[3] that there were 101,753 Aboriginal and Torres Strait Islander people living in WA in 2018 [18]. Of the Aboriginal and Torres Strait Islander people living in the state, 50% were male (50,983 males) and 50% were female (50,770 females). WA's Aboriginal and Torres Strait Islander population accounts for 3.9% of the total WA population and 13% of the total Australian Aboriginal and Torres Strait Islander population (estimated to be 778,064 in 2018) [Derived from [18, 19]].

According to estimates from the 2016 Census, 96% of Indigenous people in WA were identified as Aboriginal, 1.9% as Torres Strait Islanders and 2.1% as of both Aboriginal and Torres Strait Islander descent [20].

The Aboriginal and Torres Strait Islander population in WA is much younger overall than the non-Indigenous population (Figure 1) (Derived from [18, 19]). According to ABS estimates, about one third (32%) of Aboriginal and Torres Strait Islander people were aged less than 15 years, compared with 19% of non-Indigenous people. About 4.1% of Aboriginal and Torres Strait Islander people were aged 65-89 years, compared with 14% of non-Indigenous people.

Figure 1. Population pyramid of Indigenous and non-Indigenous populations in WA, 2018



Note: Excludes 90 years and older age-group.

Sources: Derived from ABS, 2018 [19], ABS, 2014 [18]

Population counts from the 2016 Census reveal that 40% of Aboriginal and Torres Strait Islander people in WA lived in a major city, 21% lived in inner and outer regional areas, 13% in remote areas, and 25% in very remote areas [21]. In comparison, the non-Indigenous population is concentrated in major cities (79% of non-Indigenous Western Australians), with 16% living in inner and outer regional areas, 2.9% in remote areas and 1.7% in very remote areas combined.

[2] Equivalised household income adjusts the actual incomes of households to make households of different sizes and compositions comparable [13].

[3] Population estimates are released regularly by the ABS and provide a more accurate measure of the actual size of a population [17]. 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).

Births and pregnancy outcomes

There have been some improvements in birth and pregnancy outcomes for Aboriginal and Torres Strait Islander mothers and babies in WA in recent years with a decrease in the proportion of low birthweight (LBW) babies [22]. However, significant gaps remain between outcomes for Indigenous and non-Indigenous mothers and babies.

In 2017, there were 2,783 births registered in WA with one or both parents identified as Aboriginal and/or Torres Strait Islander (14% of all Aboriginal and Torres Strait Islander births registered in Australia) [23]. (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: 42% recorded both parents as Aboriginal and/or Torres Strait Islander; 35% 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 23% of registrations only the father was recorded as Aboriginal and/or Torres Strait Islander (including births where the mother's Indigenous status was unknown) [23].

About births and fertility

In Australia, all births are required by law to be registered with the Registrar of Births, Deaths and Marriages in the jurisdiction in which the birth occurred. The registration information is limited from a health perspective so health authorities have established parallel maternal/perinatal collections. These collections are based on data recorded by staff attending births and include information about the nature, duration, and complications of the pregnancy, labour, and postnatal periods, and details about the baby (including weight, length, condition at birth, and complications). Information is collated and reported nationally by the ABS (for registration information) and the AIHW’s National Perinatal Statistics Unit (for maternal/perinatal information).

The actual numbers of births are of limited use for public health purposes. To be useful, the actual numbers of births must be related to the population in which they occur. There are a number of general measures of births and fertility, but detailed analysis involves the use of age-specific rates.[4] These rates are the annual number of live births per 1,000 women in five-year age-groups from 15 to 49 years. (The relatively small numbers of births to women aged less than 15 years are included in the 15-19 years age-group, similarly births to women aged over 49 are included in the 45 to 49 years age-group.) The summary measure of fertility is the total fertility rate, which is the sum of age-specific fertility rates multiplied by five (since five-year age-groups are involved). It estimates the number of children that would be born to 1,000 women if each woman experienced current age-specific fertility rates at each age of her reproductive life.

Age of mothers

In 2017, 16% of Aboriginal and Torres Strait Islander births in WA were to teenager mothers (15-19 years), compared with 2.8% born to all teenage mothers [23]. The median age of Aboriginal and Torres Strait Islander mothers in WA was 26 years. The highest age-specific fertility rate among Aboriginal and Torres Strait Islander mothers in WA was among the 20-24 years and 25-29 years age-groups (140 babies per 1,000 women). In comparison, the highest age-specific fertility rate for all mothers in WA was in the 30-34 years age-group (120 babies per 1,000). The age-specific fertility rate of teenage Aboriginal and Torres Strait Islander mothers (76 babies per 1,000 women) was six times that of all teenage mothers (13 babies per 1,000).

Total fertility rates

In 2017, total fertility rates (TFR) in WA were 2,527 births per 1,000 Aboriginal and Torres Strait Islander women and 1,825 per 1,000 for all women (Table 1) [23]. The highest TFR for Aboriginal and Torres Strait Islander women was in Qld (2,669 babies per 1,000 women), followed by WA (2,527 per 1,000) and Vic (2,328 per 1,000).

Table 1. Total fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2017

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

Notes: 1. Total fertility rate is the number of children born to 1,000 women at the current level and age pattern of fertility.

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

Source: ABS, 2018 [23]

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[4] The study of birth information is known as fertility analysis, where ‘fertility’ refers to the number of babies born alive. This meaning is different to the lay use of the word, which means the capacity to bear children.

Antenatal care

Antenatal care from health professionals helps pregnant women by monitoring their health, screening and providing information and support [24]. It can help with the early identification of potentially preventable risk factors that adversely affect maternal and child health outcomes, especially when care is provided during the first trimester of pregnancy [25, 26].

In 2014, 98% of Aboriginal and Torres Strait Islander women in WA accessed antenatal care at least once during their pregnancy and 78% attended five or more antenatal visits [22].[5] (The Department of Health recommends 10 visits for first-time pregnancy without complications and seven visits for subsequent uncomplicated pregnancies [24].)

Birthweight

In 2016, the average birthweight of babies (live births) born to Aboriginal and Torres Strait Islander mothers in WA was 3,142 grams, 184 grams less than the average for babies born to non-Indigenous mothers in WA (3,326 grams) [27]. Around 14% of babies born to Aboriginal and Torres Strait Islander mothers in WA were of LBW, compared with 6.5% of babies of non-Indigenous mothers in WA (Table 2). (LBW, defined as a birthweight of less than 2,500 grams, increases the risk of health problems and death in infancy [28].)

Table 2. *Proportion (%) of low birthweight babies, by sub-categories and Indigenous status, in Western Australia, 2016*

	Babies born to Aboriginal and Torres Strait Islander mothers	Babies born to non-Indigenous mothers
Low birthweight (1,500-2,499 grams)	11.7	5.5
Very low birthweight (less than 1,500 grams)	2.5	0.8

Note: Rounding may result in inconsistencies in calculated proportions.

Source: AIHW, 2018 [27]

Factors impacting on LBW include pre-term birth, socioeconomic disadvantage, the age of the mother and antenatal care [28]. A mother's nutritional status and use of tobacco during pregnancy also impact on the birthweight of her baby. Tobacco, in particular, has a major impact on birthweight. After age-adjustment, 49% of Aboriginal and Torres Strait Islander mothers and 11% of non-Indigenous mothers reported smoking during pregnancy in 2015 in WA [29].

Mortality

In 2017, 508 of the 14,494 deaths registered in WA were identified as being of an Aboriginal and Torres Strait Islander person, accounting for 3.5% of deaths in the State [30].

Adjusting for differences in the age-structures of populations

Comparison of Aboriginal and Torres Strait Islander and non-Indigenous mortality needs to take account of differences in the age structures of the populations using a process known as standardisation. The process is also referred to as age-adjustment.

Direct standardisation, the preferred method, applies detailed information about Aboriginal and Torres Strait Islander deaths, including sex and age, to a 'standard' population [31]. In Australia, currently the 2001 Australian estimated resident population (ERP) is generally used as the standard population. Direct standardisation enables accurate comparisons of Indigenous and non-Indigenous rates, and time-series analyses.

If detailed information is not available, it is still possible to use indirect standardisation to estimate standardised mortality ratios (SMRs) [31]. The SMR is the ratio of the numbers of deaths (or of other health measures) registered/observed to the number expected. SMRs allow for the comparison of numbers of registered Indigenous deaths with the numbers expected from the corresponding age-sex-specific death rates for the total population or, preferably, the non-Indigenous population.

Age-standardised death rates

In 2015-2017, after age-adjustment, the death rate for Aboriginal and Torres Strait Islander people in WA was 12 per 1,000; this was 2.1 times the rate for non-Indigenous people [30].

Between 1998 and 2015, there was a 30% reduction in the death rates for Aboriginal and Torres Strait Islander people in WA (from 18 to 12 per 1,000) and a 20% decrease for non-Indigenous people [22]. During this time period, there was a significant decrease in the gap in death rate between Aboriginal and Torres Strait Islander and non-Indigenous people in the state (from 11 to 6.2 per 1,000)

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[5] This excludes very pre-term births.

Expectation of life

In 2018, the ABS published revised estimates for expectation of life at birth for Aboriginal and Torres Strait Islander people [32]. (Life expectancy at birth is the number of years a person born in the reference year can expect to live if they experience the current age-specific death rates.) According to these estimates, Aboriginal and Torres Strait Islander males born in WA in 2015-2017 could expect to live to 66.9 years, 13.4 years less than the 80.3 years expected for non-Indigenous males (Table 3). The expectation of life at birth of 71.8 years for Aboriginal and Torres Strait Islander females was 12.0 years less than the expectation of 83.8 years for non-Indigenous females. Life expectancy estimates for Aboriginal and Torres Strait Islander people living in WA were lower than national estimates.

Table 3. Expectation of life at birth in years, by Indigenous status and sex, WA and Australia, 2015-2017

Jurisdiction	Aboriginal and Torres Strait Islander	Non-Indigenous	Difference
Males			
WA	66.9	80.3	13.4
Australia (headline)	71.6	80.2	8.6
Females			
WA	71.8	83.8	12.0
Australia (headline)	75.6	83.4	7.8

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

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

3. Differences are based on unrounded estimates.

Source: ABS, 2018 [32]

During the five-year period from 2010-2012 to 2015-2017 for WA, Aboriginal and Torres Strait Islander life expectancy estimates increased by 1.9 years for males and 1.7 years for females [32]. Nationally, there was an increase of 2.5 years for males and 1.9 years for females. (While Aboriginal and Torres Strait Islander life expectancy increased in all jurisdictions for which estimates were produced, increases were only statistically significant for males in Qld, and both males and females at the Australia comparison level.)

Life expectancy for Aboriginal and Torres Strait Islander people varied considerably by remoteness of residence [32]. Nationally, 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 4).

Table 4. 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. Final Aboriginal and Torres Strait Islander population estimates based on the 2016 Census.

2. Differences are based on unrounded estimates.

Source: ABS, 2018 [32]

Age at death

For 2015-2017 in WA, the median age at death[6] for Aboriginal and Torres Strait Islander males was 53.5 years, 24.9 years less than that for non-Indigenous males (78.4 years) [30]. The median age at death for WA Indigenous females was 58.2 years, 26.6 years less than that for WA non-Indigenous females (84.8 years). Among the states with reliable data, WA had the lowest median age at death for Aboriginal and Torres Strait Islander males and females.

In 2015-2017, age-specific death rates in WA were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people across all age-groups, with rate ratios highest in the middle adult years [30]. The greatest difference occurred among people aged 35-44 years with an Indigenous:non-Indigenous rate ratio of 5.9, followed by the 45-54 years age-group (rate ratio of 4.9).

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[6] The median age at death is the age below which 50% of people die. The measure partly reflects the age structures of the respective populations, so it a less precise measure than age-specific death rates.

Infant mortality

The infant mortality rate (IMR) is the number of deaths of children under one year of age in a calendar year per 1,000 live births in the same calendar year. In 2015-2017, the IMR of 6.3 infant deaths per 1,000 live births for Aboriginal and Torres Strait Islander infants in WA was 2.9 times the rate for non-Indigenous infants [30].

In WA, the Aboriginal and Torres Strait Islander IMR decreased from 17 per 1,000 in 1998-2000 to 5.7 per 1,000 in 2013-2015 [22]. During this time period, the gap between the Aboriginal and Torres Strait Islander and non-Indigenous IMR decreased from 13.4 to 3.7 per 1,000.

Causes of death

Coronary heart disease (CHD; also known as ischaemic heart disease) was the leading cause of death of Aboriginal and Torres Strait Islander people living in WA in 2017 [33]. For Aboriginal and Torres Strait Islander people, the mortality rate for CHD of 146 per 100,000 was 2.6 times the rate for non-Indigenous people (Table 5). The other leading specific causes of death of Aboriginal and Torres Strait Islander people were diabetes (rate: 130 per 100,000, rate ratio: 9.5), intentional self-harm (rate: 27 per 100,000, rate ratio: 1.8) and lung and related cancers (rate: 52 per 100,000, rate ratio: 2.0).

Table 5. Age-standardised death rates, by Indigenous status and cause, and Indigenous:non-Indigenous rate ratios, WA, 2017

Cause of death	Rate		Rate ratio
	Indigenous	Non-Indigenous	
Ischaemic heart diseases (I20-I25)	146	56	2.6
Diabetes (E10-E14)	130	14	9.5
Intentional self-harm (X60-X84, Y87.0)	27	14	1.8
Malignant neoplasm of trachea, bronchus and lung (C33, C34)	52	26	2.0
Chronic lower respiratory diseases (J40-J47)	71	22	3.3
Diseases of the urinary system (N00-N39)	63	15	4.2
Land Transport Accidents (V01-V89, Y85)	np	6.2	np
Cerebrovascular diseases (I60-I69)	np	28	np
Symptoms, signs and ill-defined conditions (R00-R99)	np	11	np
Cirrhosis and other diseases of liver (K70-K76)	np	5.6	np

Notes: 1. Rates are deaths per 100,000

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

Source: ABS, 2018 [33]

Avoidable mortality

Avoidable mortality refers to deaths that could have been prevented with timely and effective health care, including early detection and treatment, as well as appropriate modifications to lifestyle behaviours (such as quitting smoking) [22].

In the five year period 2011-2015, there were 1,300 avoidable deaths among Aboriginal and Torres Strait Islander people aged 0-74 years in WA [22]. After age-adjustment, the rate of avoidable deaths for Aboriginal and Torres Strait Islander people of 468 per 100,000 was 4.9 times higher than the rate for non-Indigenous people in WA.

Hospitalisation

Separation rates

During 2016-17, there were 1,159,748 hospital separations in WA, of which 110,924 (9.6%) were identified as Aboriginal and Torres Strait Islander [34]. The age-standardised separation rate of 1,816 separations per 1,000 for Aboriginal and Torres Strait Islander people was 4.5 times higher than the rate for non-Indigenous people in WA.

There were 27,466 overnight hospital stays for Aboriginal and Torres Strait Islander people in WA in 2016-17 [34]. The age-standardised separation rate for Aboriginal and Torres Strait Islander people for overnight stays was 358 per 1,000, 2.2 times higher than the rate for non-Indigenous people.

There were 83,417 same-day acute separations of Aboriginal and Torres Strait Islander people in WA in 2016-17 [34]. The age-adjusted separation rate for same-day acute separations (including those for dialysis) for Aboriginal and Torres Strait Islander people was 1,458 per 1,000, 6.0 times higher than the non-Indigenous rate. After excluding dialysis, however, the age-adjusted separation rate for Aboriginal and Torres Strait Islander people decreases to 132 per 1,000, 0.7 times the rate for non-Indigenous people.

Age-specific separation rates

In WA, in 2013-15, separation rates were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people for all age-groups, except the 65 years and older age-group; the highest disparities occurred in the middle adult years (Table 6) [35].

Table 6. Age-specific hospital separation rates (excluding dialysis), by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, WA, 2013-15

Age-group (years)	Males			Females			Persons		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0 -4	409	251	1.6	328	178	1.8	369	216	1.7
5 - 14	128	100	1.3	115	82	1.4	122	91	1.3
15 - 24	148	127	1.2	367	223	1.6	254	173	1.5
25 - 34	250	128	2.0	524	339	1.5	385	229	1.7
35 - 44	438	187	2.3	561	327	1.7	500	255	2.0
45 - 54	573	281	2.0	615	351	1.8	595	316	1.9
55 - 64	678	477	1.4	671	477	1.4	675	477	1.4
65+	939	1,024	0.9	845	857	1.0	886	935	0.9
All ages	432	312	1.4	510	355	1.4	470	331	1.4

Notes: 1. Rates are expressed as separations per 1,000 population.
2. Rate ratio is the Indigenous rate divided by the non-Indigenous rate.
3. The rates and rate ratios for 'All ages' are age-standardised.

Source: AIHW, 2018 [35]

Causes of hospitalisation

In 2013-15, the most common reason for the hospitalisation of Aboriginal and Torres Strait Islander people living in WA was for the International Classification of Diseases (ICD) group 'Care involving dialysis' (Table 7) [35]. (Many of these separations involved repeat admissions for the same people, some on an almost daily basis.) After age-adjustment, the rate of 1,106 per 1,000 for Aboriginal and Torres Strait Islander people was 20 times higher than the rate for non-Indigenous people. After excluding dialysis, ICD 'Injury, poisoning and certain other consequences of external causes' (including motor vehicle accidents, assaults, self-inflicted harm and falls) was the next most common cause of hospitalisation for Aboriginal and Torres Strait Islander people, with a rate of 62 per 1,000, which was 2.5 times higher than the non-Indigenous rate. The next leading cause of hospitalisation for Aboriginal and Torres Strait Islander people was for pregnancy and childbirth (rate of 60 per 1,000), followed by respiratory conditions with an Aboriginal and Torres Strait Islander rate of 53 per 1,000, which was 3.8 times higher than the non-Indigenous rate.

Table 7. Age-standardised hospital separation rates, by principal diagnosis and Indigenous status, and Indigenous:non-Indigenous rate ratios, WA, 2013-15

Principal diagnosis	Indigenous	Non-Indigenous	Rate ratio
Injury & poisoning & certain other consequences of external causes	62	24	2.5
Pregnancy, childbirth and the puerperium	60	43	1.4
Diseases of the respiratory system	53	14	3.8
Diseases of the digestive system	39	38	1.0
Symptoms, signs and abnormal clinical and laboratory findings	41	28	1.5
Mental and behavioural disorders	32	9.8	3.3
Diseases of the circulatory system	37	17	2.2
Diseases of the genitourinary system	26	18	1.4
Diseases of the skin & subcutaneous tissue	21	6.0	3.4
Certain infectious and parasitic diseases	14	5.2	2.8
Endocrine, nutritional and metabolic diseases	17	7.6	2.2
Other	98	143	0.7
Care involving dialysis	1,106	56	20
Total	**1,575**	**387**	**4.1**

Notes: 1. Rates are expressed as separations per 1,000 population and directly age-standardised using the 2001 Australian standard population.
2. Rate ratio is the Indigenous rate divided by the non-Indigenous rate.

Source: AIHW 2018 [35]

Burden of disease

Burden of disease (BOD)[7] analysis measures the joint effect of the fatal and non-fatal impacts of diseases and injuries on the population [36]. It accounts for the age at death, seriousness of disease and also counts deaths and disease prevalence. BOD analysis uses data from a range of sources to account for the fatal and non-fatal effects of diseases in a consistent way so that they can be used to measure health using the disability-adjusted life year (DALY). A DALY is the combination of the estimates of years of life lost due to premature death (YLL) and years lived with ill health or disability (YLD) to count the total years of healthy life lost due to disease and injury. BOD analysis is a tool that can be used as an evidence base for monitoring the health of the population.

The information presented in this section is from the 2011 Australian Burden of Disease Study which was undertaken to update BOD estimates for the Australian (total) and Aboriginal and Torres Strait Islander populations [36]. Aboriginal and Torres Strait Islander people experience a higher BOD compared with non-Indigenous people. Also the pattern and age-distribution of diseases, and mortality rates for the diseases are different between the two populations.

The BOD study only provides information for NSW, Qld, WA and the NT [36]. WA experienced the second highest age-standardised total burden or DALY rates (498 per 1,000 people) after the NT (499 per 1,000). WA also had the highest age-standardised rate of non-fatal burden or YLD (193 per 1,000) and the second highest rate of fatal burden or YLL (305 per 1,000) (Table 8).

Table 8. Total burden (DALY), non-fatal burden (YLD) and fatal burden (YLL) age-standardised rates by state/territory, Indigenous people, 2011

Jurisdiction	Total burden (DALY)	Non-fatal burden (YLD)	Fatal burden (YLL)
NSW	409	181	228
Qld	419	186	233
WA	**498**	**193**	**305**
NT	499	170	329
Australia	429	184	246

Note: Rates age-standardised to the 2001 Australian standard population and expressed per 1,000 people.

Source: Derived from AIHW, 2016 [36]

Aboriginal and Torres Strait Islander males in WA experienced a higher proportion of total burden (55%), than Aboriginal and Torres Strait Islander females (45%), this pattern was consistent for males/females across the four jurisdictions for which data were collected [36]. After age-adjustment, the total burden for males in WA was 572 per 1,000 (highest across the four jurisdictions) and for females 437 per 1,000 (second highest).

Total burden rates (age-specific) for Aboriginal and Torres Strait Islander people living in WA increased with age from 70 per 1,000 in the 5-9 years age group through to 1,538 per 1,000 in the 75 plus years age group [36]. However, the 0-4 years age group rate was 217 per 1,000. WA had some of the highest age-specific rates compared with the three other states represented in the BOD study (Table 9).

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[7] Full term is burden of disease (BOD), however, throughout this report it may also be referred to as burden.

Table 9. Age specific total burden (DALY) rates for Indigenous people, by age and jurisdiction, 2011

Age-group (years)	Jurisdiction			
	NSW	Qld	WA	NT
0-4	158	197	217	327
5-9	56	57	70	76
10-14	66	65	81	94
15-19	158	158	225	211
20-24	185	199	225	268
25-29	242	246	245	257
30-34	304	278	326	298
35-39	378	354	384	412
40-44	389	390	530	506
45-49	443	430	571	567
50-54	502	526	654	760
55-59	561	661	783	849
60-64	702	740	861	943
65-69	863	831	945	1,036
70-74	1,022	1,136	1,455	1,282
75+	1,359	1,379	1,538	1,186

Note: Expressed as per 1,000 people.

Source: AIHW, 2016 [36]

In 2011, injury was the highest contributor to the total burden of disease for Aboriginal and Torres Strait Islander people living in WA, responsible for 20% of this burden; second was mental/substance use (17%) and third CVD (14%) (Table 10) [36].

Table 10. Leading causes of total burden (proportion of DALY %), Indigenous people, WA, 2011

Disease group	% DALY
Injuries	20
Mental/substance use	17
Cardiovascular	14
Cancer	9.5
Respiratory	6.2
Endocrine	5.3
Musculoskeletal	4.9
Gastrointestinal	4.3
Infant/congenital	4.1
Neurological	3.9
Infectious diseases	3.7
Kidney/urinary	2.7

Source: Derived from AIHW, 2016 [36]

The leading cause of fatal burden for Aboriginal and Torres Strait Islander people living in WA was injuries, accounting for 28% of this burden; followed by CVD (21%) and cancer (16%) (Table 11) [36].

Table 11. Leading causes of fatal burden (proportion of YLL %), Indigenous people, WA, 2011

Disease group	% YLL
Injuries	28
Cardiovascular	21
Cancer	16
Gastrointestinal	6.4
Endocrine	6.3
Infant/congenital	6.3
Infectious diseases	3.5
Respiratory	3.4
Kidney/urinary	3.1
Neurological	2.8
Mental/substance use	1.7

Source: Derived from AIHW, 2016 [36]

Mental/substance use was responsible for 38% of non-fatal burden among Western Australian Aboriginal and Torres Strait Islander people (Table 12) [36]. Diseases of the musculoskeletal system were second highest at 11% followed by respiratory disease at 10% of the non-fatal burden.

Table 12. Leading causes of non-fatal burden (proportion of YLD %), Indigenous people, WA, 2011

Disease group	% YLD
Mental/substance use	38
Musculoskeletal	11
Respiratory	10
Injuries	7.3
Neurological	5.4
Endocrine	4.0
Infectious diseases	4.0
Oral	3.8
Cardiovascular	3.5
Skin	2.4
Hearing/vision	2.3
Kidney/urinary	2.3
Blood/metabolic	2.0
Gastrointestinal	1.5

Source: Derived from AIHW, 2016 [36]

Aboriginal and Torres Strait Islander people living in WA experienced total BOD at a rate 2.8 times higher than non-Indigenous people, the greatest disparity for the four state/territories assessed [36]. For fatal burden, the rate was 3.6 times higher and for non-fatal burden 2.0 times higher; WA having the highest rate differences across the jurisdictions between Aboriginal and Torres Strait Islander people and non-Indigenous people. For total burden by disease group for WA, the Aboriginal and Torres Strait Islander: non-Indigenous rate ratio, for was highest for kidney/urinary (rate ratio: 9.4), followed by endocrine (rate ratio: 8.7) and infectious diseases (rate ratio: 6.4) (Table 13).

Table 13. Age-standardised total burden (DALY) rates, by disease group and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, WA, 2011

Disease group	Aboriginal and Torres Strait Islander rate	Non-Indigenous rate	Rate ratio
Kidney/urinary	20	2.1	9.4
Endocrine	34	3.9	8.7
Infectious diseases	16	2.5	6.4
Gastrointestinal	22	5.3	4.1
Injury	71	18	4.0
Cardiovascular	89	24	3.8
Blood/metabolic	6.9	2.1	3.2
Mental/substance use	57	22	2.6
Respiratory	35	16	2.2
Cancer	66	32	2.1
Neurological	27	13	2.1
Infant/congenital	8.6	4.0	2.1
Hearing/vision	6.8	4.1	1.7
Skin	4.3	3.4	1.3
Musculoskeletal	26	23	1.2
Oral	7.1	5.7	1.2
Reproductive/maternal	1.8	1.7	1.0

Notes: 1. Rates per 1,000 population, age-standardised to the Australian standard population at 30 June 2001.
2. Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate.
3. Rounding may result in inconsistencies in calculated ratios.

Source: Derived from AIHW, 2016 [36]

Selected health conditions

Cardiovascular health

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

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

Unlike other types of CVD, RHD occurs when acute rheumatic fever (ARF), an illness that affects the heart, joints, brain and skin, leads to permanent damage to the heart valves [42, 43]. ARF, which is rare among non-Indigenous Australians, is caused by an untreated bacterial (group A streptococci or GAS) infection of the throat, and possibly of the skin. Reducing ARF and RHD in Aboriginal and Torres Strait Islander communities requires initiatives that address poverty, overcrowded housing and poor sanitation, all of which contribute to the spread of GAS infection [42-44].

Extent of cardiovascular disease among Aboriginal and Torres Strait Islander people

Prevalence of cardiovascular disease

It was reported in the 2012-13 Aboriginal and Torres Strait Islander Health Survey (AATSIHS) that around 12% of Aboriginal and Torres Strait Islander people in WA aged 2 years and over had CVD[8], compared to around 13% nationally [45]. Levels of hypertension (6.0%) and 'heart, stroke and vascular diseases' (4.0%) in WA were similar to national levels.

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

The prevalence of CVD in WA varied by remoteness; 8.5% of Aboriginal and Torres Strait Islander people in non-remote WA had CVD, compared with 18% in remote WA [46].

After age adjustment, Aboriginal and Torres Strait Islander people in WA were 1.3 times more likely to have CVD than non-Indigenous people [46]. Nationally, they were 1.2 times more likely to have CVD. In remote WA, Aboriginal and Torres Strait Islander people were 1.3 times more likely than non-Indigenous people to have CVD, compared with 1.1 times in non-remote areas.

The 2012-13 AATSIHS supplemented self-reported health results with biomedical results obtained from blood and urine samples from a subset of participating adults [47]. The prevalence of selected biomarkers for CVD is shown in Table 14.

Table 14. Proportion (%) of Aboriginal and Torres Strait Islander people aged 18 years and over with selected CVD biomarkers, WA and Australia, 2012-13

CVD biomarker	WA	Australia
High triglycerides	29	25
Dyslipidaemia	68	66
Abnormal high density lipoprotein (HDL) cholesterol	36	40

Notes: 1. Cut-offs for 'abnormal' HDL cholesterol vary by age and sex.

2. Triglycerides and dyslipidaemia assessment involved a fasting test. Only people who fasted for eight hours or more prior to their blood test were applicable. For Australia in 2012 - 13, approximately 77.6% of Aboriginal and Torres Strait Islander people aged 18 years and over who participated in the biomedical component had fasted.

Source: ABS 2014 [47]

Of those Aboriginal and Torres Strait Islander people aged 15 years and over in WA who participated in the 2014-15 National Aboriginal and Torres Strait Islander Social Survey (NATSISS), 15% reported currently having heart disease (including angina, high blood pressure, or heart attack in the last six months), compared with 16% nationally [46].

Estimates of the prevalence of stroke among Aboriginal and Torres Strait Islander and non-Indigenous people in WA have been made using statewide linked hospital and mortality data [48]. A study found that the average point prevalence of hospitalised stroke for the combined 2007 to 2011 years in Aboriginal and Torres Strait Islander males aged 25-84 years was 34 per 1,000 after age-adjustment. This was 3.7 times greater than in non-Indigenous males (9.1 per 1,000). Stroke prevalence in Aboriginal and Torres Strait Islander females (27 per 1,000) was 4.4 times greater than in non-Indigenous females (6.1 per 1,000).

Incidence of ARF and prevalence of RHD

Data on the incidence of ARF and the prevalence of RHD in WA come from the WA RHD Register [42]. The Register was established in 2009, and both ARF and RHD are notifiable conditions in WA [42, 49].

National data on ARF incidence and RHD prevalence do not currently exist [42]. Comparisons are given below between WA data and combined data from the Qld, WA, SA and NT RHD registers. However, these comparisons should be viewed with caution as the registers in each jurisdiction are at different stages of establishment and coverage.

There were 308 cases of ARF reported for Aboriginal and Torres Strait Islander people in WA in 2011-2015 [46]. The crude rate of ARF for Aboriginal and Torres Strait Islander people in WA was 0.7 per 1,000, compared with 0.6 per 1,000 in Qld, WA, SA and the NT combined.

In 2011-2015, the crude rate of ARF for Aboriginal and Torres Strait Islander males in WA was 0.5 per 1,000 and for females was 0.8 per 1,000 [46]. By comparison, rates were 0.5 per 1,000 and 0.6 per 1,000 for males and females respectively in Qld, WA, SA and the NT combined.

Rates of ARF are highest among young people and decrease with age. In 2011-2015 in WA, for Aboriginal and Torres Strait Islander people, 55% of cases occurred in the 0-14 years age group and 24% in the 15-24 years age group [46]. The age distribution of cases was similar in Qld, WA and the NT combined.

Between 2010 and 2015 in WA, the rate of ARF for Aboriginal and Torres Strait Islander people rose from 0.3 per 1,000 to 0.7 per 1,000, compared with a rise from 0.4 to 0.6 per 1,000 in Qld, WA, SA and the NT combined [46]. These increases may reflect an improvement in reporting and registration.

There were 378 Aboriginal and Torres Strait Islander people recorded as having RHD in WA as at 31 December 2015 [46]. The crude rate of RHD for Aboriginal and Torres Strait Islander people in WA was 3.9 per 1,000. In Qld, WA, SA and the NT combined, the rate was 7.4 per 1,000. For Aboriginal and Torres Strait Islander people in WA, the prevalence of RHD was 630 times the rate for non-Indigenous people in WA [22]. Rates of RHD among Aboriginal and Torres Strait Islander people in WA varied by age-group (see Table 15).

Table 15. Rates of RHD among Aboriginal and Torres Strait Islander people, by age group, WA and combined jurisdictions, as at 31 December 2015

Age	Rate per 1,000 in WA	Rate per 1,000 in Qld, WA, SA and the NT combined
0 - 14	2.4	2.4
15 - 24	5.3	9.1
25 - 34	4.9	13
35 - 44	5.3	13
45+	3.3	9.3
All ages	3.9	7.4

Notes: 1. Rates are crude age-specific rates per 1,000.
2. Rates were calculated using the averaged 2015, 2016 estimated resident populations based on the 2011 Census.

Source: AIHW, 2017 [46]

Estimates of RHD prevalence among specific populations in WA come from screening, surveillance and linked hospital and mortality data.

A population-based survey that aimed to compare regional differences in the prevalence of RHD detected by echocardiographic screening in high-risk Aboriginal and Torres Strait Islander children was conducted in four regions of northern and central Australia including WA's Kimberley region [50]. It found that the prevalence of definite RHD among Aboriginal and Torres Strait Islander children aged 5-15 years differed between regions, from 4.7 per 1,000 in Far North Qld to 15 per 1,000 in the Top End of the NT. In WA's Kimberley region, the prevalence of definite RHD was 8.9 per 1,000.

A study conducted under the umbrella of the Australasian Maternity Outcomes Surveillance System (AMOSS) aimed to identify the prevalence of RHD in pregnancy in Australia [51]. It found that the rate of RHD in pregnancy in Australia for the total population was 4.3 per 10,000 women giving birth. Rates among Aboriginal and Torres Strait Islander women ranged from 7.0 per 10,000 women giving birth in NSW to 222 per 10,000 in the NT. In WA, the rate among Aboriginal and Torres Strait Islander women was 72 per 10,000 women giving birth[9].

A WA data-linkage study aimed to identify the proportion of Aboriginal and non-Aboriginal adults in WA who had RHD as a comorbidity or precursor to another hospitalised cardiovascular condition [52]. The study found that differentials in the prevalence of RHD between Aboriginal and non-Aboriginal cardiovascular patients were highest at young ages:

- In 2000-2009 in WA, 20% of Aboriginal heart failure patients aged 20-54 years had a history of RHD, significantly higher than for non-Aboriginal patients (14%) [52, 53].
- In 2000-2009 in WA, just under 18% of Aboriginal atrial fibrillation patients aged 20-54 years had RHD, significantly higher than for non-Aboriginal patients (4.1%) [52].
- In 2007-2011 in WA, almost a quarter of Aboriginal stroke patients aged 25-34 years had a history of RHD; Aboriginal stroke patients were 8.9 times more likely to have a history of RHD than non-Aboriginal patients in this age-group [52].

Hospitalisation

There were 3,765 hospital separations for CVD[10] among Aboriginal and Torres Strait Islander people in WA in 2013-15 [46]. After age-adjustment, Aboriginal and Torres Strait Islander people in WA were 2.2 times more likely to be hospitalised with a primary diagnosis of CVD than non-Indigenous people (rates: 37 per 1,000 and 17 per 1,000, respectively). Nationally, Aboriginal and Torres Strait Islander people were 1.8 times more likely to be hospitalised for CVD than non-Indigenous people (rates: 32 per 1,000 and 18 per 1,000, respectively).

In 2013-15 in WA, rates of hospitalisation for CVD were slightly higher for Aboriginal and Torres Strait Islander males than for females (20.3 versus 19.9 per 1,000) [46]. This was also the case nationally (males: 18 per 1,000; females: 16 per 1,000). But differences in hospitalisation rates by Indigenous status were more pronounced for females than males: Aboriginal and Torres Strait Islander females in WA were hospitalised for CVD at 2.7 times the rate of non-Indigenous females, while males were hospitalised at 1.8 times the rate of non-Indigenous males. (Nationally, the Aboriginal and Torres Strait Islander: non-Indigenous rate ratio for females was 2.1 and for males it was 1.6).

In 2013-15, the rate of CVD hospitalisation increased with age for both Aboriginal and Torres Strait Islander and non-Indigenous people in WA, with rates being highest for those over 65 years of age [46]. However, the gap between Aboriginal and Torres Strait Islander and non-Indigenous people in WA was highest in the 35-44 year age-group; Aboriginal and Torres Strait Islander people in this age group were hospitalised at five times the rate of non-Indigenous people after age-adjustment. (Nationally, the gap was also highest in this age group but the Aboriginal and Torres Strait Islander: non-Indigenous rate ratio was lower at 3.4). Among Aboriginal and Torres Strait Islander and non-Indigenous females in WA, the inequality in CVD hospitalisation rates was most pronounced in the 45-54 years age-group, with a rate ratio of 6.0.

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

[10] 'CVD' includes the following ICD-10-AM codes: I00-I99.

In 2013-15, of specific types of CVD, CHD accounted for the biggest proportion of Aboriginal and Torres Strait Islander CVD hospitalisations in WA (40%), followed by pulmonary 'and other forms of heart disease' (34%) and cerebrovascular disease (8.2%) [46]. Although ARF/RHD accounted for only 4.4% of all Aboriginal and Torres Strait Islander CVD hospitalisations in WA, it was responsible for the biggest disparity in hospitalisation rates between Aboriginal and Torres Strait Islander and non-Indigenous people (rate ratio: 7.9), as it was nationally.

From 2013-14 to 2015-16, Aboriginal and Torres Strait Islander people in WA were 2.5 times more likely to be hospitalised for cardiac conditions[11] than non-Indigenous people, at rates of 31 and 12 per 1,000 respectively after age-adjustment [54]. The rate ratio (Aboriginal and Torres Strait Islander: non-Indigenous) for cardiac hospitalisation was highest in WA of all jurisdictions[12].

In 2012-16 for Aboriginal and Torres Strait Islander people in WA, there were 2,689 hospitalisations for heart attack, angina and heart failure ('heart-related hospitalisations') [55]. After age-adjustment, the rate of heart-related hospitalisation in WA for Aboriginal and Torres Strait Islander people (16 per 1,000) was 3.5 times the rate for non-Indigenous people (4.4 per 1,000). Of all Australian jurisdictions[13], WA had the highest Aboriginal and Torres Strait Islander: non-Indigenous rate ratio and the second-highest rate difference (after the NT) for this indicator. Of WA's statistical regions (SA4) for which data are available, the rate ratio was highest in the Wheatbelt, and lowest in North-West Perth (see Table 16).

Table 16. Heart-related hospitalisations, by Indigenous status and region, WA, 2012-16

Region (ABS Statistical Areas Level 4) (SA4)	Aboriginal and Torres Strait Islander ASR per 1,000 persons	Non-Indigenous ASR per 1,000 persons	Rate ratio
Western Australia – Wheat Belt	16	3.6	4.5
Western Australia – Outback (North)	18	4.3	4.2
Perth – North-East	20	4.9	4.1
Western Australia – Outback (South)	16	4.2	3.9
Perth – South-East	15	4.6	3.2
Bunbury	12	4.0	3.0
Perth – South-West	13	4.4	2.9
Perth – North-West	10	4.7	2.2

Notes: 1. ASR is age-adjusted at the national level using the direct method with the Australian Estimated Resident Population on 30 June 2012.
2. Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate. Rounding may result in inconsistencies in calculated ratios.
3. 'Heart-related hospitalisations' are the total number of hospitalisations for the diagnostic groups STEMI (ST- elevation myocardial infarction), NSTEMI (non-ST- segment elevation myocardial infarction), Unstable Angina and Heart Failure.
4. Regions of WA are based on the Australian Statistical Geography Standard (ASGS) according to Statistical Areas Level 4 (SA4). Data not available for inner Perth or Mandurah.

Source: National Heart Foundation, 2016 [55]

A WA study using linked data from hospital and death records from 2000 to 2009 calculated how often first-ever hospitalisations for heart failure occurred in the Aboriginal compared with the non-Indigenous population in WA [52, 53]. It found that Aboriginal people were more likely to have a first heart failure hospitalisation than non-Indigenous people (three times more likely in males and about five times more likely in females). First hospitalisations for heart failure occurred at much younger ages among Aboriginal people than non-Indigenous people: in the 20-39 year age group, rates were 11 times higher for Aboriginal males and 23 times higher for Aboriginal females than for non-Indigenous females.

A study by the same researchers investigated how often first-ever hospitalisations for atrial fibrillation occurred in the Aboriginal compared with the non-Indigenous population in WA [52, 56]. Using linked hospital and mortality data from WA for 2000-2009, it found that rates of first-ever hospitalisation for atrial fibrillation (as a main or co-diagnosis) were higher in Aboriginal people at all ages less than 65 years but similar at older ages. After age-adjustment, first-ever atrial fibrillation hospitalisation rates were 3.6 times higher for Aboriginal males and 6.4 times higher for Aboriginal females between 20 and 54 years of age than for non-Indigenous females.

Mortality

Of all specific causes of death, CHD was the leading cause of both Aboriginal and Torres Strait Islander and non-Indigenous deaths in WA in 2017 [33]. After age-adjustment, the CHD death rate for Aboriginal and Torres Strait Islander people in WA was 2.6 times the rate for non-Indigenous people (146 per 100,000 and 56 per 100,000 respectively) (Derived from [33]). Rate ratios and rates of CHD mortality for Aboriginal and Torres Strait Islander people were higher in WA than in NSW, Qld, WA, SA and the NT combined, where the age-adjusted CHD death rate for Aboriginal and Torres Strait Islander people (115 per 100,000) was 1.8 times the rate for non-Indigenous people (64 per 100,000).

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[11] Cardiac conditions includes the following ICD-10-AM codes: I00–I52.

[12] Data not available for the ACT

[13] Data not available for Tas or the ACT

In WA in 2012-2016, the age-standardised CHD mortality rate was higher for Aboriginal and Torres Strait Islander males (242 per 100,000) than for Aboriginal and Torres Strait Islander females (122 per 100,000) [55]. Both males and females had mortality rates over two-and-a-half times those of non-Indigenous males and females (Table 17). CHD death rates for Aboriginal and Torres Strait Islander males and females were higher in WA than in NSW, Qld, WA, SA and the NT combined. However, CHD death rates for non-Indigenous males and females in WA were lower than for non-Indigenous males and females in these combined jurisdictions.

Table 17. CHD death rates, by Indigenous status and sex, WA and combined jurisdictions, 2012-16

	WA	NSW, Qld, WA, SA and the NT combined
Males		
Aboriginal and Torres Strait Islander rate	242	182
Non-Indigenous rate	87	90
Rate ratio	2.8	2.0
Females		
Aboriginal and Torres Strait Islander rate	122	104
Non-Indigenous rate	46	49
Rate ratio	2.7	2.1

Notes: 1. Rates are age-standardised rates (ASR) per 100,000 persons.
2. ASR is age-adjusted at the national level using the direct method with the Australian Estimated Resident Population on 30 June 2012.
3. Rate ratio is the Aboriginal and Torres Strait Islander rate divided by the non-Indigenous rate.
4. CHD death rate includes deaths coded as I20-I25 (according to the International Classification of Diseases and Related Health Problems (ICD-10).

Source: National Heart Foundation, 2016 [55]

From 2011-2015 in WA, CVD[14] (including CHD and stroke) was the leading cause of death for Aboriginal and Torres Strait Islander people and the second leading cause (after cancer) of death for non-Indigenous people [22]. The CVD death rate for Aboriginal and Torres Strait Islander people (335 per 100,000) was 2.2 times the rate for non-Indigenous people (151 per 100,000). In comparison, in NSW, Qld, WA, SA and the NT combined, the CVD death rate for Aboriginal and Torres Strait Islander people was 1.6 times the rate for non-Indigenous people (271 per 100,000 and 173 per 100,000 respectively).

For 2013-2015 in WA, the age-standardised rate of deaths from heart attack, angina or heart failure combined ('the cardiac death rate') was about twice as high for Aboriginal and Torres Strait Islander people in WA as for non-Indigenous people (rate ratio: 2.1) [54]. Of the jurisdictions for which data are available, the cardiac death rate among Aboriginal and Torres Strait Islander people was second-highest in WA (212 per 100,000) after the NT (274 per 100,000).

Cancer

Cancer is the term given to a number of related diseases [57]. It is a genetic disease, arising from changes to the genes (DNA) that control the way cells behave. In all cancers, some of the cells of the body divide in an uncontrolled manner (cells normally grow and divide as the body needs them). When cancer cells spread into surrounding tissues, or to different parts of the body (metastasise) they are known as malignant [58]. Cancer can start almost anywhere in the body [57].

There is limited evidence available on cancer to inform initiatives to improve outcomes for Aboriginal and Torres Strait Islander people [59]. Inconsistent Indigenous identification in cancer notifications in several jurisdictions is an issue [60]. The National Aboriginal and Torres Strait Islander Cancer Framework highlights the need for improved Indigenous identification, including on pathology requests and reports [59]. It also expresses a need for routine national data collection, access and linkage, to allow national monitoring and reporting, and inform strategies to improve cancer care and outcomes.

Extent of cancer among Aboriginal and Torres Strait Islander people

Incidence

For 2009-2013, there were 881 new cases of cancer diagnosed in Aboriginal and Torres Strait Islander people living in WA [61]. After age-adjustment, Aboriginal and Torres Strait Islander people and non-Indigenous people were diagnosed with cancer at a similar rate (469 per 100,000 and 465 per 100,000 respectively). Age-adjusted cancer incidence rates were higher for Aboriginal and Torres Strait Islander people than non-Indigenous people for: liver cancer (rate ratio: 3.4); oesophageal cancer (rate ratio: 3.0); uterine cancer (rate ratio: 2.8); head and neck cancer (rate ratio: 2.2); cancers of unknown primary site (rate ratio: 2.1); pancreatic cancer (rate ratio: 1.7) and lung cancer (rate ratio: 1.6). (Table 18). Cancer incidence rates were lower for: breast cancer (rate ratio: 0.9); colorectal (bowel) cancer (rate ratio: 0.8); and prostate cancer (rate ratio: 0.4).

[14] 'CVD' includes the following ICD-10-AM codes: I00-I99.

Table 18. Age-standardised incidence rates for the 10 most common cancers, by Indigenous status, and Indigenous: non-Indigenous rate ratios, WA, 2009-2013

Cancer type	Aboriginal and Torres Strait Islander age-standardised rates	Non-Indigenous age-standardised rates	Rate ratio
Breast (females)	107	113	0.9
Lung	70	43	1.6
Head and neck	37	17	2.2
Colorectal (bowel)	46	55	0.8
Prostate (males)	70	161	0.4
Uterine (females)	39	14	2.8
Liver	19	5.5	3.4
Pancreatic	19	11	1.7
Unknown primary site	21	10	2.1
Oesophageal	16	5.3	3.0
All cancers combined	469	465	1.0

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

Source: AIHW, 2017 [61]

For 2009-2013, detailed information for cancer incidence is available for Aboriginal and Torres Strait Islander males and females living in WA. For all cancers combined, the number of new cases were higher for females (466 new cases) than for males (415 new cases) [61]. After age-adjustment, the rate for Aboriginal and Torres Strait Islander females was higher than that for non-Indigenous females 439 per 100,000 and 385 per 100,000 respectively. For males, the Aboriginal and Torres Strait Islander rate was lower compared with non-Indigenous males: 517 per 100,000 and 559 per 100,000 respectively.

Age-adjusted cancer incidence rates were higher for Aboriginal and Torres Strait Islander females than non-Indigenous females for: liver cancer (rate ratio: 4.5); uterine cancer (rate ratio: 2.8); cervical cancer (rate ratio: 2.3); cancer of unknown site (rate ratio: 2.1); pancreatic cancer (rate ratio: 2.0); head and neck cancer (rate ratio: 1.7); lung cancer (rate ratio: 1.6) and ovarian cancer (rate ratio: 1.1). Cancer incidence rates were lower for: breast cancer (rate ratio 0.9) and colorectal (bowel) cancer (rate ratio: 0.7) (Table 19) [61].

Table 19. Age-standardised incidence rates for the 10 most common cancers, by Indigenous status (females), and Indigenous: non-Indigenous rate ratios, WA, 2009-2013

Cancer type	Aboriginal and Torres Strait Islander age-standardised rates	Non-Indigenous age-standardised rates	Rate ratio
Breast	107	113	0.9
Lung	54	34	1.6
Uterine	39	14	2.8
Colorectal (bowel)	33	45	0.7
Cervical	15	6.4	2.3
Head and neck	15	8.9	1.7
Pancreatic	19	9.4	2.0
Unknown primary site	17	8.3	2.1
Liver	13	3.0	4.5
Ovarian	11	10	1.1
All cancers combined	439	385	1.1

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

Source: AIHW, 2017 [61]

Age-adjusted cancer incidence rates were higher for Aboriginal and Torres Strait Islander males than non-Indigenous males for: liver cancer (rate ratio: 3.0); head and neck cancer (rate ratio: 2.6); cancer of unknown site (rate ratio: 2.3); oesophageal cancer (rate ratio: 2.1); lung cancer (rate ratio: 1.7) and pancreatic cancer (rate ratio: 1.4) (Table 20) [61]. Cancer incidence rates were the same or lower for: colorectal (bowel) cancer (rate ratio: 1.0); stomach cancer (rate ratio: 0.9) and kidney cancer (rate ratio: 0.6).

Table 20. Age-standardised incidence rates for the 10 most common cancers, by Indigenous status (males), and Indigenous: non-Indigenous rate ratios, WA, 2009-2013

Cancer type	Aboriginal and Torres Strait Islander age-standardised rates	Non-Indigenous age-standardised rates	Rate ratio
Head and neck	64	25	2.6
Lung	94	55	1.7
Prostate	70	161	0.4
Colorectal (bowel)	63	65	1.0
Liver	25	8.3	3.0
Oesophageal	18	8.6	2.1
Pancreatic	18	13	1.4
Unknown primary site	28	12	2.3
Stomach	11	12	0.9
Melanoma (skin)	9.3	57	0.2
All cancers combined	517	559	0.9

Notes: 1. Rates per 100,000 population, age-standardised to the Australian population at 30 June 2001.

2. Cancers are ordered by numbers among Aboriginal and Torres Strait Islander people (not shown in table).

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

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

5. Rounding may result in inconsistencies in calculated ratios.

Source: AIHW, 2017 [61]

Hospitalisation

For 2013-15, in WA, the age-standardised hospitalisation rate for cancer was lower among Aboriginal and Torres Strait Islander people (9 per 1,000) compared with non-Indigenous people (17 per 1,000) [22]. The national rate for the same period was also lower among Aboriginal and Torres Strait Islander people (12 per 1,000) compared with non-Indigenous people (16 per 1,000).

Mortality

In 2017, cancers of the trachea, bronchus and lung combined were the fourth leading cause of death for Aboriginal and Torres Strait Islander people (23 deaths: 14 males and 9 females) living in WA with the overall age-adjusted death rate 2.0 times higher than for non-Indigenous people (52 per 100,000 and 26 per 100,000 respectively) [33]. For 2013-2017, cancer of the trachea, bronchus and lung combined were responsible for 88 deaths among Aboriginal and Torres Strait Islander people (53 males and 35 females), with the age-adjusted death rate 1.5 times higher than for non-Indigenous people (43 per 100,000 and 29 per 100,000 respectively).

For 2011-2015, cancer was responsible for the deaths of 402 Aboriginal and Torres Strait Islander people living in WA [61]. Lung cancer was the leading cause of cancer death for Aboriginal and Torres Strait Islander people and non-Indigenous people. After age-adjustment, the mortality rate for all cancers combined for Aboriginal and Torres Strait Islander people was 1.4 times higher than for non-Indigenous people (226 per 100,000 and 157 per 100,000 respectively). The mortality rates were higher for Aboriginal and Torres Strait Islander people than non-Indigenous people for cervical cancer (rate ratio: 6.6); head and neck cancer (rate ratio: 5.8); oesophageal cancer (rate ratio: 2.9); liver cancer (rate ratio: 2.4); cancer of unknown primary site (rate ratio: 2.0); lung cancer and breast cancer (females) (rate ratio: 1.5); pancreatic cancer (rate ratio: 1.3); prostate cancer (males) (rate ratio: 1.2) and stomach cancer and colorectal (bowel) cancer (rate ratio: 1.1) (Table 21).

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

Cancer type	Aboriginal and Torres Strait Islander age-standardised rates	Non-Indigenous age-standardised rates	Rate ratio
Lung	47	31	1.5
Head and neck	20	3.4	5.8
Liver	14	5.9	2.4
Breast (females)	30	19	1.5
Colorectal (bowel)	15	13	1.1
Oesophageal	12	4	2.9
Pancreatic	12	8.8	1.3
Unknown primary site	17	8.2	2.0
Prostate (males)	29	25	1.2
Cervical	9.2	1.4	6.6
Stomach	4.9	4.3	1.1
All cancers combined	226	157	1.4

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

Source: AIHW, 2016 [61]

For 2011-2015, the age-standardised Aboriginal and Torres Strait Islander cancer mortality rates: non-Indigenous cancer mortality rates were 1.5 times higher for females (191 per 100,000 and 124 per 100,000 respectively) and 1.4 higher for males (277 per 100,000 and 199 per 100,000 respectively) [61].

Age-adjusted cancer mortality rates were higher for Aboriginal and Torres Strait Islander females than non-Indigenous females for: cervical cancer (rate ratio: 6.6); cancer head and neck cancer (rate ratio: 5.7); oesophageal cancer (rate ratio: 4.4); uterine cancer (rate ratio: 4.2); liver cancer (rate ratio: 3.3); stomach cancer (rate ratio: 2.4); lung cancer and cancer of unknown primary site (rate ratio: 1.7) and breast cancer (rate ratio: 1.5). Cancer mortality rates were the same or lower for: colorectal (bowel) cancer (rate ratio: 1.0) and pancreatic cancer (rate ratio: 0.9) (Table 22) [61].

Table 22. Age-standardised mortality rates for the 10 most common cancers, by Indigenous status (females), and Indigenous: non-Indigenous rate ratios, WA, 2011-2015

Cancer type	Aboriginal and Torres Strait Islander age-standardised rates	Non-Indigenous age-standardised rates	Rate ratio
Lung	40	23	1.7
Breast	30	19	1.5
Liver	13	3.8	3.3
Head and neck	10	1.8	5.7
Cervical	9.2	1.4	6.6
Colorectal (bowel)	11	10	1.0
Unknown primary site	11	6.7	1.7
Pancreatic	7.2	7.7	0.9
Uterine	11	2.5	4.2
Oesophageal	7.5	1.7	4.4
Stomach	5.9	2.5	2.4
All cancers combined	191	124	1.5

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

Source: AIHW, 2017 [61]

Age-adjusted cancer mortality rates were higher for Aboriginal and Torres Strait Islander males than non-Indigenous males for: head and neck cancer (rate ratio: 5.8); cancer of unknown site (rate ratio: 2.8); oesophageal cancer (rate ratio: 2.4); liver cancer (rate ratio: 2.0); bladder cancer (rate ratio: 1.9); kidney cancer (rate ratio: 1.8); pancreatic cancer (rate ratio: 1.7); lung cancer (rate ratio: 1.5); colorectal (bowel) and prostate cancer (rate ratio: 1.2) (Table 23) [61]. The cancer mortality rate was lower for stomach cancer (rate ratio: 0.6).

Table 23. Age-standardised mortality rates for the 10 most common cancers, by Indigenous status (males), and Indigenous: non-Indigenous rate ratios, WA, 2011-2015

Cancer type	Aboriginal and Torres Strait Islander age-standardised rates	Non-Indigenous age-standardised rates	Rate ratio
Lung	59	40	1.5
Head and neck	31	5.3	5.8
Liver	16	8.2	2.0
Oesophageal	17	6.8	2.4
Pancreatic	17	10	1.7
Prostate	29	25	1.2
Colorectal (bowel)	20	16	1.2
Unknown primary site	27	9.9	2.8
Bladder	12	6.3	1.9
Kidney	8.4	4.6	1.8
Stomach	3.6	6.5	0.6
All cancers combined	277	199	1.4

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

Source: AIHW, 2017 [61]

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 [62]. High rates of smoking are the likely cause of a high incidence of cancer of the lung. High incidence rates of liver cancer are consistent with risky levels of alcohol consumption and a higher prevalence of Hepatitis B infection. Other contributing factors for Aboriginal and Torres Strait Islander people include being:

- more likely to have cancers that have a poor prognosis
- diagnosed with cancer at a later stage
- more likely to present with co-morbidities (that may lead to poorer outcomes)
- less likely to receive any treatment or adequate treatment [63-65].

Diabetes

Diabetes is a chronic disease marked by high levels of glucose in the blood and is caused by the pancreas not producing enough insulin[15] or not being able to use the insulin effectively, or both [66].

There are several types of diabetes, of which the most frequently occurring are type 1, type 2 and gestational diabetes mellitus (GDM) [66]. Type 1 diabetes is usually diagnosed in children and young people but can occur at any age [67]. Type 2 diabetes is the most common form [68] and is largely preventable by maintaining a healthy lifestyle. GDM develops in some women during pregnancy [68] and is more common among Aboriginal and Torres Strait Islander females than among non-Indigenous females [69, 70].

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 [67]. The most common form is type 2 diabetes which occurs at earlier ages for Aboriginal and Torres Strait Islander people and is often undetected and untreated. Complications from diabetes may occur within months of diagnosis while others may develop over several years [71]. Aboriginal and Torres Strait Islander people with diabetes tend to have higher levels of risk factors such as smoking [67] and may show signs of other chronic conditions, including chronic kidney disease, CVD, liver disease and anaemia [72].

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[15] Insulin is necessary to convert glucose to energy [66].

Extent of diabetes among Aboriginal and Torres Strait Islander people

Incidence and prevalence

National results from the 2012-13 National Aboriginal and Torres Strait Islander Health Measures Survey (NATSIHMS) indicated that 13% (46,200 people) of Aboriginal and Torres Strait Islander adults had diabetes, based on self-reported information and measured results [67]. In WA, Aboriginal and Torres Strait Islander adults were 4.8 times more likely to have diabetes than non-Indigenous people [73]. Higher proportions of Aboriginal and Torres Strait Islander adults living in remote areas had diabetes than those living in non-remote areas (28% compared with 22%) and males were more likely than females to have diabetes (10 per 1,000 population compared with 9.2 per 1,000) [73]. Based on self-reported information from the same survey for all Western Australians over 2 years of age, 10% had diabetes or high sugar levels. This was higher than the national rate of 8.6%. The highest proportion of people with self-reported diabetes or high blood sugar levels was in NT (12%) followed by WA (10%), SA (8.9%), Qld (8.3%), NSW (8.1%), ACT (7.6%), Vic (7.1%) and Tas (3.8%) [45].

Between 1990 and 2012 in WA, 135 cases of type 2 diabetes were diagnosed in children under 17 years of age (mean age of diagnosis 13 years) [74]. Children of Indigenous descent comprised 56% of cases. The mean incidence of type 2 diabetes in Indigenous children was 13 per 100,000 person-years. The incidence increased from 4.5 to 31 per 100,000 person years over the 12 year time period. The mean annual rate of increase in incidence was 13% per year, compared with 11% per year for non-Indigenous children.

In 2017 according to the National (insulin treated) Diabetes Register (NDR), the age-standardised incidence rate of new cases of type 1 diabetes for Aboriginal and Torres Strait Islander people in Australia was 13 per 100,000 population [75]. For the total population in WA it was 12 per 100,000 population.

In 2017, for new cases of insulin treated type 2 diabetes, the age-standardised in WA was 3,416 per 100,000 population for the total population[16] [75]. This was lower than the national rate of 4,121 per 100,000 population.

The Fremantle Diabetes Study (FDS) was an observational study conducted in two phases (phase I from 1993 to 1996 and phase II from 2008 to 2011) in an urban setting in WA [76]. Data were collected from Aboriginal and Anglo-Celt adults with diabetes. Results from phase II showed at baseline, 71% of Aboriginal participants had diabetes compared with 38% of Anglo-Celts. The Aboriginal participants were significantly younger at age of diagnosis than the Anglo-Celt participants (44 years compared with 58 years) and were more likely to smoke (44% compared with 8.2%).

Hospitalisation

Hospital separations in 2015-16 for Aboriginal and Torres Strait Islander people in WA with a principal diagnosis of diabetes were 10 per 1,000 population (rate ratio with all Western Australians: 4.9) [77]. The only state/territory that had a higher rate was the NT with 10 per 1,000 population (rate ratio 2.8). Tas had the lowest rate of hospital separations with 3.5 per 1,000 population (rate ratio 1.5).

Hospital separations in 2015-16 for Aboriginal and Torres Strait Islander people in WA with a principal and/or additional diagnosis of diabetes were 259 per 1,000 population (rate ratio with all Western Australians 6.0). This was higher in WA than in any other state or territory.

Mortality

Diabetes was the second highest leading cause of death for Aboriginal and Torres Strait Islander people in WA in 2017 (standardised death rate 130 per 100,000) [33]. Over the period 2012-2016, the age-standardised death rate for diabetes in WA among Aboriginal and Torres Strait Islander people was 252 per 100,000 population (rate ratio: 3.8). The greatest number of deaths per 100,000 population occurred in NT (381) followed by SA (264), Qld (258) and NSW (144) [77].

Avoidable and preventable deaths are those which are potentially avoidable given timely and effective medical care. Between 2012 and 2016, the age-standardised rate of avoidable and preventable deaths from diabetes was 48 per 100,000 population [77]. The rate in WA was 52 per 100,000 population which was third highest after NT (120 per 100,000 population) and SA (75 per 100,000 population). NSW had the lowest rate (21 per 100,000 population) followed by Qld (44 per 100,000 population).

Complications of diabetes

Results from phase II of the FDS [76] found that: a greater proportion of Aboriginal participants had unfavourable lipid profiles than their Anglo-Celt counterparts (1.9% compared with 1.5%), however fewer Aboriginal participants were receiving lipid-modifying treatment (52% compared with 70%). Aboriginal participants when compared with Anglo-Celt participants, were more likely to: have diabetic retinopathy (33% compared with 19%); have peripheral arterial disease (31% compared with 22%); and worse glycaemic control (average fasting serum glucose 8.4 mmol/L compared with 7.0 mmol/L).

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[16] Information was not available for Aboriginal and Torres Strait Islander people.

Diabetes treatment

The authors of the FDS study noted that their Aboriginal participants were being treated less intensively than they should have [76]. They suggested this may be due to: the lack of cultural sensitivity in the provision of care in primary care and hospital-based diabetes-specific facilities; or lower adherence to treatment by Aboriginal patients due to a lower disposable income, lower prioritisation of health behaviours, and a poorer understanding of the long term benefits of treatment.

Social and emotional wellbeing (including mental health)

Social and emotional wellbeing (SEWB) is a complex and multifaceted concept that has particular resonance and meaning for Aboriginal and Torres Strait Islander people [7, 78]. While the term SEWB has been used interchangeably with 'mental health' and 'mental illness', it has been proposed that these latter terms be positioned 'within' a broader understanding of SEWB rather than 'equated with SEWB' [7]. SEWB for Aboriginal and Torres Strait Islander people then, may be defined as 'a multidimensional concept of health that includes mental health, but which also encompasses domains of health and wellbeing such as connection to land or 'country', culture, spirituality, ancestry, family and community' [7]. Colonisation has had a systematically profound impact on Aboriginal and Torres Strait Islander peoples' traditional cultural practices and by implication on their SEWB [6, 79]. A number of factors have been linked to SEWB concerns for Aboriginal and Torres Strait Islander people such as discrimination and racism, grief and loss, child removals and unresolved trauma, life stress, social exclusion, economic and social disadvantage, incarceration, child removal by care and protection orders, violence, family violence, substance use and physical health problems [6]. Factors that enhance SEWB have also been identified including: connection to country; spirituality; ancestry; kinship; self-determination; community governance and cultural continuity.

The World Health Organization (WHO) defines mental health as a state of wellbeing in which individuals can cope with the normal stresses of life, realise their potential, work productively and contribute to their community [80]. Like SEWB, mental health is influenced by an individual's character traits, the social circumstances in which they find themselves and the environment they live in [81].

Some individuals experience compromised mental health due to mental health problems or mental illness. Mental health problems are characterised by reduced cognitive, emotional, or social functioning, but not to the extent that the criteria for a mental illness are met [82]. Mental illness is a psychological disorder that significantly interferes with an individual's cognitive, emotional or social abilities [82], and is generally determined according to the classification system of the *Diagnostic and statistical manual of mental disorders* (DSM) or the ICD [83]. Severe mental illness, while evident in the anthropological or ethnographic records, was relatively rare in traditional Aboriginal societies [84].

For Aboriginal people broadly speaking, the structure and cultural practices of traditional society buffered the impacts experienced since colonisation. Similarly, for Torres Strait Islander people, traditional cultural practices enhanced the likelihood of better health outcomes, including SEWB [84].

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

Prevalence

The 2012-13 AATSIHS found that 30% of Aboriginal and Torres Strait Islander respondents, living in WA, aged 18 years and over reported high or very high levels of psychological distress in the four weeks prior to the interview [85], (males 26% and females 33%). This compares with 11% for non-Indigenous Australians [22]. Aboriginal and Torres Strait Islander respondents in non-remote areas of WA reported higher levels of psychological distress (33%) than respondents in remote areas (27%) [35]. Perth area had the highest reported levels of psychological distress (35%), followed by Geraldton (34%) and Broome (32%) [86]. After age-adjustment, the proportion of Aboriginal and Torres Strait Islander people reporting high or very high distress levels was 2.6 times that of non-Indigenous people [35].

The 2014-15 NATSISS found that for respondents aged 18 years or over living in WA, 37% reported high/very high levels of psychological distress, which was 3.3 times higher than for non-Indigenous people (after age-adjustment) [35].

The higher overall levels of psychological distress reported by Aboriginal and Torres Strait Islander people than by non-Indigenous people are consistent with the relative frequencies with which the two populations experienced specific life stressors in the previous 12 months. According to the 2014-15 NATSISS, 68% of Aboriginal and Torres Strait Islander people nationally, aged 15 years and over, experienced one or more selected personal stressors in the 12 months prior to the survey [87].

The latest information available for WA is from the 2012-13 AATSIHS, with 72% of respondents experiencing one or more stressors (70% males and 75% females) [86]. The West Kimberley region of WA reported the highest experience of one or more stressors (95% of respondents), followed by Broome (85%) and south-western WA (78%). The most prevalent stressors were death of a family member or close friend (41% of people surveyed), followed by unable to get a job (19%) and serious illness (18%).

Another indicator of a person's state of SEWB is the degree to which they experience positive feelings. In the 2014-15 NATSISS, respondents aged 18 years and over reported on feelings of happiness, calmness and peacefulness, fullness of life, and energy. In WA, Aboriginal and

Torres Strait Islander people reported that for all/some/most of the time: 90% felt happy; 82% felt calm and peaceful, 83% felt full of life and 79% had lots of energy [8].

In 2014-2015, 25% of Aboriginal and Torres Strait Islander people living in WA, aged 15 years and over, reported having a clinically diagnosed mental health condition, compared with 28% nationally [35].

SEWB is influenced by the support a person receives from their social networks, either in the form of emotional, physical or financial assistance [88]. The 2014-15 NATSISS showed that 92% of Aboriginal and Torres Strait Islander people in WA, aged 15 years and over, were able to obtain help from someone else, not in their household, during a time of crisis [86]. For the general population, people experience similar levels of social support: in the 2014 General Social Survey (GSS) it was found that 95% of respondents living in WA were able to access support at a time of crisis [89].

Hospitalisation

Reflecting the continuing high levels of distress experienced by many Aboriginal and Torres Strait Islander people living in WA, 1,203 of the hospital separations in 2016-17 for mental health care were identified as Aboriginal and Torres Strait Islander [34]. These separations accounted for 1.1% of all hospital separations for Aboriginal and Torres Strait Islander people.

More detailed information is available for hospitalisation rates during 2013-15 for Aboriginal and Torres Strait Islander people living in WA with a principal diagnosis of mental health related conditions[17] [35]. For this period, 5,392 Aboriginal and Torres Strait Islander people (2,668 males and 2,724 females) were hospitalised. Aboriginal and Torres Strait Islander males were hospitalised at 3.7 times the rate of non-Indigenous males and Aboriginal and Torres Strait Islander females at 2.9 times the rate of non-Indigenous females. For both the Aboriginal and Torres Strait Islander and non-Indigenous populations, hospitalisation rates for a principal diagnosis of mental health related conditions was highest in the 35-44 age group (69 per 1,000 and 14 per 1,000 respectively). The next highest rates among Aboriginal and Torres Strait islander people were in the 45-54 and 25-34 age groups (51 per 1,000 and 50 per 1,000 respectively) and for non-Indigenous people the 15-24, 25-34 and 65 plus age groups (all 13 per 1,000).

For 2013-15, hospitalisation rates for each sub-category within the ICD ‘Mental and behavioural disorders’ were generally higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people living in WA [35]. For this period, the age-adjusted separation rates for mental and behavioural disorders due to ICD ‘Psychoactive substance use disorders’ were higher for Aboriginal and Torres Strait Islander males and females than those for non-Indigenous males and females (males: rate ratio 7.2; females: rate ratio 8.3). Similarly, the rates for Aboriginal and Torres Strait Islander males and females for ICD ‘Schizophrenia, schizotypal, and delusional disorders’ were higher than the rates for non-Indigenous males and females (rate ratio 4.6 for both).

For 2013-15, in WA, there were 542 hospitalisations for Aboriginal and Torres Strait Islander people for a principal diagnosis of injury and poisoning and first reported external cause of self-harm [35]. Rates were higher for females (3.7 per 1,000) compared with males (2.4 per 1,000). Aboriginal and Torres Strait Islander people were 3.4 times more likely to be admitted for intentional self-harm than non-Indigenous people. After age-adjustment, separation rates for self-harm were 3.8 and 3.2 times higher for Aboriginal and Torres Strait Islander males and females respectively, than those for non-Indigenous males and females.

Mortality

The most recent detailed information indicates that mental health conditions accounted for 385 deaths among Aboriginal and Torres Strait Islander people living in NSW, Qld, WA, SA and the NT in 2011-2015 [46]. Of these 385 deaths, 167 were among males and 218 among females. After age-adjustment, death rates were 1.2 and 1.1 times higher for Aboriginal and Torres Strait Islander males and females respectively, than for non-Indigenous males and females.

In 2017, the death rate for ICD ‘Intentional self-harm’ for Aboriginal and Torres Strait Islander people living in WA was 1.8 times the rate reported for non-Indigenous people (27 and 14 per 100,000 population respectively) [33]. It was the third leading specific cause of death among Aboriginal and Torres Strait Islander people compared with a ranking of 11th for non-Indigenous people.

For 2013-2017, age-standardised death rates from intentional self-harm were 3.0 times higher for Aboriginal and Torres Strait Islander people living in WA (39 per 100,000) than for non-Indigenous people (13 per 100,000) [33]. Age-standardised death rates for Aboriginal and Torres Strait Islander people revealed that WA had the highest death rate, 39 deaths per 100,000, among jurisdictions for which data were available. Death rates were higher for Aboriginal and Torres Strait Islander males than females in jurisdictions for which details were available (Table 24).

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

Table 24. Age-standardised death rates for intentional self-harm among Aboriginal and Torres Strait Islander people, by sex and jurisdiction, and Aboriginal and Torres Strait Islander:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2013-2017

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

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

Source: ABS, 2018 [33]

Research in NSW, Qld, WA, SA and the NT has highlighted the increasing impact of suicide among young Aboriginal and Torres Strait Islander people, and a trend among young Indigenous males [8]. In the Kimberley region of WA between 2005-2014, the age-adjusted rate of suicide per year was 74 per 100,000, 68% of people who committed suicide were less than 30 years old and 71% were male [90]. The level of intentional self-harm has been recognised as a key indicator of Indigenous disadvantage [8].

Data sovereignty in Aboriginal and Torres Strait Islander health

There is increasing recognition of the importance of local level data in terms of data governance and sovereignty [91]. In recent years, it has become increasingly apparent that data pertaining to Indigenous people globally and Aboriginal and Torres Strait Islander people in Australia have promulgated a racialised narrative of Indigenous deficit. Walter in particular, has named the five 'D's; disparity, deprivation, disadvantage, dysfunction and difference that have infused much of the debate about Aboriginal and Torres Strait Islander people [92]. She also lamented the 'data desert' surrounding more positive strength based assessments of Aboriginal and Torres Strait Islander health [93]. There are a number of emerging data sources that gather local, culturally safe data such as the work of Eunice Yu and colleagues in the Kimberley Region [94]. In their research, they have conceptualised the social and emotional wellbeing using the local understandings of the word 'Liyan'. As Patrick Dodson, Paul Lane and Alan Duncan state in their forward to a Yap and Yu (2016) report, 'many of the indicators commonly used to capture Indigenous peoples' wellbeing are drawn from western concepts that fail to reflect the essential elements of a good life that resonate with Yawuru people' p. 8 [95]. Another striking example of local level data, is the study of Aboriginal suicide in the Kimberley [90]. As reported in this section, the local level data revealed suicide rates significantly, and worryingly, higher than reported in the national statistics. These local level statistics reenergised and recalibrated the debate and imperative towards urgent action in the region. These two case studies are exemplars of the importance of data sovereignty for the development of future policy and practice in Aboriginal and Torres Strait Islander health.

Kidney health (renal disease)

Kidney disease, renal and urologic disease, and renal disorder are terms that refer to a variety of different disease processes involving damage to the filtering units (nephrons) of the kidneys which affect the kidneys' ability to eliminate waste and excess fluid [96]. Of particular importance to Aboriginal and Torres Strait Islander people, is chronic kidney disease (CKD), which is defined as kidney damage or reduced kidney function that lasts for three months or more [97]. CKD is inclusive of different conditions, including diabetic nephropathy, hypertensive renal disease, glomerular disease, chronic renal failure, and end-stage renal disease (ESRD) [98]. If CKD is left untreated, kidney function can decrease to the point where kidney (renal) replacement therapy, in the form of dialysis (mechanical filtering of the blood to help maintain functions normally performed by the kidneys) or transplantation (implantation of a kidney from either a living or recently deceased donor) is necessary to survive [99]. ESRD, where the kidneys are operating at less than 15% of capacity and dialysis or transplant are required [96], is expensive to treat [100] and has a marked impact on the quality of life of those who suffer from the disease as well as those who care for them [101, 102].

Risk factors associated with kidney disease, include obesity, hypertension, diabetes mellitus, tobacco use, established CVD, age, family history, socioeconomic disadvantage [103] and LBW [104, 105]. These factors are particularly common among Aboriginal and Torres Strait Islander people and contribute to high rates of CKD [36, 99].

Extent of kidney disease among Aboriginal and Torres Strait Islander people

Prevalence/incidence

Around 1.7% of Aboriginal and Torres Strait Islander people in WA reported kidney disease as a long-term health condition in the 2012-13 AATSIHS, this compares with 1.8% nationally [45]. For the period 2011-2013, after age-adjustment, Aboriginal and Torres Strait Islander people in WA, aged 18 years and older, were 2.4 times more likely to have indicators[18] of CKD compared with non-Indigenous people (26% compared with 11% respectively); with the national rate being 2.2 times higher (22% compared with 10% respectively) [22].

With most information on CKD limited to self-reported data, the primary focus in the literature has been on ESRD. The overall incidence rate of ESRD for Aboriginal and Torres Strait Islander people nationally is consistently reported as being considerably higher than for non-Indigenous people [106]. Rates fluctuate from year to year but in recent years Aboriginal and Torres Strait Islander rates have been slowly increasing.

Data from the ANZDATA for the five-year period 2011-2015 reveal that the age-standardised notification rate of ESRD for Aboriginal and Torres Strait Islander people in WA was 1,090 per 1,000,000 population, 12.7 times the rate for non-Indigenous people (Derived from [18, 107-109]). WA had the second highest recorded rate in Australia behind the NT (Table 25).

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

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

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

Source: Derived from ABS, 2014 [18], ABS, 2003 [107], ABS, 2014 [108], ANZDATA, 2017, [109]

Of people newly registered with the ANZDATA in 2011-2015 from WA, 60% of Aboriginal and Torres Strait Islander people were aged less than 55 years, compared with 29% of non-Indigenous people. Notification rates were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people across all age-groups (where applicable) and the rate ratio was particularly high for the 45-54 age-group (24.3) (Table 26) (Derived from [18, 107-109]).

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

Age-group (years)	Aboriginal and Torres Strait Islander		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-14	0	n.p	10	4.4	n.p
15-24	4	44	17	10	4.2
25-34	22	311	49	25	12.4
35-44	57	1,013	81	46	21.8
45-54	104	2,357	159	97	24.3
55-64	90	3,398	219	162	21.0
65-74	31	2,930	246	276	10.6
75+	3	699	294	441	1.6
All ages	311	677	1,075	89	7.6

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

Source: Derived from ABS, 2014 [18], ABS, 2003, [107], ABS, 2014 [108], ANZDATA, 2017 [109]

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[18] Based on biomedical results.

Hospitalisation, dialysis and transplantation

In 2016-17, there were 1,816 per 1,000 hospital separations for Aboriginal and Torres Strait Islander people living in WA, 4.5 times the rate for non-Indigenous people (403 per 1,000) [34]. However, around 90% of the difference between these rates was due to higher separations for Aboriginal and Torres Strait Islander people admitted for dialysis.

Detailed information from ANZDATA is available for 2017 when a total of 83 (830 per 1,000,000 population) Aboriginal and Torres Strait Islander people living in WA commenced dialysis, an increase from 2016 (74 people, 756 per 1,000,000 population) [106]. In 2017, there were three new transplant operations for Aboriginal and Torres Strait Islander recipients, compared with 115 performed for non-Indigenous recipients. Data are not available for WA specifically however, nationally, at 31 December 2017, 31 (3.2%) of the 964[19] patients on the waiting list for a transplantation were Aboriginal and/or Torres Strait Islander. For the period 2014-2017, WA had the lowest median time between commencement of dialysis to receipt of first transplant for Aboriginal and Torres Strait Islander people (just under three years), NSW/ACT having the best results of around five years.

Haemodialysis (HD), conducted in urban or regional clinics and hospitals, is the most common form of dialysis treatment for Aboriginal and Torres Strait Islander people with ESRD [99, 106, 110]. For the period 2013-2017, WA had one of the highest rates (also SA and NT) for haemodialysis treatment for ESRD among Aboriginal and Torres Strait Islander people [106]. This pattern was also observed for peritoneal dialysis (Qld and NT also had high rates). In 2017, there were 425 prevalent dialysis patients in WA (PD and HD) identified as Aboriginal and Torres Strait Islander.

For 2013-15, the age-standardised hospitalisation rate for CKD (excluding dialysis) among Aboriginal and Torres Strait Western Australians was 6.3 times higher than for non-Indigenous people (8.3 per 1,000 and 1.3 per 1,000 respectively) [22]. For Aboriginal and Torres Strait Islander males and females, rates were both 6.2 times higher than for non-Indigenous males and females (males: 6.8 per 1,000 and 1.1 per 1,000 respectively, and females: 9.6 per 1,000 and 1.6 per 1,000 respectively). Rates increased with age, peaking for the 55-64 year age group (18 per 1,000), at 11.1 times the rate compared with non-Indigenous Western Australians in the same age group (1.6 per 1,000).

Mortality

There were 22 deaths from disease of the urinary system among Aboriginal and Torres Strait Islander people living in WA in 2017 [33].[20] After age-adjustment, the death rate for Aboriginal and Torres Strait Islander people was 4.2 times that for non-Indigenous people.

For 2012-2016, after age-adjustment, the death rate for kidney disease for Aboriginal and Torres Strait Islander people living in WA (30 per 100,000) was 3.1 times the rate for non-Indigenous people (9.6 per 100,000) [111].

Injury, including family violence

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

The classification of injury has generally followed the WHO's ICD, which includes particular attention to the external cause of the injury [38].[21] When looking at injury in Aboriginal and Torres Strait Islander contexts, there are a number of factors which must be taken into consideration. These include low socioeconomic contexts (which have a higher risk of injury because of unsafe environments) [114, 116], alcohol and other drug use, intimate partner violence [117], disruption to culture [112], as well as less access to prevention efforts and high-quality treatment and rehabilitation services.

Extent of injury and family violence among Aboriginal and Torres Strait Islander people in WA

Prevalence

In 2012-2013, 18% of Aboriginal and Torres Strait Islander people in WA reported an injury in the last four weeks [46]. Aboriginal and Torres Strait Islander people in remote areas of WA were slightly more likely to report an injury in the last four weeks than those in non-remote areas (19% and 17% respectively).

According to the 2014-15 NATSISS, 25% of Aboriginal and Torres Strait Islander people in WA aged 15 years and older had experienced physical or threatened violence in the last 12 months, a level greater than reported nationally (21%) [8]. Aboriginal and Torres Strait Islander people in WA aged 15 years and older were 2.7 times more likely than non-Indigenous people to have been victims of physical or threatened violence in the last 12 months.

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[19] Included 37 patients with an unreported Indigenous status.

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

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

Hospitalisation

In 2013-15 there were 10,165 hospitalisations of Aboriginal and Torres Strait Islander people in WA for a principal diagnosis of injury and poisoning [46]. After age adjustment, Aboriginal and Torres Strait Islander people were 2.5 times more likely to be hospitalised for a principal diagnosis of injury and poisoning than non-Indigenous people. Aboriginal and Torres Strait Islander females were 2.9 times more likely to be hospitalised for a principal diagnosis of injury and poisoning than non-Indigenous females, and Aboriginal and Torres Strait Islander males were 2.3 times more likely to be hospitalised for a principal diagnosis of injury and poisoning than non-Indigenous males.

Aboriginal and Torres Strait Islander males and females across all age groups were more likely to be hospitalised for a principal diagnosis of injury and poisoning than non-Indigenous people [46]. The greatest disparity between Aboriginal and Torres Strait Islander and non-Indigenous males was in the 35-44 and 45-54 years age groups, where the rate of hospitalised injury was 3.7 times higher. For Aboriginal and Torres Strait Islander females, the greatest disparity was in the 25-34 and 35-44 years age groups, where the rate of hospitalised injury was 6.0 times higher than for non-Indigenous females.

The leading external causes of injury-related hospitalisations for Aboriginal and Torres Strait Islander people in WA in 2013-15 were assault (30%), falls (17%), complications of medical and surgical care (13%) and exposure to inanimate mechanical forces (11%) [46].

Assaults account for a higher proportion of injury-related hospitalisation among Aboriginal and Torres Strait Islander people than among non-Indigenous people in WA; in 2013-15, Aboriginal and Torres Strait Islander people were 23.9 times more likely to be hospitalised for assault than non-Indigenous people [46]. This disparity is particularly high among Aboriginal and Torres Strait Islander females, who were 56.2 times more likely to be hospitalised for assault than non-Indigenous females.

Mortality

In the period 2011-2015, there were 454 Aboriginal and Torres Strait Islander deaths from injury in WA, representing 19% of all deaths in the state [46]. After age-adjustment, Aboriginal and Torres Strait Islander people in WA died from injury at 2.7 times the rate of non-Indigenous people.

Respiratory health

Respiratory health can be compromised by a number of conditions that affect the airways and other structures of the lung [118] and impair the process of breathing and oxygen delivery [119]. These conditions range from acute respiratory infections to chronic respiratory conditions [36].

Respiratory disease is associated with a number of contributing factors, including: risky behaviours (particularly tobacco use); environmental conditions; occupational exposures and hazards [36, 120]; family history and other health conditions (obesity, infectious diseases) [120]. 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 [121, 122].

Extent of respiratory disease among Aboriginal and Torres Strait Islander people

Prevalence

Long-term diseases of the respiratory system[22] were reported by 28% of Western Australian Aboriginal and Torres Strait Islander people who participated in the 2012-13 AATSIHS [35]. Respiratory disease was reported more by people living in non-remote areas (32%) than those in remote areas (22%).

Asthma was reported by 15% of Aboriginal and Torres Strait Islander people in the 2012-13 AATSIHS [123]. WA had the second lowest proportion of people reporting asthma as a long-term condition; the ACT/NSW had highest levels at 23% and the national level was 18%.

Hospitalisation

For 2013-15, the age-standardised hospitalisation rate for respiratory disease among Aboriginal and Torres Strait Western Australians was 3.8 times higher than for non-Indigenous people (53 per 1,000 and 14 per 1,000 respectively) [35]. For Aboriginal and Torres Strait Islander males, rates were 3.6 times higher than for non-Indigenous males (54 per 1,000 and 15 per 1,000 respectively) and 4.2 times higher for females (53 per 1,000 and 13 per 1,000 respectively). Rates were highest for both Aboriginal and Torres Strait Islander and non-Indigenous people in the 65 years and older age-group (118 per 1,000 and 40 per 1,000 respectively). The next highest rate for both populations was for children aged 0-4 years: Aboriginal and Torres Strait Islander children had a rate of 103 per 1,000 and non-Indigenous children had a rate of 33 per 1,000. The greatest gap between the two populations was in the 45-54 years age-group, with Aboriginal and Torres Strait Islander people 9.4 times more likely to be hospitalised for a disease of the respiratory system than non-Indigenous people (69 per 1,000 and 7.4 per 1,000 respectively).

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[22] Individuals who reported a current respiratory condition that had lasted, or was expected to last, for six months or more [123].

Mortality

In 2017, chronic lower respiratory disease (which includes asthma, bronchitis, bronchiectasis, emphysema, and other COPD) was the fourth highest cause of death overall for Aboriginal and Torres Strait Islander people living in WA (responsible for 23 deaths) [33]. After age-adjustment, the death rate for chronic lower respiratory disease among Aboriginal and Torres Strait Islander people was 3.3 times higher than the non-Indigenous rate.

For the period 2011-2015, respiratory diseases were responsible for 166 deaths among Aboriginal and Torres Strait Islander people living in WA [22]. The age-standardised death rate from respiratory diseases for Aboriginal and Torres Strait Islander people (110 per 1,000) was more than twice as high as that for non-Indigenous people (47 per 1,000).

For the period 2013-2017, chronic lower respiratory diseases were responsible for 108 deaths (63 males and 45 females) of Aboriginal and Torres Strait Islander people living in WA [33]. The age-adjusted death rate for Aboriginal and Torres Strait Islander people was 3.1 times higher than the non-Indigenous rate (72 per 100,000 and 23 per 100,000 respectively). For Aboriginal and Torres Strait Islander males and females, rates were 3.4 and 2.7 times higher than the rates for non-Indigenous males and females (males: 92 and 27 per 100,000 respectively and females: 56 and 20 per 100,000).

Eye health

Eye health can be affected by a number of factors, including genetics, ageing, premature birth, diseases (such as diabetes), infections, injuries, ultraviolet (UV) exposure, nutrition and tobacco use [88, 124, 125]. Poor vision can limit opportunities in education, employment and social engagement; it can also increase the risk of injury and be a reason for dependence on services and other people [46, 126, 127]. Even partial loss of vision can reduce an individual's ability to live independently and increase the risk of mortality [128-130].

A range of factors heighten the risk of certain eye conditions among Aboriginal and Torres Strait Islander people [131]. There is however, evidence that Aboriginal and Torres Strait Islander children, especially those living in remote areas, generally experience better vision than non-Indigenous children [8, 132].

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[23] and surveillance activities that rely on eye examinations or self-report[24].

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

The National Eye Health Survey (NEHS) was conducted between March 2015 and April 2016 [131]. It provides the latest evidence about the prevalence, causes and treatment of VI and blindness 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. Specific age-adjusted data for WA is limited to bilateral VI which occurred among 16% of Indigenous Australians [135], compared with the national occurrence of 14% [131]. The NEHS found that the prevalence of bilateral VI was 2.7 times higher among Western Australian Indigenous participants than non-Indigenous participants.

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 [136], self-reported information is the only recent data available for some aspects of eye health. The most recent self-reported information on eye health problems comes from the 2014-15 NATSISS. In 2014-2015, 15% of Aboriginal and Torres Strait Islander people, living in WA, aged 15 years and over reported having eye or sight problems [22, 35]. Eye problems were more likely to be reported in remote areas (17%) than in non-remote areas (15%) [22].

Eye and sight problems were reported in the 2012-13 AATSIHS by 30% of Western Australian Aboriginal and Torres Strait Islander people, making it the most commonly reported long-term health condition [85].

Prevalence estimates of trachoma and trichiasis based on surveillance

The National Trachoma Surveillance and Reporting Unit provides prevalence data for trachoma which shows there have been substantial improvements in trachoma control in Indigenous communities in Australia [137]. In WA, the number of at-risk communities screened for trachoma has more than halved since 2010 (from 75 communities in 2010 to 34 communities in 2017, however the observed prevalence of active trachoma among Indigenous children aged 5-9 years in selected WA remote communities has decreased only marginally, from 10% in 2010 [138] to 8.8% in 2017 [137]. In 2017, the observed prevalence of active trachoma ranged from 4.8% in five communities in the Midwest to 13% in six communities in the Pilbara [137].

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

[24] Self-reported survey data may underestimate the prevalence of health conditions because participants: may not have been diagnosed yet, may not be willing to disclose a diagnosis, may have forgotten the diagnosis or misinterpreted the survey question [134].

In 2017, screening was undertaken in at-risk communities in Qld, WA, SA, and the NT. Among the 2,872 children screened (534 in WA), 91 cases were detected: 47 were in WA, 15 in SA, and 29 in the NT, with no children with active trachoma detected in Qld [137]. For WA, no trachoma was reported in children aged 5-9 years in 39% of at-risk communities, however, endemic levels of trachoma (greater than 5%) were reported in 59% of the at-risk communities.

If left untreated, trachoma can cause scarring of the eyelid and in-turned eyelashes (trichiasis) that lead to blindness [137]. In 2017, screening in at risk communities in WA detected trichiasis in 0.1% of Indigenous adults aged 15 years and over 0.2% of those aged 40 years and over. A total of three cases of trichiasis were detected in Indigenous adults over 40 years of age (one in the Goldfields and two in the Kimberley). Trichiasis was not detected in any adults in the 15-40 year age-group.

Eye health outreach programs and hospitalisation

Outreach programs have been established to enhance access to health services across Australia [139]. Currently, the Australian Government funds three programs that incorporate eye health specialists and related services. These are delivered primarily in regional and remote regions and include WA. The programs are the Visiting Optometrists Scheme (VOS), Rural Health Outreach Fund (RHOF) and Medical Outreach Indigenous Chronic Disease Program (MOICDP). In WA, in 2016-17, VOS provided 3,096 occasions of service (rate: 31 per 1,000 occasions) for Aboriginal and Torres Strait Islander people living in WA; RHOF provided 2,345 (rate: 39 per 1,000) and MOICDP provided 563 (rate: 5.7 per 1,000) [135]. In the context of all states and territories, WA was ranked in the top two jurisdictions for occasions of services under the three programs.

In WA, for the period July 2014 to June 2016. Aboriginal and Torres Strait Islander people were hospitalised for diseases of the eye at a lower age-standardised rate (14 per 1,000) compared with non-Indigenous people (17 per 1,000) [135]. Information is available for hospitalisation rates in relation to cataract extraction, with WA accounting for the highest rate among Aboriginal and Torres Strait Islander people (3.9 per 1,000).

More detailed hospitalisation data are available for 2013-15; after age-adjustment, rates for a principal diagnosis of diseases of the eye and adnexa were lower among Aboriginal and Torres Strait islander people in WA (14 per 1,000) compared with non-Indigenous people (17 per 1,000) [35]. Aboriginal and Torres Strait Islander males and females were hospitalised at the same rate (14 per 1,000), however, non-Indigenous females were hospitalised at the highest rate (18 per 1,000) and males (17 per 1,000). Hospitalisation rates for Aboriginal and Torres Strait Islander people increased with age from 25-34 years (1.8 per 1,000) to 65 years and over (67 per 1,000). However, the rate for children 0-4 years of age was 2.0 per 1,000.

Between July 2014 and June 2016, there were also 368 hospitalisations (crude rate of 1.9 per 1,000 separations) for eye injury among Aboriginal and Torres Strait Islander people in WA, second to the NT (2.7 per 1,000) [135].

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, 143-145]. 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 [146].

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 [8]. A reduced risk of OM has been found for children who were breastfed [8, 147].

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 otitis media described among children living in some remote communities in northern and central Australia have been such that they would be classified by the WHO as being ‘a massive public health problem’ requiring ‘urgent attention’ [148, p.2].

Multiple surveys undertaken between 2001 and 2013 showed that 90% of children under three years of age living in remote communities in the northern region of Australia (including one community in WA) had some form of OM [149, 150].

Ear/hearing problems were reported for 10% of Western Australian Aboriginal and Torres Strait Islander children aged 0-14 who participated in the 2014-15 NATSISS, the second highest proportion, after the NT (11%) [35]. For Aboriginal and Torres Strait Islander people 15 years and over, the proportion reporting ear or hearing problems as a long-term condition was 8.9%.

Ear/hearing problems were reported as a long-term health condition by 13% of Aboriginal and Torres Strait Islander people from WA who participated in the 2012-13 AATSIHS [35]. Ear/hearing problems were reported more by participants living in a remote area (14%) than non-remote area (13%). After age-adjustment, the rate for ear/hearing problems for Aboriginal and Torres Strait Islander people was 1.3 times higher than for non-Indigenous people (17% compared with 13%) [22].

Hospitalisation

For 2013-15, the age-standardised hospitalisation rate for middle ear and mastoid conditions for Aboriginal and Torres Strait Islander children, in WA, aged 0-14 years (14 per 1,000) was 1.9 times the rate for non-Indigenous children (7.2 per 1,000) [35]. Rates for Aboriginal and Torres Strait Islander people aged 15 years and over (1.8 per 1,000) were 1.2 times higher than for non-Indigenous people (1.5 per 1,000). Aboriginal and Torres Strait Islander females 15 years and over (2.5 per 1,000) were hospitalised at 1.5 times the rate of non-Indigenous females (1.7 per 1,000). However, non-Indigenous males were hospitalised at a higher rate than Aboriginal and Torres Strait Islander males (1.4 and 0.9 per 1,000 respectively).

A data linkage study for children born in WA between 1996 and 2012 found that Aboriginal children (less than 15 years of age) were 10 times more likely to be hospitalised for a middle ear infection than non-Aboriginal children (23 per 1,000 child years compared with 2.4 per 1,000 child years) [151]. However, Aboriginal children were less likely to have a medical procedure than non-Aboriginal children [151]. Aboriginal children were hospitalised at higher rates, compared with non-Aboriginal children, across all age groups, with the greatest gap in the 0-5 month age group. Also, Aboriginal children living in rural or remote areas were 1.9-4.6 times more likely to be hospitalised for a non-procedural middle ear infection than Aboriginal children living in the metropolitan area.

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 [152]. One of the most common oral diseases is tooth decay (dental caries) [153].

Tooth decay occurs when bacteria in plaque interacts with sugar in food and drink to produce acids that degrade tooth enamel [154]. 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 tooth decay is the consumption of free sugars[25]. Untreated tooth decay can lead to pain and an increased likelihood of root canal therapy or tooth extraction being needed.

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

A study of data collected from Western Australian school children aged 5-15 years during dental examinations conducted by the WA School Dental Service in 2014 found that:

- The average number of decayed, missing or filled[26] baby teeth for Aboriginal and Torres Strait Islander children aged 5-10 years was 1.9 times the average number for non-Indigenous children (2.54 teeth compared with 1.37 teeth).
- The average number of decayed, missing or filled adult teeth for Aboriginal and Torres Strait Islander children aged 6-15 years was twice the average number for non-Indigenous children (0.96 teeth compared with 0.49 teeth) [155].

The study found that the differences in rates of decayed teeth between Aboriginal and Torres Strait Islander children and non-Indigenous children persisted when other factors were controlled for (rate ratio 1.8 for baby teeth and 2.4 for adult teeth).

In the 2010 Child Dental Health Survey, the proportion of Aboriginal and Torres Strait Islander children in WA who had no decay experience in their baby or adult teeth respectively varied by remoteness (Table 27) [46].

Table 27. Percentage of Aboriginal and Torres Strait Islander children with no decayed, missing or filled teeth, by remoteness and tooth type/age, WA, 2010

	Major cities	Inner regional	Outer regional	Remote/very remote
Children aged 5-10 years with no decay experience in baby teeth	25	34†	34	38
Children aged 6-15 years with no decay experience in adult teeth	43†	75	48	37*

Note: 1† Estimate has a relative standard error between 25% and 50% and should be used with caution.

Source: AIHW, 2017 [46]

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

[26] Counting decayed, missing and filled teeth is one way of measuring the severity of tooth decay.

The 2014-15 NATSISS collected data about the self-reported tooth or gum problems of Aboriginal and Torres Strait Islander children [46]. In 2014-2015 in WA, the proportion of 0-14 year-old children with reported tooth or gum problems was 26%, compared with 28% nationally.

The 2012-13 AATSIHS collected information about the self-reported tooth loss of Aboriginal and Torres Strait Islander adults (excluding the loss of wisdom teeth). In 2012-2013 in WA, the proportion of people aged 15 years and over with complete tooth loss was 2.9%, which was lower than the national level (4.7%) [22]. In remote areas of WA, the proportion was 2.3%, compared with 3.3% in non-remote areas of WA.

Dentist visits and hospitalisation

In the 2012-13 AATSIHS, around 4.2% of all Aboriginal and Torres Strait Islander people in WA aged 2 years and over reported visiting a dental professional in the two weeks[27] prior to the survey, compared to 4.8% nationally [86].

In 2015-16, after age-adjustment, hospitalisation rates for acute dental conditions in WA were 1.2 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (4.4 per 1,000 and 3.7 per 1,000 population respectively) (Derived from [111]). Nationally, acute dental hospitalisation rates for Aboriginal and Torres Strait Islander people (3.9 per 1,000) were 1.4 times higher than those for non-Indigenous people (2.8 per 1,000).

In 2013-15 in WA, the crude rate of hospitalisation for dental problems for Aboriginal and Torres Strait Islander people was 2.4 per 1,000, compared with 2.6 per 1,000 nationally [46]. The age-adjusted rate of hospitalisation for dental problems for Aboriginal and Torres Strait Islander people in WA (1.6 per 1,000) was 0.8 times the rate for non-Indigenous people (2.0 per 1,000). Nationally, the age-adjusted rate for Aboriginal and Torres Strait Islander people (1.8 per 1,000) was 1.2 times higher than the rate for non-Indigenous people (1.5 per 1,000).

In 2013-15 in WA, there was a slight difference between crude hospitalisation rates for dental problems for Aboriginal and Torres Islander males (2.5 per 1,000) and females (2.2 per 1,000) [46]. Nationally, Aboriginal and Torres Strait Islander males and females were hospitalised for dental problems at identical rates (2.6 per 1,000).

In 2013-15 in WA, rates of dental hospitalisation were highest among Aboriginal and Torres Strait Islander people in the 0-4 years age-group (8.0 per 1,000) and the 5-14 years age-group (5.5 per 1,000) [46]. Rates were also highest for non-Indigenous people in these age groups. Hospitalisation rates for dental problems in WA were lower for Aboriginal and Torres Strait Islander than non-Indigenous people in all age-groups, except the 0-4 years age-group where Aboriginal and Torres Strait Islander children were hospitalised at 1.5 times the rate of non-Indigenous children, and the 25-34 years age-group where rates were the same for both populations. This was not the case nationally, where rates of dental hospitalisation were higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people in the 0-44 years age-groups.

Disability

Disability can be defined as a limitation, restriction or impairment which has lasted, or is likely to last, for at least six months and restricts everyday activities [156]. 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 [66, 157]. A profound or severe core-activity limitation refers to a specified condition for which the person requires help or supervision in one or more core activities (e.g. self-care, mobility or communication) [88].

Aboriginal and Torres Strait Islander people may perceive the concept of disability differently to non-Indigenous people [158]. For Aboriginal and Torres Strait Islander people, the concept of disability is often viewed within the context of their beliefs, attitudes and experiences of disability.

The greater burden of disability experienced by Aboriginal and Torres Strait Islander people is associated with poorer physical and mental health, increased exposure to risk factors, and higher levels of socio-economic disadvantage [66, 88].

Extent of disability among Aboriginal and Torres Strait Islander people

Prevalence

The 2016 Census only provided information on assistance for Australians with a profound or severe disability. In 2016, 4.9% of Aboriginal and Torres Strait Islander people in WA reported a need for assistance with either self-care, mobility or communication (for an additional 8.5% of respondents, a need for assistance was not stated) [159]. Of those who needed assistance, more females (52%) needed assistance than males (48%).

In the 2014-15 NATSISS, 6% of Aboriginal and Torres Strait Islander people in WA reported having a profound or severe disability [88].

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[27] This data cannot be used to reliably calculate annual aggregates of service usage [86].

In the 2014-15 NATSISS, 43% of Aboriginal and Torres Strait Islander people in WA aged 15 years and over reported having a disability or restrictive long-term health condition [22]. After age-adjustment, the rate of Aboriginal and Torres Strait Islander people reporting having a disability or restrictive long-term health condition in WA was 1.6 times that of non-Indigenous people (470 per 1,000 and 287 per 1,000 respectively).

Services

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

The NDS, at a national level, aims to improve the lives of people living with a disability [160]. The second implementation plan for the NDS acknowledges the specific needs of Aboriginal and Torres Strait Islander people with disability [161]. As part of the NDS, the Government developed the *Australian Government plan to improve outcomes for Aboriginal and Torres Strait Islander people with disability* to address these often complex and multi-faceted needs [162]. The plan covers areas for future attention and includes activities relating to education, employment, health and the NDIS [46].

The NDA previously identified increasing access to disability services for Aboriginal and Torres Strait Islander people, as a priority area for all Australian governments (COAG) [163, 164]. The *National Indigenous access framework* forms part of the NDA and aims to ensure that the needs of Aboriginal and Torres Strait Islander people with disability are addressed through accessible and appropriate service delivery [164]. NDA services[28] include accommodation support, community support, community access, respite and employment services [166].

The NDIS aims to assist people with marked and permanent disabilities who require assistance with everyday activities [167]. Access is determined according to a set of criteria. If eligible, individuals are provided with funding to purchase the support they require. The NDIS is being introduced across Australia in stages and over time most NDA recipients will be expected to transition to the NDIS. Not all NDA users will be eligible for the NDIS, however, the government has guaranteed ‘continuity of support services’ so they are not disadvantaged [168].

For disability services provided under the NDA for 2016-17 in WA, 6.7% of service users were identified as Aboriginal and Torres Strait Islanders [165].

In 2016-17 in WA, 90% of Aboriginal and Torres Strait Islander service users were aged under 50 years; 9.1% were aged 50-64 years and 1.2% were aged 65 years and over [165].

In 2014-15 in WA, after age adjustment, the rate of Aboriginal and Torres Strait Islander service users aged under 65 years was 1.9 times that of non-Indigenous people (21 and 11 per 1,000, respectively) [22]. The rate was higher for Aboriginal and Torres Strait Islander males (25 per 1,000) than females (18 per 1,000).

Communicable diseases

Communicable diseases (caused by infectious agents e.g. bacteria, viruses, parasites, fungi, or their toxic products) can be passed from a person or an animal to another [169]. Risk factors vary according to the type of disease. Improvements to sanitation and the increased use of vaccination and antibiotics have markedly reduced some infectious diseases in Australia [169, 170].

Sexually transmitted infections

Sexually transmissible infections (STIs) include bacterial, viral and parasitic infections that are transmitted through sexual contact [171]. Young people are particularly vulnerable to STI infections. The use of condoms is regarded as fundamental in preventing STI transmission. Most STIs are treatable and early detection is important in the management of STIs.

Chlamydia

Chlamydia is an infection caused by the bacterium *Chlamydia trachomatis* and is asymptomatic in about 80% of cases [172]. In 2017, there were 1,602 notifications of chlamydia for Aboriginal and Torres Strait Islander people living in WA, accounting for 24% of the notifications in Australia for this population. The age-standardised notification rate[29] for chlamydia was 3.0 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (1,256 per 100,000 compared with 415 per 100,000). Rates declined in WA among the Aboriginal and Torres Strait Islander population from 1,309 per 100,000 in 2013 to 1,125 per 100,000 in 2015 before increasing again to 1,248 and 1,256 per 100,000 in 2016 and 2017 respectively.

Gonorrhoea

Gonorrhoea is an infection caused by the bacterium *Neisseria gonorrhoeae* [172]. In 2017, there were 1,153 gonorrhoea notifications for Aboriginal and Torres Strait Islander people living in WA accounting for 29% of the notifications in Australia for this population. The

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[28] Additional services include advocacy and ‘other’ support, however, data are not collected for these service groups [165].

[29] In WA, chlamydia notifications for Aboriginal and Torres Strait Islander status were ≥50% complete for 2017 [172].

age-standardised notification rate[30] was 10.4 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people in WA (936 per 100,000 and 90 per 100,000 respectively). WA had the second highest Aboriginal and Torres Strait Islander rate, after the NT (rate ratio: 16.8). Rates declined in WA among the Aboriginal and Torres Strait Islander population from 943 per 100,000 in 2013 to 685 per 100,000 in 2015 before increasing again to 797 per 100,000 in 2016 and then stabilising at close to 2013 rates of 936 per 100,000 in 2017.

Syphilis

Syphilis is an infection caused by the bacterium *Treponema pallidum* [172]. In 2017, there were 72 syphilis notifications for Aboriginal and Torres Strait Islander people living in WA, accounting for 9.2% of the notifications in Australia among this population. The syphilis age-standardised notification rate[31] for Aboriginal and Torres Strait Islander people in WA was 6.6 times higher than that for non-Indigenous people (67 per 100,000 and 10 per 100,000 respectively). For the period 2013-2017, syphilis rates increased in WA among the Aboriginal and Torres Strait Islander population from 8.4 per 100,000 in 2013 to 67 per 100,000 in 2017, an increase of 696%.

The human immunodeficiency virus (HIV)

The human immunodeficiency virus (HIV) can be transmitted either by sexual or blood contact and from mother to child; if untreated, it can progress to acquired immune deficiency syndrome (AIDS) [172].

In 2017, there were 963 cases of newly diagnosed HIV infection in Australia, of which 31 (3.2%) were of Aboriginal and Torres Strait Islander people [172]. Of these 31 cases, three were in WA, accounting for 9.7% of the notifications among Aboriginal and Torres Strait Islander people for that year. For the period 2013-2017, in WA, there were 17 cases of HIV diagnosed among Aboriginal and Torres Strait Islander people.

Hepatitis

Hepatitis is an inflammation of the liver which can be caused by viral infections [169].

Hepatitis C

Transmission of hepatitis C virus (HCV) mainly occurs via blood contact and from mother to newborn [172]. New treatment for HCV; direct-acting antiviral therapies have been found to be highly effective [173]. There is no vaccine to protect people against HCV [174].

In 2017, there were 294 notifications of HCV for Aboriginal and Torres Strait Islander people living in WA, accounting for 40% of the cases in Australia among this population [172]. After age-adjustment, the notification rate for HCV was 8.5 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people (303 per 100,000 and 36 per 100,000 respectively). Rates increased in WA among the Aboriginal and Torres Strait Islander population from 217 per 100,000 in 2013 to 303 per 100,000 in 2017.

Hepatitis B

Transmission of hepatitis B virus (HBV) may be from blood or sexual contact or from mother to child at birth [172].

In 2017, there were 33 notifications of HCV for Aboriginal and Torres Strait Islander people living in WA, accounting for 45% of the cases in Australia among this population, and the highest for the jurisdictions for which data were collected [172]. After age-adjustment, the notification rate for Aboriginal and Torres Strait Islander people was 2.5 times higher than for non-Indigenous people (52 per 100,000 and 21 per 100,000 respectively). From 2013 to 2017, rates in WA increased by 25% from 42 per 100,000 in 2013 to 52 per 100,000 in 2017.

Pneumococcal disease

Pneumococcal disease results from infection by the bacterium *Streptococcus pneumoniae* that may cause severe invasive disease including meningitis, pneumonia, bacteraemia and non-invasive disease, including OM [175].

Nationally-funded vaccination for pneumococcal disease is available for Aboriginal and Torres Strait Islander infants, adults aged 50 years and older and those aged 15-49 years at high risk [175].

For 2018, in WA, there were 50 cases of invasive pneumococcal disease (IPD) identified as Indigenous [176-179].

For 2011 and 2012, there were 23 deaths, attributed to IPD among Aboriginal and Torres Strait Islander people nationally [180]. In WA, among Aboriginal and Torres Strait Islander people there were five deaths in 2011 and one in 2012.

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[30] In WA, gonorrhoea notifications for Aboriginal and Torres Strait Islander status were ≥50% complete for 2017 [172].

[31] In WA, syphilis notifications for Aboriginal and Torres Strait Islander status were ≥50% complete for 2017 [172].

Tuberculosis

Tuberculosis (TB) is primarily a lung infection caused by the inhalation of *Mycobacterium tuberculosis* bacteria [181].

For 2010-2014:

- Of the 172 Australian-wide notifications of TB identified as Indigenous, nine (5.2%) were for Indigenous people living in WA [182-185].
- In WA, the notification rate for TB was 2.0 cases per 100,000 population for Indigenous people (Derived from [18, 182-185]). After age-adjustment, the notification rate for TB for Indigenous people in WA was 4.0 times higher than for Australian-born non-Indigenous people.[32]

Skin health

The most common skin infections affecting Aboriginal and Torres Strait Islander children are scabies and impetigo [186, 187]. Scabies is a skin disease caused by the mite *Sarcoptes scabiei* that produces skin inflammation and itching [188]. Scratching in response to a scabies infestation can result in impetigo[33], a bacterial infection of the skin [188-190]. Recent research suggests that scabies mites could also spread bacterial infection and promote bacterial growth [186, 191]. Impetigo in Aboriginal and Torres Strait Islander communities commonly involves GAS, which brings a risk of severe effects including kidney disease and, possibly, ARF [186, 191-195].

Resource-poor environments [186, 189, 195-197] and the ‘normalisation’ of infections in communities [198] are associated with an increased burden of skin infections and infestations. However, preventative, focused and collaborative programs based within remote Aboriginal communities have had some positive outcomes [192, 199-201].

Risk factors for impetigo include poverty, overcrowding, lack of water, poor hygiene, tropical climate, scabies and other conditions affecting skin integrity [190, 192, 195, 196, 202].

Prevalence

Scabies is endemic in some remote central and northern Aboriginal and Torres Strait Islander communities, affecting both adults and children [203, 204]. Most prevalence data available are 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 [205]. Aboriginal and Torres Strait Islander people, particularly those living in the high-rainfall, humid areas of northern Australia, are also vulnerable to a variety of other fungal and bacterial infections [192].

Recent prevalence data for skin disease among Aboriginal and Torres Strait Islander people in WA are limited, particularly in remote settings [206]. A study was undertaken in two remote Aboriginal communities during 2000-2002 on the benefits of swimming pools for the health of Aboriginal and Torres Strait Islander children under 17 years of age. It found that skin disease was initially detected in 64% of participants in community A and 78% in community B. The prevalence of impetigo was 62% and 70% for the two communities respectively [207], reducing during the period of the study to 18% and 20%.

Hospitalisation and primary health care presentations

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 [208]. In WA, for the period 2014-15, emergency presentations for illness of the skin/subcutaneous tissue/breast accounted for 10% of all emergency department presentations by Indigenous people. This category of diagnosis had the highest number of presentations. This compares to a national figure of 6.7% (which ranked fourth for presentations).

In 2014-15, the age specific hospitalisation rates of ‘diseases of the skin and subcutaneous tissue’ as principal diagnosis among Aboriginal and Torres Strait Islander children aged four years and under in WA was 6.0 times higher than for non-Indigenous children (21 and 3.5 per 1,000 respectively) [8].

Between October 2015 and January 2016, 49% of children under 16 years of age (74% who were Aboriginal), admitted to two regional hospitals in WA were diagnosed with impetigo and 8.2% with scabies [209, 210].

In a WA study to ascertain the burden of communicable diseases, including skin infections, in the Western Desert, a review of clinical presentations for 2007-2012, of all children aged 0-5 years, was undertaken [211]. It determined that skin infections (sores, scabies and fungal infections) accounted for 16% of presentations. Skin sores affected children in all age groups with 72% of participants presenting at least once with skin sores. Scabies accounted for 2% of presentations, however, it predominantly affected children under the age of six months (25% of presentations).

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[32] Reflecting the fact that the vast majority of new cases of TB in Australia are among people born overseas, the analysis here compares the notification rates of Indigenous people with those of Australian-born non-Indigenous people.

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

In 2014, a healthy skin initiative in a remote Aboriginal community in the Kimberley was implemented in response to an outbreak of acute post streptococcal glomerulonephritis which can affect the kidneys after a GAS infection of the throat or skin [212]. Before the intervention, 9.5%, of all primary health care presentations to the local clinic among Aboriginal children 0-17 years, were for scabies. This dropped to 2.2% after the initiative was implemented.

A retrospective study of Western Australian children born between 1996 and 2012 found that Aboriginal children were hospitalised for skin infections at an age-specific rate 15 times higher than non-Indigenous children (32 and 2.1 per 1,000 respectively) [213]. Fifty-nine percent (59%) of total skin infection admissions were an associated principal diagnosis. In Aboriginal children, a principal diagnosis of scabies accounted for 16% and impetigo and pyoderma (14%). Admissions were significantly higher in children less than one year of age with Aboriginal infants 23 times more likely to be hospitalised with skin infections than non-Indigenous children (79 and 3.5 per 1,000 respectively). However, these rates for infants did decline over the study period. Remote regions including the Pilbara (47 per 1,000), Kimberley (45 per 1,000) and Goldfields (42 per 1,000) had the highest hospitalisation rates for Aboriginal children less than 16 years of age.

Factors contributing to Aboriginal and Torres Strait Islander health

Selected health risk and protective factors

The factors contributing to the health status of Aboriginal and Torres Strait Islander people should be seen within the broad context of the social determinants of health [169, 214, 215]. The WHO describes the social determinants of health as the conditions in which people are born, grow, live, work and age [216]. A life course approach to health and the risk of disease, known as life course epidemiology, integrates theories about the social determinants of health, fetal and developmental origins of disease and the impact of lifestyle and individual behaviour [217]. The determinants of health, some of which are discussed in the *Social and cultural concepts* section of this *Overview*, are shaped by a wider set of forces and systems, including policies, political systems and social norms [216, 218].

For the health of Aboriginal and Torres Strait Islander people, social disadvantage needs to be considered together with 'health risk and protective factors'. These are the behaviours, characteristics, or exposures that may increase or decrease the likelihood of developing a particular health condition [219]. Health risk and protective factors can be divided into non-modifiable factors, often biomedical (e.g. age, sex, genetics), and modifiable factors which are environmental or behavioural and which, in theory, can be changed [66]. It is important to note that risk is based on probability, or likelihood [220]. Not everyone who is exposed to a known risk factor will have an adverse outcome, and people may develop a health condition without ever having been exposed to an associated risk factor.

The selected health risk and protective factors summarised in the following sections are generally related to individual behaviour. However, these behavioural factors should be considered within the context of the social determinants of health and structural influences that could be shaping behaviour and ability to make changes [169, 221]. Research undertaken in WA emphasised the importance of having a strong cultural identity in enabling Aboriginal people to make healthy choices [222].

Environmental health

Environmental health refers to the physical, chemical and biological factors that may affect people in particular surroundings or settings [223]. Environmental factors can be associated with ill health conditions including intestinal and skin infections and some chronic diseases, for example, acute rheumatic fever, respiratory issues (such as asthma) and some cancers [224]. Aboriginal and Torres Strait Islander people are disproportionately affected by the diseases associated with environmental health due to a number of factors, including: the remoteness of some communities; poor infrastructure; lack of access to tradespeople and repairs; and the cost of maintenance [224, 225].

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

Overcrowding

Cultural aspects need to be considered in relation to housing conditions and overcrowding for Aboriginal and Torres Strait Islander people. Contributions to overcrowding include: visits to other households (to see relatives, for funerals or because of ties to neighbourhoods or towns and to be closer to 'country') and the high importance placed on demand sharing[34] [226].

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 [16]. In 2016, 20% of Aboriginal and Torres Strait Islander Western Australians were living in an overcrowded house. In the context of all states and territories, WA had the second-highest levels of overcrowding after the NT (53%).

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[34] Demand sharing is mainly where resources and money are shared within an extended family group [226].

More detailed information on overcrowding is available for the period 2014-2015. This data shows that there have been some decreases in overcrowding in Aboriginal and Torres Islander households in recent years [8]. In 2014-2015, the proportion of Aboriginal and Torres Strait Islander people living in overcrowded households in WA was 25%, this compares with 30% in 2008, and 33% in 2004-2005. The average number of persons per bedroom has also seen improvements over the ten year period 2004-2005 to 2014-2015. In 2004-2005, the average number of persons per bedroom was 1.2, this figure has decreased to 0.9 in 2014-2015.

Infrastructure

An important contributor to the health and wellbeing of Aboriginal and Torres Strait Islander people is access to working infrastructure in housing and communities, including sewerage, water supply and electricity [227].

Information on household infrastructure is available for 2014-2015, when 79% of Aboriginal and Torres Strait Islander households in WA were living in houses of an acceptable standard[35] [8]. This proportion has improved slightly since 2012-2013, with 74% of households living in houses of an acceptable standard, however it is a decrease from 2008 data, where 82% of Aboriginal and Torres Strait Islander households were living in houses of an acceptable standard. In 2014-2015, 25% of Aboriginal and Torres Strait Islander households in WA reported major structural issues within their dwelling. In WA, the most significant issues for Aboriginal and Torres Strait Islander dwellings were major cracks in the walls/floors (11%), major plumbing problems (7.2%) and walls or windows not straight (5.7%).

In terms of access to household facilities, the majority of Aboriginal and Torres Strait Islander households in WA in 2014-2015 had access to working facilities, with most households reporting functioning facilities [8]. This included access to working facilities for: washing people (96%); washing clothes and bedding (89%); preparing food (92%) and sewerage facilities (96%). Overall, access to household facilities in WA has remained relatively stable since 2008.

Hospitalisation

There is currently no data for hospitalisation for selected diseases related to environmental health in WA, however some national data are available. In 2014-15, after age-adjustment, Aboriginal and Torres Strait Islander people were hospitalised for selected diseases related to environmental health at 2.3 times the rate of non-Indigenous people [8].

Mortality

There is currently no data for mortality as a result of diseases associated with poor environmental health in WA, however some national data are available. For 2010-2014 in NSW, Qld, WA, SA and the NT, after age-adjustment, Aboriginal and Torres Strait Islander people died as a result of diseases associated with poor environmental health at 1.7 times the rate of non-Indigenous people [8].

Nutrition

The diet of Aboriginal and Torres Strait Islander people changed after 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 [228]. Traditional foods remain an important part of the diet for many people, strongly linked to identity, culture and country.

The nutritional status of Aboriginal and Torres Strait Islander people is influenced by many factors such as socioeconomic disadvantage, and geographical, environmental and social factors [229]. Poor nutrition is an important factor contributing to overweight and obesity, malnutrition, CVD, type 2 diabetes, and tooth decay [229, 230]. The *Australian dietary guidelines* recommend that adults eat fruit and plenty of vegetables every day, selected from a wide variety of types and colours [230]. 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'[36] foods and drinks.

A recent report by the AIHW states that there is little difference between the food and nutrient intakes and health outcomes of Aboriginal and Torres Strait Islander people and non-Indigenous Australians [232].

Fruit consumption

Based on data from the 2012-13 National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey (NATSINPAS), 61% of Aboriginal and Torres Strait Islander people (or 3,220 people) from WA did not meet the recommended daily servings of fruit [45] (two serves for adults). This compares with 69% in ACT, 64% in Tas, 62% in SA, 62% in Vic, 58% in Qld, 58% in NSW and 49% in NT. The proportion drops to 49% when analysing the data only from the Indigenous regions of WA [45]. The Indigenous regions are defined as Broome, Geraldton, Kalgoorlie, Kununurra, Perth, South Hedland, South-Western WA and West Kimberley.

In 2014-2015, 25% of Aboriginal and Torres Strait Islander Western Australians (aged 12 years and over) reported eating less than one serve of fruit per day [22]. A greater proportion of those in non-remote areas (27%) than remote areas (22%) reported eating less than one serve. Across Australia, 25% of Aboriginal and Torres Strait Islander people reported eating less than one serve of fruit a day.

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[35] Housing of an acceptable standard includes two components: working household facilities; and major structural components [8].

[36] Foods that are energy dense but do not provide many/any nutrients and that typically contain high levels of sugar, salt and fat [230, 231].

Vegetable consumption

According to the 2012-13 NATSINPAS, 95% of Aboriginal and Torres Strait Islander people (or 5,040 people) from WA did not meet the recommended daily servings of vegetables [45] (five serves for adults). This compares with 97% of people in NT, 96% in Qld, ACT and SA, 95% in Vic, 94% in NSW and 93% in Tas. The proportion drops slightly to 92% when analysing the data only from the Indigenous regions of WA.

In 2014-15, 10% of Aboriginal and Torres Strait Islander Western Australians (aged 12 years and over) reported eating less than one serve of vegetables per day [22]. A greater proportion of those in remote areas (11%) than non-remote areas (9%) reported eating less than one serve. Across Australia, 12% of Aboriginal and Torres Strait Islander people reported eating less than one serve of vegetables a day.

Dairy food consumption

Nationally, according to the 2012-13 NATSINPAS, Aboriginal and Torres Strait Islander people aged two years and over averaged 1.2 serves per day of milk, yoghurt, cheese and alternatives [233]. This does not meet the recommended two daily serves. The WA Health and Wellbeing Survey 2017 [234] reported that the proportion of WA adults consuming low fat varieties of milk in remote (26%) or very remote (25%) areas was significantly lower than in areas classified as major cities (44%).

Discretionary foods

Nationally, according to the 2012-13 NATSINPAS, discretionary foods were consumed by a large proportion of Aboriginal and Torres Strait Islander people in the 24 hours prior to the survey, including confectionary (25%), snack foods (20%) and alcoholic beverages (11%) [235]. On average, Aboriginal and Torres Strait Islander people consumed 41% of their total daily energy in the form of discretionary foods [236].

Sugar consumption

The WHO recommends that both adults and children consume less than 10% of daily dietary energy from free sugars [237]. Nationally, according to the 2012-13 NATSINPAS, Aboriginal and Torres Strait Islander people consumed 111 grams (g) of total sugars per day on average [231]. Around two-thirds of this (75 g or 18 teaspoons of white sugar) was free sugars[37], which equated to an average of 14% of daily dietary energy from free sugars. The majority of free sugars consumed were from discretionary foods and beverages.

In 2014, an assessment of sugar sweetened carbonated beverages (SSCBs) in two remote communities in WA found that the average daily SSCB consumption per person was 335 mls [Derived from [238]]. More than half (56%) of sales of SSCBs were to people under 25 years of age [238]. The survey also found that only 11% of shelf space in the community stores was dedicated to selling water, compared with 38% and 65% shelf space dedicated to SSCBs in the two communities.

Sodium (salt) consumption

Nationally, 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) [236]. Males in all age-groups, except for those 51 years and older, had average intakes that exceeded the upper level of sodium intake recommended by the NHMRC. Males recorded a higher consumption of sodium than females.

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 [235]. Nationally, Aboriginal and Torres Strait Islander people in remote areas were more likely than non-remote people 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).

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 [239]. Nationally, this had been a problem for 22% of respondents; 7% of respondents had run out and gone without food, while 15% had run out but not gone without food. People in remote areas were more likely to run out of food than people in non-remote areas (31% and 20% respectively) and slightly more likely to go without (9.2% and 6.4% respectively). A recent study conducted in urban settings in NT identified that food insecurity is intermittent, occurring especially when large household bills are due for payment [240].

In WA, food costs substantially more in very remote areas compared with the Perth area; in 2010 the mean cost of a healthy food basket was 24% higher in very remote areas than in Perth [241]. On average, people in very remote areas paid 32% more for fruit, 26% more for vegetables and 40% more for dairy foods. Improving affordability and quality of nutritious foods in remote communities may positively impact food choices, improve food security and prevent diet-sensitive chronic disease.

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[37] Foods that are energy dense but do not provide many/any nutrients and that typically contain high levels of sugar, salt and fat [230, 231].

Breastfeeding

Breast milk is the natural and optimum food for babies and provides all the energy and nutrients that an infant needs for the first six months of life [230, 242]. Breastfeeding promotes sensory and cognitive development and protects the infant against SIDS, asthma, infectious diseases and, chronic diseases later in life. Exclusive breastfeeding aids a quicker recovery from illness and reduces infant deaths from common childhood illnesses such as diarrhoea or pneumonia. The *Australian dietary guidelines* recommendation is to ‘encourage, support and promote breastfeeding’ [230]. The WHO recommends exclusive breastfeeding for six months followed by complementary feeding with continued breastfeeding for up to two years or beyond [242]. Breastfeeding contributes to the health of the mother by reducing the risk of ovarian and breast cancers.

In the 2014-15 NATSISS, it was reported that nationally, 80% of Aboriginal and Torres Strait Islander children aged 0-3 years had been breastfed [22, 88, 128]. In 2014-2015, in WA, 76% of Aboriginal and Torres Strait Islander children aged 0-3 years were reported to have been, or were currently breastfed. The proportion who were never breastfed was 22% (which is similar to the national proportion). Of those who were breastfed, 17% of children had been breastfed for 1 - 6 months, compared with 24% nationally.

The proportion of Aboriginal and Torres Strait Islander infants aged 0-2 years who had ever been breastfed ranged from 98% in the NT to 75% in Vic (87% in ACT, 86% in Qld, 83% in SA, 79% in NSW, 78% in Tas and 77% in WA) [128].

According to the Health and Wellbeing of Children in Western Australia 2017 report, the majority of babies living in WA did not met the WHO recommendations for excusive breastfeeding to six months of age; only four respondents reported that their child was exclusively breastfed to six months of age [243].

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 [244]. However, a recent study in SA concluded that Aboriginal Family Birthing program services - where Aboriginal women are cared for by Aboriginal women - are having a positive impact on rates of breastfeeding of Aboriginal infants [245].

Physical activity

Physical activity is important for maintaining good overall health and wellbeing [246]. Low levels of activity, including high levels of sedentary behaviour are risk factors for a range of health conditions as well as being a strong contributor to obesity. Australia’s *Physical activity and sedentary behaviour guidelines* for adults recommend a combination of moderate and vigorous physical activity on most, preferably all, days of the week to improve health and reduce the risk of chronic disease and other conditions [247]. However, doing some physical activity is better than doing none and the health benefits of being physically active are continuous, starting with any activity above zero [248]. Regular physical activity reduces the risk of many health problems, such as CVD, type 2 diabetes, depression and certain cancers [247].

Nationally according to the 2012-13 AATSIHS, 47% of Aboriginal and Torres Strait Islander adults aged 18 years and over living in non-remote areas had met the target of 30 minutes of moderate intensity physical activity on most days (or a total of 150 minutes per week) [86]. A smaller proportion (41%) of adults had exercised for at least 150 minutes over five sessions in the previous week. In WA for the same time period, 43% of Aboriginal and Torres Strait Islander adults reported they had undertaken a sufficient level of physical activity in the past week [22].

In WA in 2014-2015, 79% of Aboriginal and Torres Strait Islander children aged 4-14 were reported to have undertaken at least 60 minutes of physical activity each day [22]. When measuring number of days of physical activity, 79% of WA Aboriginal and Torres Strait Islander children were reported to be physically activity every day of the previous week, and 12% were active on 4-6 days of the week. Less than 2% of WA Aboriginal and Torres Strait Islander children were reported to not have days when they did not participate in any physical activity in the previous week. Nationally in 2014-2015, 76% of Aboriginal and Torres Strait Islander children in the same age group (4-14 years) were reported to be active every day of the previous week, 13% were active on 4-6 days of the week and almost 3% had days where they reported to have done no physical activity in the last week.

According to the 2012-13 AATSIHS, Aboriginal and Torres Strait Islander patients talked to health professionals about a range of lifestyle issues including increasing their physical activity [77]. The age-standardised rate for WA was 12%, with the highest rate in NSW (18%) and the lowest rate in NT (9.5%).

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) [249]. Being overweight (BMI 25 to 29) or obese (BMI of 30 or more) [249] increases a person's risk for CVD, type 2 diabetes, certain cancers, chronic kidney disease and some musculoskeletal conditions [250]. 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 [230, 251]. Being underweight (BMI less than 18.5) [66] can also have adverse health consequences, including lower immunity (leading to increased susceptibility to some infectious diseases) and osteoporosis (bone loss) [230].

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) [252].

Obesity and abdominal obesity, as measured by BMI and WC, have been shown to be risk factors for hypertension [253] and type 2 diabetes in Aboriginal and Torres Strait Islander people [254]. 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 [255-257]. It has been suggested that a BMI of 22 might be more appropriate than 25 as a measure of acceptable BMI for Aboriginal people [257]. 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[38], height, weight, age and sex for use in the clinical assessment and management of obesity [258].

Nationally in 2012-2013, 69% of Aboriginal and Torres Strait Islander people aged over 18 years were considered to be overweight (29%) or obese (40%) [8]. For the same time period, 67% of Aboriginal and Torres Strait Islander people in WA over the age of 15 were overweight or obese (28% overweight and 39% obese) [22]. In WA in 2011-2013 a greater proportion of Aboriginal and Torres Strait Islander people aged over the age of 18 were considered to be overweight or obese compared to non-Indigenous people (74% and 65% respectively).

In 2012-2013 in WA, based on measurements taken at interview, Aboriginal and Torres Strait Islanders aged 18 years and over in major cities (77%) and outer regional areas (76%) had a higher age-standardised rate of overweight or obese individuals, than in inner regional areas (72%) and in remote and very remote areas (71%) [22]. There was very little difference between males and females (67%) and (66%) respectively.

In 2011-2013 in WA, 3% of Aboriginal and Torres Strait Islander people over the age of 18 years were underweight compared with 1% of non-Indigenous people, and 24% were a normal weight compared to 33% of non-Indigenous Western Australians [8].

Measurements of WC and WHR were taken in the 2012-13 AATSIHS to help determine levels of risk for developing certain chronic diseases [259]. Nationally, based on WC, a higher proportion of Aboriginal and Torres Strait Islander females (81%) than Aboriginal and Torres Strait Islander males (62%) aged 18 years or older were found to be at increased risk of developing chronic diseases. Based on WHR, 81% of males and 73% of females aged 18 years or older were at increased risk of developing chronic diseases. The proportion of Aboriginal and Torres Strait Islander males and females who were at increased risk of developing chronic diseases based on both measures of WC and WHR increased with age.

According to the 2012-13 AATSIHS, based on BMI information, nationally, around 30% of Aboriginal and Torres Strait Islander children aged 2-14 years were either overweight (20%) or obese (10%), 62% were in the normal weight range, and 8% were underweight [45]. Similar proportions of Aboriginal and Torres Strait Islander boys and girls aged 2-14 years were overweight or obese (28% and 32% respectively). After age-adjustment, the combined overweight/obesity levels were slightly higher for Aboriginal and Torres Strait Islander children aged 2-14 years than for non-Indigenous children (rate ratio: 1.2) mainly due to higher obesity rates in both Aboriginal and Torres Strait Islander boys and girls (boys: 10% compared with 6% respectively; and girls: 11% compared with 7% respectively).

Immunisation

In recent decades, vaccination has been very successful in contributing to improvements in Aboriginal and Torres Strait Islander health and child survival [175]. National immunisation coverage rates for Aboriginal and Torres Strait Islander children have improved steadily since 2008, reducing the gap between Indigenous and non-Indigenous children [260]. The National Immunisation Program (NIP) schedule for the Australian population (including WA) recommends vaccinations at different stages of life and additional recommendations for specific high risk populations [261]. Due to some vaccine-preventable diseases still being experienced at higher rates among Aboriginal and Torres Strait Islander people, other supplementary vaccines[39] are also specifically prescribed depending on age, location and health risk factors, including vaccines for Aboriginal and Torres Strait Islander people residing in WA.

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[38] 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.

[39] These include vaccinations for Bacille Calmette-Guérin (BCG) for newly born babies living in areas of high TB incidence in Qld northern SA and NT, hepatitis A for children living in Qld, WA, SA and the NT, hepatitis B for adults not previously vaccinated against hepatitis B or who are non-immune, influenza for all persons aged 6 months or over, meningococcal for ACWY and B for persons aged 2 months to 19 years, pneumococcal conjugate for children living in Qld, WA, SA and the NT and pneumococcal polysaccharide for persons aged 50 years and older with a second dose for persons 65 years and older with underlying conditions [175].

Childhood vaccination

Nationally, in 2014 it was agreed by the Australian Chief Medical Officer and state and territory chief health officers to set a goal of having 95% of children fully immunised in line with the NIP schedule's recommendations relevant to their age [262]. The NIP requires the following vaccinations for a child to be considered fully immunised by age 5 years; hepatitis B, diphtheria, tetanus, pertussis (whooping cough), *Haemophilus influenza type b* (Hib), measles, mumps and rubella (MMR), polio, pneumococcal conjugate, meningococcal C, varicella (chickenpox) [263, 264]. In WA, across the three primary health networks (PHN), in 2018, percentages for fully immunised Aboriginal and Torres Strait Islander children varied for all three age-groups [263].

These were:

- 1 year-olds - 89% in Country WA, 87% in Perth South and 86% in Perth North (all lowest nationally)
- 2 year-olds - 82% in Country WA, 81% in Perth South and 79% in Perth North (all lowest nationally)
- 5 year-olds - 96% in Country WA, 94% in Perth North and 93% in Perth South.

According to data from nine Statistical Areas Level 4 (SA4s) in WA, the proportion of Aboriginal and Torres Strait Islander children who were fully immunised in 2016-2017 varied by age (Table 28) [263].

Table 28. Aboriginal and Torres Strait Islander children fully immunised, by age and Statistical Area Level 4, WA, 2016-2017

Statistical Area Level 4 name	Percentage fully immunised		
	1 year	2 years	5 years
Bunbury	90 #	89	95
Mandurah	87 #	97 #	94 #
Perth – inner	86 #	NP	NP
Perth – North-East	86	85	89
Perth – North-West	85	81	90
Perth – South-East	80	75	93
Perth – South-West	92	82	95
Outback	91	83	96
Wheat Belt	96	96	97

Notes: 1. # interpret with caution due to low numbers of eligible children.
2. For 1 year olds, Perth South East was the lowest.
3. For 2 year olds; Mandurah was the highest nationally and Perth South East lowest.

Source: AIHW, 2018 (Derived from [263])

According to the Australian Immunisation Register, Western Australian immunisation rates for fully immunised Aboriginal and Torres Strait Islander children at December 2018 were lower than the rates for all children: 89% compared with 93% for 1 year-olds, and 82% compared with 90% for 2 year-olds [264]. The immunisation rate for Aboriginal and Torres Strait Islander 5 years-olds was higher than the rate for all children (95% compared with 93% respectively). Table 29 provides a comparison with national figures.

Table 29. Immunisation coverage, by age, by Indigenous status, nationally and WA, December 2018

Age-group	Aboriginal and Torres Strait Islander children (WA) % fully immunised	All children (WA) % fully immunised	Aboriginal and Torres Strait Islander children (national) % fully immunised	All children (national) % fully immunised
1 year	89	93	93	94
2 years	82	90	88	91
5 years	95	93	97	95

Source: Department of Health (Derived from [264])

Adult vaccination

Vaccinations for hepatitis B, seasonal influenza, pneumococcal disease, Japanese encephalitis (outer Torres Strait Islander residents) and rubella (non-pregnant women of child bearing age) are recommended for Aboriginal and Torres Strait Islander adults [175]. Due to the high rates of mortality and morbidity associated with hepatitis B in the Aboriginal and Torres Strait Islander population, it is important that people are tested for hepatitis B infection, and offered vaccination if they are not immune.

As reported in the *National key performance indicators for Aboriginal and Torres Strait Islander primary health care: results for 2017*, 29% of Aboriginal and Torres Strait Islanders regular clients[40] living in WA, aged over 50 years were immunised against influenza compared with 25% in June 2017, nationally this was 36% and 32% respectively [26]. Of those clients aged 15-49 years with type 2 diabetes and COPD, 29% and 32% were immunised against influenza respectively, nationally 36% and 37% respectively.

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 [128]. 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 sudden infant death syndrome (SIDS).

Extent of tobacco use among Aboriginal and Torres Strait Islander people

The 2014-15 NATSISS found that 45% of the Aboriginal and Torres Strait Islander population in WA aged 18 years and over were current daily smokers [265]. This figure has increased slightly from the prevalence reported in the 2012-13 AATSIHS (42%) [8]. After age-adjustment, daily smoking among Aboriginal and Torres Strait Islander people aged 18 years and over in WA in 2014-2015 was 3.1 times more common than among non-Indigenous people.

In WA in 2014-2015, the highest proportion of Aboriginal and Torres Strait Islander daily smokers were living in outer regional and remote areas (57% and 53% respectively) [265]. Aboriginal and Torres Strait Islander people in inner regional areas were least likely to smoke (30%), followed by people in major cities (40%).

In 2014, almost half (49%) of Aboriginal and Torres Strait Islander mothers in WA smoked during pregnancy [35]. After age adjustment, Aboriginal and Torres Strait Islander mothers were 4.6 times more likely to smoke during pregnancy than non-Indigenous mothers.

In 2014-2015, 61% of Aboriginal and Torres Strait Islander children aged 0-14 years in WA lived with someone who was a daily smoker, a level 3.1 times higher than for non-Indigenous children [35]. Around 10% of Aboriginal and Torres Strait Islander children aged 0-14 years lived in households where someone smoked indoors.

While data from 2014-2015 show that the prevalence of smoking among Aboriginal and Torres Strait Islander people in WA has increased slightly, national data shows that smoking among Aboriginal and Torres Strait Islander people has declined significantly over the 20 year period 1994 to 2014-2015 [266]. In particular, smoking prevalence has decreased in those aged 18 years and over, and also in smoking initiation for the 15-17 years age group. While the year-to-year declines in smoking rates reported in the major health surveys don't always appear to be significant, this report shows that there are encouraging trends in the younger age cohorts which will results in improved health outcomes over time.

Alcohol use

Drinking too much alcohol, both on single drinking occasions (binge drinking) and over a person's lifetime can lead to health and social harms including chronic diseases, injury and transport accidents, mental health disorders, intergenerational trauma and violence. This not only affects the individual, but families and the wider community [267, 268]. Many common factors influence why people drink too much alcohol, for example, socioeconomic disadvantage, stress, and early life experience [269]. 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 [267, 270, 271].

Aboriginal and Torres Strait Islander people are less likely to drink alcohol than non-Indigenous people, but those who do drink are more likely to at levels that cause harm [128, 268]. 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 [271, 272].

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[40] 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 [26].

Extent of alcohol use among Aboriginal and Torres Strait Islander people

Assessing risks from use of alcohol

The 2009 NHMRC guidelines seek to estimate the overall risk of alcohol-related harm over a person's lifetime [273]. For males and females:

- Guideline 1 states that to reduce the risk of alcohol-related harm over a lifetime, no more than two standard drinks should be consumed on any day.
- Guideline 2 states that to reduce the risk of injury on a single occasion of drinking, no more than four standard drinks should be consumed.
- Guideline 3 recommends that the safest option is not drinking alcohol for those aged under 15 years and delaying alcohol use for as long as possible for those aged 15 to 17 years.
- Guideline 4 recommends that the safest option for pregnant and breastfeeding women is not to drink alcohol.

Abstinence or no consumption of alcohol in the last 12 months

Aboriginal and Torres Strait Islander people are more likely to not drink alcohol than non-Indigenous people. In the 2014-15 NATSISS, 40% of Aboriginal and Torres Strait Islander people in WA aged 15 years and over (32% of males and 47% of females) reported not drinking alcohol in the previous 12 months [88].

Single occasion risk

The 2014-15 NATSISS reported that among Aboriginal and Torres Strait Islander people 15 years and over in WA who drank alcohol, 33% drank at levels exceeding the 2009 guidelines for single occasion risk (five or more standard drinks on any day over the last two weeks) [88]. A greater proportion of males reported exceeding the guidelines for single occasion risk than females (40% and 26% respectively). The proportion was higher in remote areas (38%) than non-remote areas (30%) [46].

Lifetime risk

The 2014-15 NATSISS reported that among Aboriginal and Torres Strait Islander people 15 years and over in WA who drank alcohol, 17% drank at levels exceeding the 2009 guidelines for lifetime risk (no more than two standard drinks on any single day) [88]. A greater proportion of males reported exceeding the guidelines for lifetime risk than females (23% and 12% respectively). The proportion was higher in remote areas (22%) than non-remote areas (14%) [46].

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 [274, 275]. In the 2014-15 NATSISS, 81% of mothers of Indigenous children aged 0-3 years in WA reported they did not drink alcohol during pregnancy [22].

Hospitalisation

The age-standardised rate of hospitalisations for 2013-15 in WA with a principal diagnosis related to alcohol use for Aboriginal and Torres Strait Islander people was 13 per 1,000 population. This rate was 8.9 times that of non-Indigenous people (1.5 per 1,000). The rate was higher for Aboriginal and Torres Strait Islander males (16 per 1,000) than females (11 per 1,000) [22]. From 2012-13 to 2014-15, the age-standardised alcohol-related hospitalisation rate for Aboriginal and Torres Strait Islander people nationally was 9.5 per 1,000 [8]. The highest rate was in the NT (15 per 1,000) followed by WA (14 per 1,000).

Illicit drug use

Illicit drug use describes the use of drugs that are illegal to possess (e.g. cannabis, heroin, ecstasy, and methamphetamine), and the non-medical use of prescribed drugs such as painkillers [8, 276]. 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 [8, 36, 277, 278].

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

Data for WA in the 2014-15 NATSISS found that 32% of Aboriginal and Torres Strait Islander people aged 15 years and over reported using illicit drugs (including volatile substance use) in the last 12 months [46]. Aboriginal and Torres Strait Islander males were more likely to have used illicit drugs than females (34% and 29% respectively).

Western Australian jurisdictional data for Aboriginal and Torres Strait Islander people on the prevalence of specific illicit drug use is not readily available. Previous national health surveys for Aboriginal and Torres Strait Islander people have reported cannabis as the most commonly used illicit drug, used by 19% of Aboriginal and Torres Strait Islander people in the last 12 months [88, 268].

Some data are available for police detainees in Perth, WA from the Drug Use Monitoring in Australia (DUMA) program [46]. The data showed that for Perth in 2014 and 2015, 85% of Aboriginal and Torres Strait Islander detainees at police stations tested positive to a drug compared with 69% of non-Indigenous detainees. The most common drugs Aboriginal and Torres Strait Islander detainees tested positive for was cannabis (60%), followed by methamphetamine (53%). The most common drugs non-Indigenous detainees tested positive to was methamphetamine (45%) followed by cannabis (44%).

The 2014-2015 NATSISS found that 92% of Aboriginal and Torres Strait Islander women in WA surveyed, reported not using any illicit drug or substance use during pregnancy [46].

In 2016-17, 80 organisations were funded by the Australian government nationally to provide treatment, support and rehabilitation services to prevent harmful substance use among Aboriginal and Torres Strait Islander people [279]. Of these, 13 organisations (16%) were services based in WA.

Hospitalisation

In 2014-15, the hospitalisation rate for Aboriginal and Torres Islander people from poisoning due to drug use in WA (7.2 per 1,000) was 3.5 times the rate for non-Indigenous people (2.1 per 1,000) [8].

Hospitalisation for mental disorders due to drug use has increased in recent years [8] with some evidence that regional areas in WA have been affected more than metropolitan areas and that Aboriginal people are experiencing a disproportionate burden of harm from amphetamines [280]. One study found that at a Port Hedland Health Campus, the majority of patients presenting to the emergency department for mental and behavioural problems was due to amphetamine use. Of those presenting, 69% identified as Aboriginal [280].

Mortality

For the period 2010-2014, WA had the third highest rate of drug-induced deaths for Aboriginal and Torres Strait Islander people (9 per 100,000) after SA (24 per 100,000) and NSW (17 per 100, 000) [8]. The rate of drug-induced deaths for WA was 1.3 times higher for Aboriginal and Torres Strait Islander people than for non-Indigenous people.

Volatile substance use

Volatile substance use (VSU) involves sniffing substances that give off fumes at room temperature such as petrol, paint, glue or deodorants [281]. They are also called ‘inhalants’ because of the way people use them by inhaling the fumes through the nose or mouth.

Most volatile substances are central nervous system depressants which slow down brain activity. Short-term effects include; slurred speech, lack of coordination, dizziness and euphoria [282, 283]. With short lasting effects, users continue to inhale for hours to extend the feelings of intoxication. Sniffing volatile substances can cause the heart to stop within minutes [283]. This condition is known as sudden sniffing death and can happen to a first time user who is otherwise healthy. VSU can also cause a person to lose consciousness, increasing the risk of suffocation [284].

Using volatile substances repeatedly (chronic use) damages the kidneys, liver, heart and lungs, and can cause hearing loss and bone marrow damage [281, 283, 284]. Excessive harmful inhalant use can lead to permanent acquired brain injury [285, 286]. Petrol is one of most dangerous volatile substances to sniff, especially when it contains tetraethyl lead (found in leaded petrol and no longer sold in Australia) which can result in long-term health consequences [287]. However, long-term abstinence from inhalants may allow recovery of normal brain function, where encephalopathy from lead poisoning is not present [286]. The availability of low aromatic unleaded fuel has significantly reduced petrol sniffing in many communities [288]. Since 2005, the Australian Government has made subsidised low aromatic fuel (LAF) available in regional and remote communities across Australia with around 175 retail outlets now stocking LAF [289]. These include sites in Qld, WA, SA the NT.

Extent of VSU use among Aboriginal and Torres Strait Islander people

There are limited data about VSU in Australia as it is not a criminal offence and the data collected do not always include Indigenous status [290].

A study of petrol sniffing in 41 Aboriginal and Torres Strait Islander communities in WA (10 communities[41]), Far North Qld, SA and the NT found that the number of people sniffing petrol decreased by 29% from 289 in 2011-12 to 204 in 2013-14, for WA the decrease was 76%, from 72 in 2011-12 to 17 in 2013-14 [288]. The study found that sniffing was highest among males than females and more prevalent in the 10-14 and 15-24 year age groups across all the communities participating, see Table 30 for WA results.

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[41] Communities in WA – East Kimberley (four), Goldfields (two) and Ngaanyatjarra (four)

Table 30. Petrol sniffing among Aboriginal and Torres Strait Islander people, by sex, age and level of use, WA selected communities, 2011-12 and 2013-14

	Year 2011-12 Numbers	2013-14 Numbers	Percentage reduction
Males	56	10	82
Females	16	7	56
5-9	2	0	100
10-14	31	4	87
15-24	37	13	65
25-29	2	0	100
Occasional	21	11	48
Regular	24	4	83
Heavy	27	2	93
Total	**72**	**17**	**76**

Source: d'Abbs, P., Shaw, G., 2016 (Derived from [288])

Since 2005, an overall decline in reported use for 17 of these communities (four from WA) for which there are comparable data, shows that the total number of people sniffing petrol has fallen, from 647 in 2005-06 to 78 in 2013-14, a reduction of 88% [288]. For WA, the decrease was 94%, from 154 persons to 9. This decrease in prevalence of sniffing has been associated with the replacement of regular unleaded petrol with LAF.

Hospitalisation

Nationally in 2014-15, the rate of hospital separations for Aboriginal and Torres Strait Islander people from poisoning and accidental poisoning due to the toxic effect of organic solvents (e.g. petrol) was 0.04 per 1,000 [8]. Aboriginal and Torres Strait Islander people were hospitalised due to the toxic effect of organic solvents at rates 3.9 to 5.1 times the rates for non-Indigenous people.

The rate of hospital separations due to mental/behavioural disorders from use of volatile substances was 0.05 per 1,000 which was which was 9.2 times the rate for non-Indigenous people (0.5 per 100,000) [8].

Mortality

The systematic collection of VSU associated mortality data are very limited due to the practice of listing the medical explanation for death rather than the use of volatile substances as a cause [291]. 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, see Table 31 for WA specific data, with the main reported causes of death being respiratory failure/asphyxia and suicide [290, 292, 293].

Table 31. Number of deaths from petrol sniffing, by region, WA, 1998-2003

Region	Number of deaths
Ngaayatjarra Lands	5
Pitjantjatjara Lands	11
Central Northern Territory	16
East Kimberley	3
Top End	2

Source: Shaw, G., Biven, A., Gray, D., Mosey, A., Stearne, A., & Perry, J., 2004 [292]

Concluding comments

This *Overview* provides up-to-date information about the health of Aboriginal and Torres Strait Islander people in WA. In particular, it provides key information in a form that is timely, accessible, and relevant.

The vision for Aboriginal people to live long, well and healthy lives is included in the *WA Aboriginal Health and Wellbeing Framework 2015-2030.* The Framework provides a unique insight into the aspirations and goals for WA to achieve. It was developed after extensive consultation [294]. Aboriginal Health senior representatives travelled across the State and met with key stakeholders. In addition, Aboriginal Health held a consultation forum to seek further input and guidance from senior Aboriginal professionals, Aboriginal community members, and people who provide health services to Aboriginal people, to develop the direction of the Framework. The framework states that cultural understanding of health must address five dimensions: physical health; psychological health; social health and wellbeing; spirituality and cultural integrity [294]. It also advocates understanding Aboriginal health from an inalienable human rights perspective. The framework also commits to strengths based approaches that recognise the importance of cultural determinants of health including:

- self-determination
- freedom from discrimination
- individual and collective rights
- importance and value of Aboriginal culture
- protection from removal/relocation
- connection to, custodianship, and utilisation of country and traditional lands
- reclamation, revitalisation, preservation and promotion of language and cultural practices
- protection and promotion of traditional knowledge and Aboriginal intellectual property
- understanding of lore, law and traditional roles and responsibilities.

The plan outlines key guiding principles of:

- Cultural security
- The health and wellbeing of Aboriginal people is everyone’s business
- Partnerships
- Aboriginal community control and engagement
- Access and equality
- Accountability.

There are six strategic directions with culture at the centre:

- Prevention and early intervention
- Promote good health across the life course
- A culturally respectful and non-discriminatory health system
- Individual, family and community wellbeing
- A strong, skilled and growing Aboriginal health workforce
- Equitable and timely access to the best quality and safe care.

Key priority areas include:

- Addressing risk factors
- Managing illness better
- Building community capacity
- Better health systems
- Aboriginal workforce development
- Data, evidence and research
- Addressing the social determinants of health.

The vision for the health and wellbeing of Aboriginal people and communities in WA is of course an expression of the national commitments to strengths based narratives, leadership, and stewardship that underpin key national rallying calls such as the Redfern Statement [11] and the Uluru Statement from the Heart [295]. Nevertheless, the implementation plan for the Framework acknowledges that notwithstanding important gains in the health of Aboriginal people, it is self-evidently true that gaps remain that must be addressed [296].

This *Overview* also honours our commitment to the principles of data sovereignty [91]. Anderson (2017) highlighted the shift in thinking towards local action and empowered communities and the subsequent need for local (and regional) level data to inform local (and regional) level solutions [297]. As Professor Ian Anderson declared in his Menzies Oration in 2017,

'Public data is a national asset. However, its value is only realised when data is transformed into information, and more importantly knowledge. Data can help shape debate, identify areas of need, and be used to analyse the effectiveness of policy and other actions'.

We offer jurisdictional data in WA as part of the effort to produce local level data for local level solutions. However, again as noted by Anderson (2017) there is some way to go until the data are available in sufficiently disaggregated form to truly realise this aspiration for what he called democratised data [297]. This *Overview* is offered as a step in the direction of providing data in a form that can inform policy, program and practice at the local and regional level.

On the national front, towards improving the health and wellbeing of Aboriginal and Torres Strait Islander people, in December 2018, COAG released the COAG statement on the Closing the Gap Refresh [298]. This is a draft of the strengths based framework that recognises the importance of genuine partnership between the governments and Aboriginal and Torres Strait Islander people and outlines refreshed targets. For the Closing the Gap Refresh, the Commonwealth, states and territories share accountibility with the prirority areas of:

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

The statement sets timeframes for all governments to:

- establish a new formal partnership with Aboriginal and Torres Strait Islander peoples, through their representatives, by the end of February 2019
- finalise all draft targets by mid-2019
- review the *National Indigenous reform agreement* (NIRA) [299] by mid-2019
- work with the Productivity Commission's Indigenous Commissioner to develop an independent, Aboriginal and Torres Strait Islander-led approach to the three-yearly comprehensive evaluation and review of progress at a national level, and in each jurisdiction.

The refresh represents a fundamental recalibration of the aspirations of not only the targets but also, and perhaps more significantly, how these targets will be met. The Prime Minister in his Closing the Gap report has signalled a whole of government commitment to some principles that he believes will shift the narrative in profoundly important ways [300]. They include a commitment to strengths based approaches, authentic partnerships, co-design, community led solutions, a strong evidenced based approach, whole of government (including states and territories) approaches and clearly articulated accountabilities.

Appendix 1

Limitations of the sources of Aboriginal and Torres Strait Islander health information

The assessment of the health status of Aboriginal and Torres Strait Islander people living in WA requires accurate information about the size of the population and the numbers of specific health conditions/occurrences. This information is required at state, 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 [16]. Despite these efforts, there are impacts on data quality such as non-responses for identification.

The ABS has also worked for many years with the AIHW and state and territory authorities to improve the accuracy of Indigenous status in a number of health-related collections, including birth and death registrations, hospital administrative data, and the maternal/perinatal collection [60]. Some attention has also been directed to the data collections related to communicable diseases, cancer, and to a number of other disease-specific collections.

A persistent problem, however, is the extent to which Aboriginal and Torres Strait Islander people are correctly identified in the various health-related data collections. In death registrations, for example, not all Aboriginal and Torres Strait Islander deaths are correctly identified as such [32]. 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, including WA, also collect this information from medical certificates of causes of death [30]. 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 [30, 301]. 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 [301]. 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.

In 2017, there were 111 deaths for which no Indigenous status was reported in WA, representing 0.6% of registered deaths; it is very likely that some of these deaths were among Aboriginal and Torres Strait Islander people [30]. The number of deaths with no Indigenous status reported has decreased over time [301].

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 [32].

The Indigenous Mortality Study (now the 2016 Death Registrations to Census Linkage Project [302]) involved linking death registrations with 2006 Census records with the aim to assess the consistency of Indigenous status across the two datasets [32]. 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 [303]. Completeness of identification varied across the country, with only Vic, Qld, WA, SA and the NT having levels above 90%; WA was 95%.

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 [8]. This means that previously there was an underestimation of Aboriginal and/or Torres Strait Islander births. Indigenous status for around 6% of births is unknown, due to unknown status of the father. Identification of the father is not compulsory for birth registrations.

The level of identification in hospital admissions is variable, but overall it has been estimated that 88% of Aboriginal and Torres Strait Islander patients were correctly identified in Australian public hospital admission records in 2011-12 [304]. The accuracy of the identification of Indigenous people varied between states and territories from 98% in the NT to 58% in the ACT; for WA it was 91%. In WA, hospitalisation records with an 'unknown' Indigenous status were reported under non-Indigenous status [8].

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

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

- Special reports related to Aboriginal and Torres Strait Islander health (see the *Sources of information* section) tend to be selective rather than comprehensive in their coverage of the various health topics.
- The time periods for which detailed information is available tend to vary substantially; this means that documents like this *Overview* need to draw on information from various time periods in attempting to compile a comprehensive picture.
- Important data sources, particularly major national surveys, are generally only conducted around every five years; this is inevitable, but it means that relevant information is often quite dated.
- Changes in aspects like methodology and levels of reporting in publications pose difficulties in the analysis and synthesis of information for periods of time and for comparisons.

Glossary

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

age-adjustment or age-adjusted
see **age-standardisation**

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

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

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

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

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

biomedical data
data collected from the results of blood and urine testing

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

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

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

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

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

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

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

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

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

hospitalisation
an episode of admitted patient care, which can be either a patient's total stay in hospital (from admission to discharge, transfer or death), or part of a patient's stay in hospital that results in a change to the type of care (for example, from acute care to rehabilitation)

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

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

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

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

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

indirect standardisation
the procedure for adjusting rates in which the specific rates in a standard population are averaged using as weights the distribution of the study population. This form of standardisation is used when the populations under study are small and the age-specific rates are unreliable or not known

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

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

International Classification of Disease
World Health Organization's internationally accepted classification of death and disease. The ICD-10-AM (Australian modification) was introduced in hospitals and other healthcare agencies in 1999 to report morbidity data

life expectancy
see **expectation of life**

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

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

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

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

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

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

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

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

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

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

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

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

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

Abbreviations

AATSIHS - Australian Aboriginal and Torres Strait Islander Health Survey

ABS - Australian Bureau of Statistics

ACCHOs - Aboriginal Community Controlled Health Organisations

ACT - Australian Capital Territory

AHMAC - Australian Health Ministers' Advisory Council

AIHW - Australian Institute of Health and Welfare

ANZDATA - Australia and New Zealand Dialysis and Transplant Registry

AOD - Alcohol and other drug

ARF - Acute rheumatic fever

BMI - Body mass index

CHD - Coronary heart disease

CKD - Chronic kidney disease

COAG - Council of Australian Governments

COPD - Chronic obstructive pulmonary disease

CSOM - Chronic suppurative otitis media

CVD - Cardiovascular disease

DALY - Disability-adjusted life year

DNA - Deoxyribonucleic acid

ERP - Estimated resident population

ESRD - End-stage renal disease

FDS - Fremantle Diabetes Study

GAS - Group A streptococcus

GDM - Gestational diabetes mellitus

GP - General practitioner

HBV - Hepatitis B virus

HCV - Hepatitis C virus

HIV - Human immunodeficiency virus

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

IMR - Infant mortality rate

IPD - Invasive pneumococcal disease

LAF - Low aromatic fuel

LBW - Low birthweight

NATSIHMS - National Aboriginal and Torres Strait Islander Health Measures Survey

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

NATSISS - National Aboriginal and Torres Strait Islander Social Survey

NDA - National Disability Agreement

NDIS - National Disability Insurance Scheme

NDS - National Disability Strategy

NEHS - National Eye Health Survey

NHMRC - National Health and Medical Research Council

NIP - National Immunisation Program

NSW - New South Wales

NT - Northern Territory

OM - Otitis media

Qld - Queensland

RHD - Rheumatic heart disease

SA - South Australia

SCRGSP - Steering Committee for the Review of Government Service Provision

SEWB - Social and emotional wellbeing

SMR - Standardised mortality ratio

STI - Sexually transmitted infection

Tas - Tasmania

TB - Tuberculosis

VI - Vision impairment

Vic - Victoria

VSU - Volatile substance use

WA - Western Australia

WC - Waist circumference

WHO - World Health Organization

WHR - Waist to hip ratio

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