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Overview of the health of Indigenous people in Western Australia 2013

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Australian Indigenous
Health*InfoNet*

Overview of the health of Indigenous people in Western Australia 2013

Government of **Western Australia**
Department of **Health**
Aboriginal Health

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Australian Indigenous Health*InfoNet*

The Australian Indigenous Health*InfoNet* is an innovative Internet resource that contributes to 'closing the gap' in health between Indigenous and other Australians by informing practice and policy in Indigenous health.

Two concepts underpin the Health*InfoNet*'s work. The first is evidence-informed decision-making, whereby practitioners and policy-makers have access to the best available research and other information. This concept is linked with that of translational research (TR), which involves making research and other information available in a form that has immediate, practical utility. Implementation of these two concepts involves synthesis, exchange and ethical application of knowledge through ongoing interaction with key stakeholders.

The Health*InfoNet*'s work in TR at a population-health level, in which it is at the forefront internationally, addresses the knowledge needs of a wide range of potential users, including policy-makers, health service providers, program managers, clinicians, Indigenous health workers, and other health professionals. The Health*InfoNet* also provides easy-to-read and summarised material for students and the general community.

The Health*InfoNet* encourages and supports information-sharing among practitioners, policy-makers and others working to improve Indigenous health – its free on line yarning places enable people across the country to share information, knowledge and experience. The Health*InfoNet* is funded mainly by the Australian Department of Health. Its award-winning web resource (www.healthinfonet.ecu.edu.au) is free and available to everyone.

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Overview of the health of Indigenous people in Western Australia 2013

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Contents

Preface

This *Overview of the health of Indigenous people in Western Australia* has been prepared by the Australian Indigenous Health*InfoNet* as a part of our contributions to 'closing the gap' in health between Indigenous people and other Australians by making relevant, high quality knowledge and information easily accessible to policy makers, health service providers, program managers, clinicians, researchers, students and the general community.[1]

Its preparation was undertaken as a part of the development within the Health*InfoNet* web resource of a specific section devoted to the health of Indigenous Western Australians. Development of the section, the first of a planned series for all states and territories, has been enabled with the provision of separate funds from the Western Australian Department of Health's Aboriginal Health Division. The Health*InfoNet* is grateful for this support.

The main purpose of this *Overview* is to provide a comprehensive summary of the most recent indicators of the health of Indigenous people in WA. It is beyond the scope of the *Overview* to analyse trends in the various indicators, so it tends to draw attention to the current health status of WA's Indigenous people. The *Overview* doesn't attempt to review other aspects, such as the availability and use of services (including barriers to their use) and strategies and policies related to specific health topics. Readers interested in these aspects should refer to the topic-specific reviews that are available on the Health*InfoNet*'s web resource.

Research for this *Overview* involved the collection, collation, and analysis of a wide range of relevant information, including both published and unpublished material. Sources include the full range of relevant literature, including journal articles and other relevant publications, the vast majority of which are accessible via the Health*InfoNet*'s Australian Indigenous Health*Bibliography*. This bibliography, with more than more 20,000 entries, captures all relevant journal articles, books, book chapters and reports (including the 'grey' literature).

As well as the relevant journal literature, the Health*InfoNet*'s overviews draw on important government reports, particularly those produced by the Australian Bureau of Statistics (ABS), the Australian Institute of Health and Welfare (AIHW), the Steering Committee for the Review of Government Service Provision (SCRGSP), and reports in the *Aboriginal and Torres Strait Islander health performance framework* series. These reports, prepared by the Australian Health Ministers' Advisory Council (AHMAC) in 2006, 2008, 2011 and 2012, are accompanied by substantial detailed analyses, including analyses that are specific to WA, and accessible on the AIHW website. The Health*InfoNet*'s overviews also draw on information from the main administrative data collections (such as the birth and death registration systems and the hospital inpatient collections) and national surveys. Information from these sources has been published mainly in government reports, particularly those produced by the ABS, the AIHW, and the SCRGSP.

Importantly, this *Overview* draws also on a wide variety of other information sources, including registers for specific diseases and other conditions, regional and local surveys, and numerous epidemiological and other studies examining particular diseases, conditions, and health determinants. Information from these sources is disseminated mainly through journals and similar periodicals, or in special reports.

A number of sections include the results of our own analyses of data obtained from a variety of sources. For example, estimates of some health conditions were made using notification data provided by the Epidemiology Branch at the WA Department of Health. The section on cancer benefitted from information provided by the WA Cancer Registry.

Despite the important advances that have been made in recent years in both the extent and quality of information about the health of Indigenous people, there is substantial scope for further improvement. First, there are deficiencies in the information available for some important areas. Second, the important special reports noted above tend to be selective rather than comprehensive in their coverage of the various health topics. Third, 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. Fourth, important data sources, particularly major surveys, are generally only conducted around every five years; this is inevitable, but it means that relevant information is often quite dated. Finally, changes in aspects like methodology and levels of reporting in publications pose difficulties in the analysis and synthesis of information with a time perspective.

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[1] The term Indigenous is used in this *Overview* to refer generally to the two Indigenous populations of Australia - Australian Aboriginal people and Torres Strait Islanders.

The initial sections of this *Overview* provide information about the context of Indigenous health, the Indigenous population in WA, and various measures of population health status. Most sections about specific health conditions comprise an introduction about the condition and evidence of the current burden of the condition among Indigenous people.

It should be noted that some references in this *Overview* to specific health conditions or groups of related health conditions follow the exact terms used by the World Health Organization (WHO) in its International Classification of Diseases (ICD). These terms are usually included in quotation marks preceded by ICD.

Further information about the aspects summarised in this *Overview* are included in the corresponding sections of the Health*InfoNet*'s web resource (www.healthinfonet.ecu.edu.au), on which updated versions of this *Overview* will be made available.

Neil Thomson

We welcome your comments and feedback about the *Overview of the health of Indigenous people in Western Australia 2013*.

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

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Particular thanks are extended to:

- The Western Australian Department of Health's Aboriginal Health Division, which has for a number of years funded the updating and maintenance of the special section of the Health*InfoNet* devoted to the health of Indigenous Western Australians
- The Western Australian Department of Health's Epidemiology Branch for the provision of a variety of WA-specific data
- The Western Australian Cancer Registry for information about the incidence of cancer in WA
- The Office for Aboriginal and Torres Strait Islander Health (OATSIH) within the Australian Department of Health for their ongoing support of the 'core' work of the Health*InfoNet*.

Key facts

Indigenous population

- At 30 June 2011, the estimated Western Australian Indigenous population was 88,277.
- In 2011, around 96% of Indigenous people living in WA were Aboriginal, 1.9% were Torres Strait Islanders, and 1.9% of people identified as being of both Aboriginal and Torres Strait Islander descent.
- The Indigenous population is much younger than the non-Indigenous population.
- More than one-third (37%) of WA's Indigenous population lived in the Perth metropolitan area, and 15% lived in the South-Western region.

Births and pregnancy outcome

- In 2011, there were 2,506 births registered in WA with one or both parents identified as Indigenous (8% of all births registered).
- In 2011, Indigenous mothers in WA were younger than non-Indigenous mothers; the median age was 24.2 years for Indigenous mothers and 30.3 years for all mothers.
- In 2011, total fertility rates were 3,011 births per 1,000 for Indigenous women in WA and 1,953 per 1,000 for all women in WA.
- In 2010, the average birthweight of babies born to Indigenous mothers living in WA was 3,139 grams compared with 3,353 grams for babies born to non-Indigenous mothers.
- In 2010, the proportion of low birthweight babies born to Indigenous women in WA was twice that of non-Indigenous women (13.6% compared with 6.1%).

Indigenous mortality

- In 2006-2010, the age-standardised death rate for Indigenous people in WA was 2.5 times the rate for non-Indigenous people.
- Between 1991 and 2010, there was a 35% reduction in the death rates for Indigenous people in WA.
- For Indigenous people born 2005-2007 in WA, life expectancy was estimated to be 65.0 years for males and 70.4 years for females, around 14 and 12.5 years less than the estimates for non-Indigenous males and females, respectively.
- In 2007-2011, age-specific death rates were higher for Indigenous people than for non-Indigenous people across all age-groups in WA, and were much higher in the middle adult years.
- For 2009-2011, the infant mortality rate was 2.4 times higher for Indigenous infants than that for non-Indigenous infants in WA.
- For 2006 to 2010, the leading causes of death among Indigenous people in WA were cardiovascular disease, injury, and neoplasms (almost entirely cancers).
- In 2006-2010, the age-adjusted rate of avoidable deaths for Indigenous people was 4.8 times higher than the rate for non-Indigenous people in WA.

Indigenous hospitalisation

- In 2010-11, 7.4% of all hospitalisations in WA were of Indigenous people.
- In 2010-11, the age-standardised hospital separation rate for Indigenous people in WA was 3.8 times higher than that for other Western Australians.
- In 2010-11, the main causes of hospitalisation for Indigenous people were for 'care involving dialysis' and injury.

Selected health conditions

Cardiovascular disease

- In 2004-2005, 11% of Indigenous people in WA reported having a long-term heart or related condition.
- In 2008-10, Indigenous people in WA were hospitalised for cardiovascular diseases at 1.9 times the rate of non-Indigenous people.

- In 2006-2010, cardiovascular disease was the leading cause of death for Indigenous people in WA, accounting for 26% of Indigenous deaths.

- In 2006-2010, the age-adjusted death rate for Indigenous people was 2.3 times the rate for non-Indigenous people in WA.

Cancer

- In 2007-2011, age-adjusted cancer incidence rates were similar for Indigenous people and non-Indigenous people in WA.

- In 2007-2011, the most common cancers diagnosed among Indigenous people in WA were lung and breast cancer.

- In 2008-10, age-standardised hospitalisation rates for cancer were lower for Indigenous people than those for non-Indigenous people in WA.

- In 2006-2010, the age-standardised death rate for all cancers for Indigenous people was 1.5 times higher than that for non-Indigenous people in WA.

Diabetes

- In 2004-2005, 8.8% of Indigenous people in WA reported having diabetes; after age-adjustment, Indigenous people were 3.7 times more likely to report having some form of diabetes than were non-Indigenous people.

- In 2008-10, age-adjusted hospitalisation rates for diabetes for Indigenous males and females were 4.4 and 6.2 times the rates of other males and females in WA, respectively.

- In 2006-2010, Indigenous people in WA died from diabetes at 8.7 times the rate of non-Indigenous people.

Social and emotional wellbeing

- In 2008, Indigenous people in WA experienced high to very high levels of psychological distress at almost three times the rate reported by non-Indigenous people.

- In 2008, 92% of Indigenous people living in WA felt happy either some, most, or all of the time.

- In 2000-2001, 24% of WA Indigenous children aged 4-17 years were at high risk of clinically significant emotional or behavioural difficulties; this compares with 15% of similarly aged children in the State's general population.

- In 2008-10, after age-adjustment, the hospitalisation rate for Indigenous males and females in WA with mental health-related conditions was 3.1 and 2.1 times the rates for their non-Indigenous counterparts, respectively.

- In 2005-2009, the death rate for ICD 'Intentional self-harm' for Indigenous people living in WA was 3.1 times the rate for non-Indigenous people.

Kidney health

- In 2008-2010, after age-adjustment, the notification rate of end stage renal disease was 11.7 times higher for Indigenous people than that for non-Indigenous people in WA.

- In 2008-10, the age-adjusted hospitalisation rate for dialysis and chronic kidney disease were 15 times higher for Indigenous people than that non-Indigenous people living in WA.

- In 2006-2010, the age-standardised death rate from kidney disease was 5.4 times higher for Indigenous people than that for non-Indigenous people in WA.

Injury

- In 2008-10, after age-adjustment, Indigenous people were hospitalised for injury at 2.9 times the rate for non-Indigenous people in WA.

- In 2006-2010, injury was the second most common cause of death among Indigenous people in WA, accounting for 18% of Indigenous deaths.

Respiratory disease

- In 2004-2005, the overall levels of respiratory disease were similar for Indigenous and non-Indigenous people in WA.
- In 2008-10, the age-standardised hospitalisation rate for respiratory disease was 4.0 times higher for Indigenous people than that for non-Indigenous people in WA.
- In 2006-2010, after age-adjustment, the death rate for Indigenous people was 2.9 times higher than that for non-Indigenous people in WA.

Eye health

- In 2004-2005, eye and sight problems were reported by 29% of Indigenous people in WA.
- In 2008, WA was the jurisdiction with the highest prevalence of low vision among Indigenous adults (12%) and the second highest prevalence among Indigenous children (1.9%).
- In 2008-10, hospitalisation rates for diseases of the eye and adnexa were lower for Indigenous people than those for non-Indigenous people in WA.

Ear health and hearing

- In 2008, 9.0% of Indigenous children in WA aged 0-14 years had ear/hearing problems.
- In 2004-2005, prevalence of diseases of the ear and mastoid was higher among Indigenous children living in remote areas of WA (16% males and 12% females) than among those living in non-remote areas (9% males and 7% females).
- In 2008-10, the age-adjusted hospitalisation rate for Indigenous people for disease of the ear and mastoid process was 1.5 times higher than the non-Indigenous rate in WA.

Oral health

- In 2008, 28% of Indigenous children in WA had problems with their teeth or gums.
- In 2004-2005, 77% of Indigenous adults in WA had lost fewer than five adult teeth.

Disability

- In 2011, after age-adjustment, Indigenous people were more than twice as likely as non-Indigenous people in WA to have a profound/core activity restriction.

Communicable diseases

- In 2009-2011, the age-standardised rate for hepatitis B notifications for Indigenous people in WA was almost three times, and the rate for hepatitis C notifications was four times, the rates reported for other people in WA.
- In 1997-2007, the age-adjusted notification rate of invasive pneumococcal disease was 6.7 times higher for Indigenous people than that for non-Indigenous people in WA.
- In 2011, the age-adjusted notification rate for gonorrhoea for Indigenous people living in WA was 44 times higher than the rate for non-Indigenous people.
- In 2011, the age-adjusted notification rate for infectious syphilis for Indigenous people living in WA was 11 times the rate for non-Indigenous people.
- In 2011, the age-adjusted notification rate for chlamydia for Indigenous people living in WA was almost four times higher than the rate for non-Indigenous people.
- In 2011, there were 98 cases of newly diagnosed HIV infection in WA, of which five were identified as Indigenous.

Factors contributing to Indigenous health

Nutrition

- In 2004-2005, the majority of Indigenous people in WA reported eating fruit (85%) and vegetables (94%) on a daily basis.

Physical activity

- In 2008, 29% of Indigenous adults and 66% of Indigenous children living in WA took part in some type of physical activity or sport in the previous 12 months.
- In 2004-2005, 71% of Indigenous adults in non-remote areas of WA reported sedentary or low levels of activity.

Bodyweight

- In 2004-2005, the age-adjusted level of obesity/overweight was 1.3 times higher for Indigenous adults than that for non-Indigenous adults in WA.

Immunisation

- In 2011, more than 80% of Indigenous children aged 0-5 years in WA were fully immunised against the recommended vaccine-preventable diseases.
- In 2004-2005, 60% of Indigenous people aged 50 years or older in WA had been vaccinated against influenza in the previous year and 35% had been vaccinated against pneumonia in the previous five years.

Breastfeeding

- In 2004-2005, 81% of Indigenous babies aged 0-3 years in non-remote areas of WA had been breastfed.

Tobacco use

- In 2008, 44% of Indigenous adults in WA were current smokers.
- In 2009, 51% of Indigenous mothers in WA reported smoking during pregnancy; this level was more than four times that of their non-Indigenous counterparts.

Alcohol use

- In 2008, 34% of Indigenous adults abstained from alcohol.
- In 2004-2005, there were similar levels of long-term risky/high risk alcohol use for Indigenous and non-Indigenous people in WA, but Indigenous people were twice as likely to report binge drinking on a weekly basis as non-Indigenous people.
- In 2008-09, the hospitalisation rate for alcoholic liver disease was 9.3 times higher for Indigenous people than that for non-Indigenous people in WA.
- In 2005-2009, the age-standardised death rate for alcohol-related deaths was 11 times higher for Indigenous people than that for non-Indigenous people in WA.

Illicit drug use

- In 2008, 45% of Indigenous adults reported that they had ever used an illicit substance, and 25% reported that they had used an illicit substance in the previous 12 months.

Introduction

This *Overview of the health of Indigenous people in Western Australia* draws largely on previously published information, some of which has been re-analysed to provide clearer comparisons between Indigenous and non-Indigenous people (for more details of statistics and methods, readers should refer to the original sources).[2]

Limitations of the sources of Indigenous health information

The assessment of the health status of Indigenous people 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 (for more information about the assessment of population health status, see [1]).

Nationally, 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 Australian Bureau of Statistics (ABS) has made considerable efforts in recent decades to achieve accurate counts of the Indigenous population in the five-yearly Australian censuses [2, 3]. Despite these efforts, doubts remain about the extent to which official estimates reflect the actual size of the Indigenous population [2, 4].

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

A persisting problem, however, is the extent to which Indigenous people are correctly identified in the various health-related data collections. In death registrations, for example, not all Indigenous deaths are correctly identified as such, with some identified as non-Indigenous [5]. 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. Details of these estimates are not available for recent years. However, it is likely that they are in line with the ABS's assessment of the completeness of recording of Indigenous deaths in 2006-2007, which was based on a comparison of deaths in those years with Indigenous status reported in the 2006 Census [6]. Based on this comparison, the ABS estimated that the Australia-wide and WA levels of Indigenous identification in deaths notifications in 2006-2007 were 92% [6]; this level of identification is much higher than previous national estimates (around 56%) [7].

The AIHW conducted a study in 2011-2012 that investigated the quality of Indigenous identification in records of public hospital separations in Australia's states and territories [8]. This study found that 96% of Indigenous patients in WA's public hospitals were correctly identified as such in 2011-12. The accuracy of the identification of Indigenous people varied slightly with remoteness level in WA: 100% in outer regional and very remote areas; 96% in major cities; 90% in inner regional and remote areas. A previous study estimated the completeness of Indigenous identification of WA's hospital data to be 97% in 2007 [9].

The estimated coverage of Indigenous births in WA was 95% for the period 2002-2006 [10]. In 2012, a study was undertaken comparing the consistency in determining the Indigenous status of children recorded in a large-scale survey (*Western Australian Aboriginal child health survey* (WAACHS)) and two administrative data sources (WA Register of Births and the WA Midwives' Notification System) [11]. This study found that there was substantial under-identification of Indigenous births when using only the two administrative data sources; applying an adjustment based on the linked survey data increased the estimated number of Indigenous births in WA by around 25%.

The need for information at a community level was identified in consultations undertaken for the development of the *National Aboriginal and Torres Strait Islander information plan* [12], but there are no reliable data routinely available at this level. Survey information, particularly that collected nationally by the ABS, (such as in the *2004-05 National Aboriginal and Torres Strait Islander health survey* (NATSIHS) and the *2008 National Aboriginal and Torres Strait Islander social survey* (NATSISS)), is valuable, but it is limited

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[2] The term 'Indigenous' is used in this overview to refer generally to the two Indigenous populations of Australia – Australian Aboriginal people and Torres Strait Islanders.

at a regional level by the relatively small number of Indigenous people surveyed. It is also difficult to compare survey findings because of differing sample sizes, methodologies, and seasonal variations in some health conditions. On the other hand, very good data about various aspects of the health of Indigenous children in WA are available from the WAACHS.

Statistics on hospitalisation provide some insights into ill-health in the population. They are, however, quite a poor reflection of the extent and patterns of treatable illness in the community because they represent only illness that is serious enough to require hospitalisation. Even then, hospital statistics relate to episodes of hospitalisation, with the result that each admission of an individual for a specific condition will be counted. This has a major impact on the numbers of admissions for aspects like renal dialysis, for which some people may be admitted many times in a year.

With these uncertainties, there must be some doubt about the precision of the various estimates of Indigenous health status. The differences between Indigenous 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.

The context of Indigenous health

Historical context and social determinants of Indigenous health

There is a clear relationship between the social disadvantages experienced by Indigenous people and their current health status [13]. These social disadvantages, directly related to dispossession and characterised by poverty and powerlessness, are reflected in measures of education, employment, and income. Before presenting the key indicators of Indigenous health status, it is important, therefore, to provide a brief summary of the context within which these indicators should be considered.

The historical context of Indigenous health

Indigenous peoples generally enjoyed better health in 1788 than most people living in Europe [14-18]. They did not suffer from smallpox, measles, influenza, tuberculosis, scarlet fever, venereal syphilis and gonorrhoea, diseases that were common in 18th century Europe. Indigenous people probably suffered from hepatitis B, some bacterial infections (including a non-venereal form of syphilis and yaws) and some intestinal parasites. Trauma is likely to have been a major cause of death, and anaemia, arthritis, periodontal disease, and tooth attrition are known to have occurred. The impact of these diseases at a population level was relatively small, however, compared with the effects of the diseases that affected 18th century Europe.

All of this changed after 1788 with the arrival of introduced illness, initially smallpox and sexually transmissible infections (gonorrhoea and venereal syphilis), and later tuberculosis, influenza, measles, scarlet fever, and whooping cough [15, 16, 19, 20]. These diseases, particularly smallpox, caused considerable loss of life among Indigenous populations, but the impacts were not restricted to the immediate victims. Smallpox also affected the fabric of Indigenous societies through depopulation and social disruption.

The impact of introduced diseases was almost certainly the major cause of death for Indigenous people, but direct conflict and occupation of Indigenous homelands also contributed substantially to Indigenous mortality [19, 21, 22]. The initial responses of Indigenous people to the arrival of the First Fleet were apparently quite peaceful. It didn't take long, however, before conflict started to occur – initially over access to fish stocks and then over access to other resources as non-Indigenous people started to plant crops and introduce livestock. This pattern of conflict was almost certainly widespread as non-Indigenous people spread across the country.

Conflict escalated in many places, in some instances resulting in overt massacres of Indigenous people. The 1838 massacre at Myall Creek (near Inverell, NSW) is the most infamous [23], but less well-known massacres occurred across Australia [22]. As Bruce Elder notes, as 'painful and shameful as they are, 'the massacres' should be as much a part of Australian history as the First Fleet, the explorers, the gold rushes and the bushrangers' [22, p.vi].

Prior to 1788, Indigenous people were able to define their own sense of being through control over all aspects of their lives, including ceremonies, spiritual practices, medicine, social relationships, management of land, law, and economic activities [24-26]. In addition to the impacts of introduced diseases and conflict, the spread of non-Indigenous peoples undermined the ability of Indigenous people to lead healthy lives by devaluing their culture, destroying their traditional food base, separating families, and dispossessing whole communities [15, 16, 19]. This loss of autonomy undermined social vitality, which, in turn, affected the capacity to meet challenges, including health challenges; a cycle of dispossession, demoralisation, and poor health was established.

These impacts on Indigenous populations eventually forced colonial authorities to try to 'protect' remaining Indigenous peoples. This pressure led to the establishment of Aboriginal 'protection' boards, the first established in Vic by the Aboriginal Protection Act of 1869 [27]. Along with the other colonies, WA enacted similar legislation in 1886 to 'protect' Indigenous populations within its boundaries. The 'protection' provided under the provisions of the various Acts imposed enormous restrictions on the lives of many Indigenous people. These restrictions meant that, as late as 1961, in eastern Australia 'nearly one-third of all Australians recorded as being of Aboriginal descent lived in settlements' [28, p.4].

The provisions of the Acts were also used to justify the forced separation of Indigenous children from their families 'by compulsion, duress or undue influence' [27, p.2]. The *National inquiry into the separation of Aboriginal and Torres Strait Islander children from their families* concluded that 'between one-in-three and one-in-ten Indigenous children were forcibly removed from their families and communities in the period from approximately 1910 until 1970' [27, p.31]. It was the 1960s, at the earliest, when the various 'protection' Acts were either repealed or became inoperative.

The importance of contemporary social determinants and cultural concepts of Indigenous health

The health disadvantages experienced by Indigenous people can be considered historical in origin [26], but perpetuation of the disadvantages owes much to contemporary structural and social factors, embodied in what have been termed the 'social determinants' of health [13, 29, 30]. In broad terms, economic opportunity, physical infrastructure, and social conditions influence the health of individuals, communities, and societies as a whole. These factors are specifically manifest in measures such as education, employment, income, housing, access to services, social networks, connection with land, racism, and incarceration. On all these measures, Indigenous people suffer substantial disadvantage. For many Indigenous people, the ongoing effects of 'protection' and the forced separation of children from their families compound other social disadvantages.

It is also important in considering Indigenous health to understand how Indigenous people themselves conceptualise health. There was no separate term in Indigenous languages for health as it is understood in western society [31]. The traditional Indigenous perspective of health is holistic. It encompasses everything important in a person's life, including land, environment, physical body, community, relationships, and law. Health is the social, emotional, and cultural wellbeing of the whole community and the concept is therefore linked to the sense of being Indigenous. This conceptualisation of health has much in common with the social determinants model and has crucial implications for the simple application of biomedically-derived concepts as a means of improving Indigenous health. The reductionist, biomedical approach is undoubtedly useful in identifying and reducing disease in individuals, but its limitations in addressing population-wide health disadvantages, such as those experienced by Indigenous people, must be recognised.

Indicators of Indigenous social disadvantage

The key measures in these areas for Indigenous people include:

Education

According to counts from the 2011 Australian Census:

- 92% of 5 year-old Indigenous children nationally were attending an educational institution [32]
- 2.2% of WA's Indigenous population had not attended school, compared with 0.6% of the non-Indigenous population [33]
- 30% of WA's Indigenous people reported year 10 as their highest year of school completion; 21% had completed year 12, compared with 53% of non-Indigenous people [33]
- 26% of Indigenous people nationally reported having a post-school qualification, compared with 49% of non-Indigenous people [32]
- 4.6% of Indigenous people nationally had attained a bachelor degree or higher, compared with 20% of non-Indigenous people [32].

A national ABS school report [34] revealed, in 2012:

- the apparent retention rate nationally for Indigenous students from year 7/8 to year 10 was 98%, from year 7/8 to year 12 it was 51%[3]
- for non-Indigenous students, the apparent retention rate nationally from year 7/8 to year 10 was 101%; and from year 7/8 to year 12 it was 81%
- 14% of full-time Indigenous students lived in WA.

The 2012 national report on schooling in Australia [35] found that among WA students:

- 64% of Indigenous students in year 3 and 54% in year 5 were at or above the national minimum standard for reading, compared with 94% and 92% respectively of non-Indigenous students in WA
- 71% of year 3 Indigenous students and 59% of year 5 Indigenous students were at or above the national minimum standard for persuasive writing, compared with 96% and 94% respectively of non-Indigenous students in WA
- 69% of year 3 Indigenous students and 65% of year 5 Indigenous students were at or above the national minimum standard for spelling, compared with 94% and 93% respectively of non-Indigenous students in WA
- 57% of year 3 Indigenous students and 48% of year 5 Indigenous students were at or above the national minimum standard for grammar and punctuation, compared with 92% and 91% respectively of non-Indigenous students in WA
- 64% of Indigenous students in year 3 and 60% in year 5 were at or above the national minimum standard for numeracy, compared with 95% and 94% respectively of non-Indigenous students in WA.

Employment

According to counts from the 2011 Australian Census:

- 46% of Indigenous people aged 15 years or older in WA were employed and 18% were unemployed. In comparison, 68% of non-Indigenous people aged 15 years or older in WA were employed and 4.5% were unemployed [33]
- the most common occupation classification of employed Indigenous people nationally was 'labourer' (18%) followed by 'community and personal service worker' (17%). The most common occupation classification of employed non-Indigenous people was 'professional' (22%) followed by 'clerical and administrative worker' (15%) [32].[4]

Income

According to the 2011 Australian Census:

- the median total household income for Indigenous people in WA was $1,043, compared with $1,425 for non-Indigenous people [33].

Indigenous population

Based on information gathered as part of the 2011 Census of Population and Housing, the ABS has estimated the Aboriginal and Torres Strait Islander population at 88,277, with 43,710 Indigenous males and 44,567 Indigenous females living in WA at 30 June 2011 [36]. The WA Indigenous population represents around 3.8% of the total WA population and 13.2% of the total Australian Indigenous population (estimated to be 669,736 at 30 June 2011).

There was a 21% increase in the number of Indigenous people counted in the 2011 Census compared with the 2006 Census [2].[5] There are two 'structural' reasons contributing to the growth of the Indigenous population: the slightly higher fertility rates of Indigenous women compared with the rates of other Australian women (see 'Births and pregnancy outcome'); and the significant numbers of Indigenous babies born to Indigenous fathers and non-Indigenous mothers. Two other factors are considered likely to have contributed to the increase in people identifying as Indigenous: changes in enumeration processes (i.e. more Indigenous people are being captured during the census process); and changes in identification (i.e. people who did not previously identify as Indigenous in the census have changed their response).

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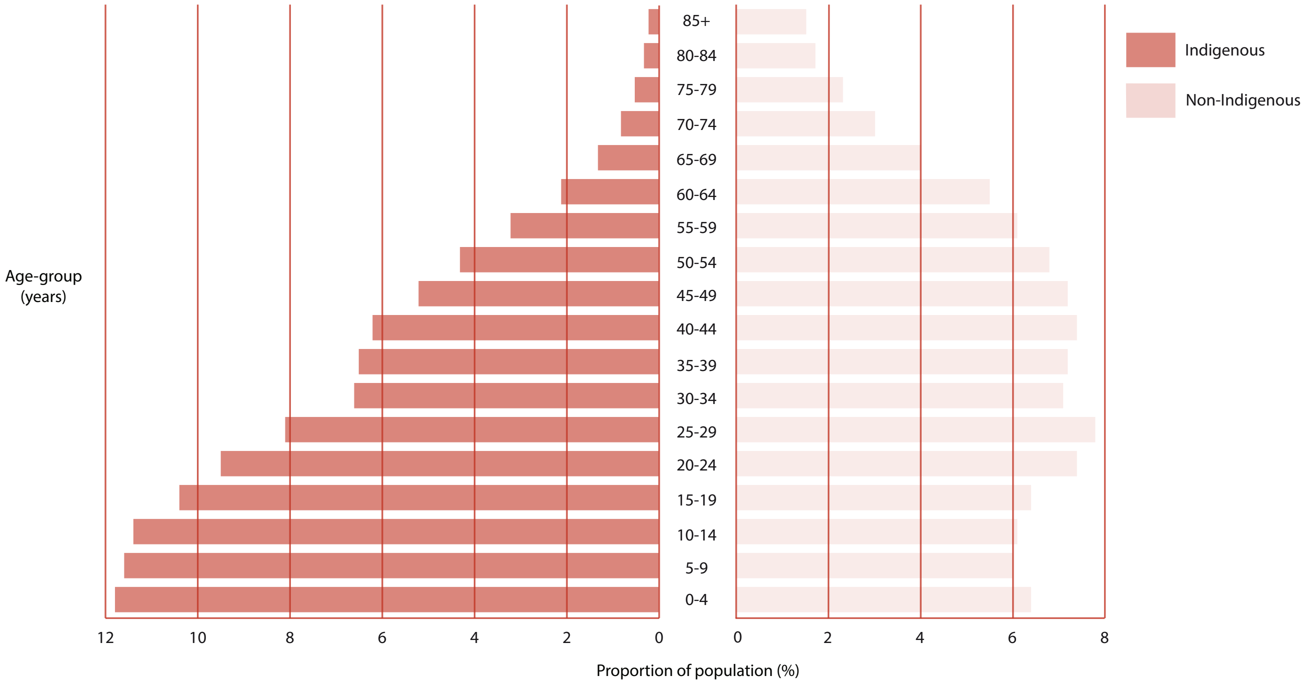
[3] Retention rates for Indigenous students were not provided for states and territories

[4] Occupational classifications for Indigenous people were not provided for states and territories

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

The Indigenous population in WA is much younger overall than the non-Indigenous population (Figure 1) [36]. According to estimates from the 2011 Census, at June 2011 about 35% of Indigenous people were aged less than 15 years, compared with 19% of non-Indigenous people. About 3.0% of Indigenous people were aged 65 years or over, compared with 12% of non-Indigenous people.

Figure 1. Population pyramid of Indigenous and non-Indigenous populations in WA, 30 June 2011



Source: ABS, 2013 [36]

According to counts from the 2011 Census, around 96% of Indigenous people living in WA were Aboriginal, 1.9% were Torres Strait Islanders, and 1.9% people identified as being of both Aboriginal and Torres Strait Islander descent [33].

Population counts from the 2011 Census reveal that over one-third of WA's Indigenous people lived in the Perth metropolitan area, where they comprised 1.6% of the total population (Table 1) [37]. The next most populous geographical region was South-Western WA, where 15% of the State's Indigenous population lived and comprised 2.8% of the total population of that region. The region of Kununurra had the highest proportion of Indigenous people (48% of that jurisdiction's population). More than two-fifths (40%) of WA's Indigenous population lived in remote or very remote areas at 30 June 2011, compared with only 5.4% of the total population.[6]

Table 1. Place of usual residence for Western Australian Indigenous population by Indigenous region, 30 June 2011

Indigenous region	Indigenous population (no.)	Proportion of Indigenous population of WA (%)	Proportion of total population of jurisdiction (%)	Proportion of population status unknown (%)
Perth	25,531	37	1.6	5.3
South-Western WA	10,552	15	2.8	5.3
South Hedland	7,260	10	12	18
Geraldton	6,330	9.1	11	6.0
Kalgoorlie	5,618	8.1	9.6	10
Kununurra	5,504	7.9	48	6.7
Broome	4,372	6.3	29	8.8
West Kimberley	4,041	5.8	48	8.7
Total	69,670	100	3.1	5.8

Notes: 1 This table presents raw census count numbers and as such underestimates the population of Indigenous people in each jurisdiction. For this reason the status unknown column is included

2 The Indigenous regions are those used by the ABS for aggregation of population estimates

Source: Derived from ABS, 2013 [37]

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[6] Based on the Accessibility/Remoteness Index of Australia (ARIA), the five categories of remoteness used by the ABS are: 'major cities' (Census collection districts (CDs) with an average ARIA value of 0-0.2); 'inner regional' (average ARIA value > 0.2 and <= 2.4); 'outer regional' (average ARIA value > 2.4 and <= 5.92); 'remote' (average ARIA value > 5.92 and <= 10.53); and 'very remote' (average ARIA value > 10.53). The last two categories are characterised by 'very little or very restricted access to goods and services and opportunities for social interaction'.

Births and pregnancy outcome

In 2011, there were 2,506 births registered in WA (1,291 males and 1,215 females) with one or both parents identified as Indigenous (7.8% of all births registered) [38]. (Implied coverage of Indigenous births in WA for 2002-2006 was estimated at 95% based on 2001 Census-based projections). Both parents were identified as Indigenous in 44% of the births. Only the mother identified as Indigenous in 35% of Indigenous registered births (including births where paternity was not acknowledged and those where the father's Indigenous status was unknown), and only the father identified as Indigenous in 21% (including births where the mother's Indigenous status was unknown).

Box 1: About births and fertility

In Australia, all births are required by law to be registered with the registrar of the state/territory in which the birth occurred. Because the information collected through the registration process is quite limited from a health perspective, the health authorities established parallel collections. These maternal/perinatal collections, which are based on data recorded by midwives and other staff attending births, collect information about the nature, duration, and complications of the pregnancy, labour, and puerperium periods, as well as details about the baby (including weight, length, condition at birth, and complications).

Information from the two collections is collated and reported nationally - by the ABS (for registration information) and the AIHW's National Perinatal Statistics Unit (for maternal/perinatal information). This section draws on the information collated by these two agencies.

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

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. These rates are the annual number of births per 1,000 women in five-year age-groups from 15 to 44 years. (The relatively small numbers of births to women aged less than 15 are included in the 15-19 years age-group, and those older than 44 years in the 40-44 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 born to 1,000 women at the current age-specific patterns of fertility.

Age of mothers

In 2011, Indigenous women in WA tended to have more babies and to have them at younger ages than did non-Indigenous women [38]. The median age of Indigenous mothers was 24.2 years compared with 30.3 years for all mothers. In 2011, the highest age-specific fertility rates were for the 20-24 years age-group for Indigenous women and in the 30-34 years age-group for all women (Table 2). The fertility rate of Western Australian teenage Indigenous women (106 babies per 1,000 women) was more than five times that for all teenage women in WA.

Table 2. Age-specific fertility rates, by Indigenous status of mother, WA and Australia, 2011

Age-group (years)	Western Australia		Australia	
	Indigenous mothers	All mother	Indigenous mothers	All mothers
15-19	106	19	78	16
20-24	180	58	155	52
25-29	154	107	147	101
30-34	101	125	105	122
35-39	52	66	52	70
40-44	n.p.	15	11	15
45-49	n.p.	0.8	0.6	0.8

Note: 1 Rates are births per 1,000 women in each age-group

2 n.p. refers to numbers not available for publication, but included in totals where applicable

3 Births to mothers aged less than 15 years are included in the 15-19 years age-group

4 Births to mothers aged 50 years or older are included in the 45-49 years age-group

Source: ABS, 2012 [38]

Total fertility rates

In 2011, the total fertility rate for Indigenous women living in WA was 3,011 births per 1,000 compared with 1,953 per 1,000 for all Western Australian women [38]. WA had the highest total fertility rate for Indigenous women, followed by Qld (2,932 per 1,000) and NSW (2,683 per 1,000). The total fertility rate for Indigenous women in Australia was 2,740 births per 1,000 compared with 1,884 births per 1,000 for all Australian women.

Method of birth

In 2010, Indigenous mothers in WA were more likely than non-Indigenous mothers to have a non-instrumental vaginal (including breech) birth (68% compared with 51%) and less likely to have assisted instrumental vaginal deliveries (forceps or vacuum extraction) (7.7% compared with 15%) [39]. Indigenous mothers in WA also had a lower proportion of births by caesarean section than non-Indigenous mothers (25% compared with 34%).

Birthweights

In 2010, the average weight of babies born to Indigenous mothers living in WA was 3,139 grams, which was 214 grams lighter than the average for babies born to all Western Australian mothers (3,353 grams) [39]. Babies born to Indigenous women in WA were more than twice as likely to be of low birthweight (LBW) than were those born to all women in WA (13.6% compared with 6.1%). (LBW, defined as a birthweight of less than 2,500 grams, increases the risk of illness and death in infancy and of other health problems.)

Risk factors for LBW include socioeconomic disadvantage, the size and age of the mother, the number of babies previously born, the mother's nutritional status, illness during pregnancy, the duration of the pregnancy, and mother's alcohol consumption and use of tobacco and other drugs during pregnancy [39, 40]. According to the WAACHS, infants born to mothers who used tobacco during pregnancy had a significantly lower average birth weight (3,110 grams) than did infants born to mothers who had not used tobacco during pregnancy (3,310 grams) [41]. Lowest average birthweights were for infants whose mothers used marijuana with tobacco (3,000 grams) or with both tobacco and alcohol (2,940 grams).

Mortality

In 2011, 454 of the 12,724 deaths registered in WA were identified as being of an Indigenous person [5], but, because of the under-identification of Indigenous people in death registrations, the actual number of Indigenous deaths is likely to be higher than the number registered.

The following summary measures of mortality are based on the numbers of registered deaths, so some caution should be exercised in their interpretation.

Box 2: Adjusting for differences in the age-structures of populations

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

Direct standardisation, the preferred method, applies detailed information about Indigenous deaths, including sex and age, to a 'standard' population [42]. (In Australia in recent years, the 2001 Australian population has generally been 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). 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. The SMR is the ratio of the numbers of deaths (or of other health measures) registered/observed and expected.

Age-standardised death rates

After age-adjustment, the death rate for Indigenous people in WA of 1,431 per 100,000 was 2.5 times the rate for non-Indigenous people in 2006-2010 [43].

Between 1991 and 2010, there was a 35% reduction in the death rates for Indigenous people in WA (there was a 31% reduction for other Western Australians) [43]. Between 2001 and 2010, there was no significant change in the death rates for Indigenous people, but a reduction of 9% for non-Indigenous people in WA.

Expectation of life

In 2009, the ABS revised its estimates for expectation of life at birth for Indigenous people [6]. After adjustment for the underestimate of the number of deaths identified as Indigenous, the ABS estimates that Indigenous males born in WA in 2005-2007 could be expected to live to 65.0 years, 14 years less than the 79.0 years expected for non-Indigenous males. (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.) The expectation of life at birth of 70.4 years for Indigenous females born in WA was 12.5 years less than the expectation of 82.9 years for non-Indigenous females born in WA. For the same time period, the estimates for Indigenous people nation-wide were 67.2 years for males and 72.9 years for females.

Age at death

In 2011, the median age at death for Indigenous males in WA was 52.2 years, 25.2 years less than that for non-Indigenous males (77.4 years) [5].[7] The median age at death for WA Indigenous females was 54.2 years, 30.2 years less than that for WA non-Indigenous females (84.4 years).

In 2007-2011, death rates in WA were higher for Indigenous people than for non-Indigenous people across all age-groups, with rate ratios highest in the middle adult years (Table 3) [5].[8] (These ratios, being based on the numbers of deaths registered, are likely to underestimate the true differences between death rates for Indigenous people and the total population.) The greatest difference occurred among males and females aged 35-44 years with Indigenous:non-Indigenous rate ratios of around seven to eight.

Table 3. Age-specific death rates, by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, WA, 2007-2011

Age-group (years)	Males			Females		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0	10	3	3.4	5	3	1.8
1- 4	63	22	2.8	48	12	4.0
5-14	38	9	4.3	29	9	3.1
15-24	241	56	4.3	106	26	4.1
25-34	406	89	4.6	219	36	6.1
35-44	834	121	6.9	510	66	7.7
45-54	1,388	260	5.3	1,021	153	6.7
55-64	2,381	579	4.1	1,671	343	4.9
65+	6,380	3,819	1.7	5,296	3,423	1.5

Notes: 1 Rates are per 100,000 population, except for age 0
2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3 Deaths for which Indigenous status was not stated were excluded from the calculation of rates

Source: ABS, 2012 [5]

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 2009-2011, the IMR of 7.0 infant deaths per 1,000 live births for Indigenous people in WA was 2.4 times the rate for non-Indigenous infants [5]. The IMR of 10.2 per 1,000 for Indigenous male infants was 2.8 times higher than the rate of 3.7 per 1,000 for Indigenous female infants.

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[7] 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 is a less precise measure than age-specific death rates.

[8] Rate ratios are the Indigenous rate divided by the non-Indigenous rate for each age-group.

Causes of death

In 2006-2010, the most common cause of death among Indigenous people in WA was circulatory disease (also known as cardiovascular disease, which includes heart disease and stroke), accounting for 26% of Indigenous deaths in WA [43]. The next leading causes of death were injury and neoplasms (almost entirely cancer), responsible for 18% and 16% respectively of Indigenous deaths in WA (Table 4).

Table 4. Age-standardised death rates, by Indigenous status and cause, and Indigenous:non-Indigenous rate ratios, WA, 2006-2010

Cause of death	Indigenous	Non-Indigenous	Rate ratio
Circulatory disease	415	181	2.3
Injury	137	41	3.4
Neoplasms (cancer)	265	177	1.5
Endocrine, metabolic and nutritional disorders (including diabetes)	165	24	6.9
Respiratory disease	123	43	2.9
Digestive disease	72	20	3.6
Kidney disease	55	10	5.4
Nervous system disease	42	28	1.5
Infectious and parasitic disease	29	7	4.0
Conditions originating in the perinatal period	5	2	2.8
Other causes	123	41	3.0
All causes	1431	574	2.5

Notes: 1 Due to the under-identification of Indigenous deaths, these rates are likely to under-estimate the true difference between the Indigenous and non-Indigenous populations

2 Rates per 100,000 population

3 Ratio is the Indigenous rate divided by the non-Indigenous rate

Source: AIHW, 2013[43]

Avoidable mortality

Avoidable mortality refers to deaths that could have been prevented with timely and effective health care, including early detection and effective treatment, as well as appropriate modifications to lifestyle behaviours (such as quitting smoking) [44]. In the five year period 2006-2010, there were 1,417 avoidable deaths among Indigenous people aged 0-74 years in WA [43]. After age-adjustment, the rate of avoidable deaths for Indigenous people was 4.8 times higher than the rate for non-Indigenous people in WA. In 2006-2010, the leading causes of avoidable Indigenous deaths in WA were coronary heart disease (responsible for 19% of avoidable deaths), cancer (13%), and diabetes (11%) [43]. Other causes included intentional self-harm (10%), road traffic injury (9.0%) and alcohol-related disease (5.8%).

Between 1997 and 2010, there were significant reductions in death rates from avoidable causes for Indigenous and non-Indigenous Western Australians, but no closing of the gap in death rates [43]. Between 2001 and 2010, there was no change in death rates from avoidable causes for Indigenous people in WA, but there was a reduction in the rates for non-Indigenous people in WA.

Hospitalisation

Separation rates[9]

During 2011-12, there were 1,024,462 hospital separations in WA, of which 75,306 (7.4%) were identified as Indigenous [45].[10] The age-standardised separation rate of 1,563 separations per 1,000 for Indigenous people was 3.8 times higher than the rate for other people in WA. Around 39% of the separations identified as Indigenous involved overnight hospital stays, and 60% were same-day acute separations (the details of a small number of the overall separations were not reported). The age-standardised separation rate for Indigenous people for overnight stays was 2.4 times the rate for non-Indigenous people. Excluding same-day separations for renal dialysis, for which rates were much higher for Indigenous people than for non-Indigenous people, the age-adjusted separation rate for same-day separations was 1.3 times higher for non-Indigenous people than that for Indigenous people

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[9] 'Separation' refers to an episode of admitted patient care, which can be either a patient's total stay in hospital or part of a patient's stay in hospital that results in a change to the type of care (e.g. from acute to rehabilitation). Hospital separations are more widely known as 'admissions', but can also be referred to as 'hospitalisations'.

[10] The overall level of identification of Indigenous people in WA's public hospitals was very good at 96%, but the level was only 90% for admissions in inner regional and remote areas.

Age-specific separation rates

In WA in 2008-10, separation rates were higher for Indigenous people than those 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 5) [46].

Table 5. Age-specific hospital separation rates (excluding dialysis), by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, WA, 2008-10

Age-group (years)	Males			Females			Persons		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0–4	438	246	1.8	367	181	2.0	403	214	1.9
5–14	137	93	1.5	108	75	1.4	123	85	1.5
15–24	188	132	1.4	432	228	1.9	306	178	1.7
25–34	272	142	1.9	595	355	1.7	430	245	1.8
35–44	464	188	2.5	575	324	1.8	520	255	2.0
45–54	580	273	2.1	579	331	1.7	580	302	1.9
55–64	676	457	1.5	709	447	1.6	693	452	1.5
65+	855	920	0.9	800	764	1.0	824	837	1.0
All ages	329	290	1.5*	436	349	1.6*	382	319	1.5*

Notes: 1 Numbers include separations for which Indigenous status was not stated
2 Rates are expressed as separations per 1,000 population
3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
4 Rate ratios for 'All ages' are directly age-standardised using the 2001 Australian standard population (*)

Source: AIHW, 2013 [46]

Causes of hospitalisation

In 2008-10, the most common cause of hospitalisation among Indigenous people living in WA was for the International Classification of Diseases (ICD) group 'Care involving dialysis' (Table 6) [46]. (Many of these separations involved repeat admissions for the same people, some on an almost daily basis.) After age-adjustment, the rate of 764 per 1,000 for Indigenous people was almost 16 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 Indigenous people, with an Indigenous rate of 65 per 1,000 which was 2.9 times higher than the non-Indigenous rate. The next leading cause of hospitalisation for Indigenous people was for respiratory conditions with an Indigenous rate of 56 per 1,000 which was 4.0 times higher than the non-Indigenous rate.

Table 6. Age-standardised hospital separation rates, by principal diagnosis and Indigenous status, and Indigenous:non-Indigenous rate ratios, WA, 2008-10

Principal diagnosis	Indigenous	Non-Indigenous	Rate ratio
Injury, poisoning and certain other consequences of external causes	65	23	2.9
Disease of the respiratory system	56	14	4.0
Disease of the digestive system	38	39	1.0
Symptoms, signs and abnormal clinical and laboratory findings	37	23	1.6
Disease of the circulatory system	36	19	1.9
Pregnancy, childbirth and the puerperium	35	21	1.6
Mental and behavioural disorders	33	13	2.6
Endocrine, nutritional and metabolic diseases	29	8.6	3.4
Disease of the genitourinary system	23	16	1.4
Disease of the skin and subcutaneous tissue	19	5.7	3.3
Certain infectious and parasitic diseases	14	4.8	2.9
Other	96	129	0.7
Care involving dialysis	764	49	15.5
Total	1,245	364	3.4

Notes: 1 Numbers include separations for which Indigenous status was not stated
2 Rates are expressed as separations per 1,000 population and directly age-standardised using the 2001 Australian standard population
3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate

Source: Derived from AIHW, 2013 [46]

Selected health conditions

Cardiovascular disease

Cardiovascular disease (CVD; ICD 'Diseases of the circulatory system') includes all diseases and conditions that affect the heart and blood vessels [47]. CVD presents a significant burden for Indigenous people in terms of ill-health, hospitalisation, and mortality [48]. Coronary heart disease (or ischaemic heart disease), cerebrovascular disease (including stroke), heart failure, hypertension and rheumatic heart disease are of particular importance to Indigenous people.

Risk factors for CVD are categorised as either modifiable (risk factors that can be altered), which can be behavioural and biomedical, or non-modifiable (risk factors that cannot be altered) [49]. Modifiable behavioural factors include tobacco use, physical inactivity, dietary behaviour, and excessive alcohol consumption. Modifiable biomedical factors include hypertension, high blood cholesterol, overweight and obesity, and depression. Certain related health conditions, particularly diabetes and chronic kidney disease, can also increase the risk of developing CVD. Non-modifiable risk factors, such as age, sex, family history, and ethnicity, can influence the risk of CVD.

As important as these factors may be, they should be considered within a broad social determinants of health framework, with the following aspects being important contributors to the development of CVD disease among Indigenous people:

- cultural and historical factors, such as loss of land, and disruptions to culture, language and identity [50, 51]
- environmental and socioeconomic factors, such as poor housing, low education and income [51]
- psychosocial stressors, such as death of a family member or close friend, serious injury or disability [51, 52]
- limited access to health care, both preventive and clinical [50, 51, 53].

Extent of cardiovascular disease among Indigenous people in WA

There were 7,594 Indigenous people in WA who reported having a heart and circulatory problems as a long-term health condition in 2004-2005, representing 11% of WA's Indigenous population [46]. A similar proportion of the Indigenous population Australia-wide (12%) reported having the condition. After age-adjustment, a higher proportion of Indigenous females than non-Indigenous females in WA reported heart and circulatory conditions; the proportions of Indigenous and non-Indigenous males were the same. The prevalence of heart and circulatory conditions increased with age; Indigenous people aged 55 years and over had the highest prevalence of self-reported heart and circulatory conditions (48%). The largest disparity in prevalence between Indigenous and non-Indigenous people was among those aged 35-44 years (ratio of 2.2).

In 2004-2005, 6% of Indigenous males and 8% of Indigenous females in WA reported having hypertension [43]. After age-adjustment, Indigenous females in WA were 1.5 times more likely than non-Indigenous females to have hypertension; Indigenous males were only slightly more likely than non-Indigenous males to report having hypertension (ratio of 1.1). Indigenous people living in remote areas of WA were more likely than those living in non-remote areas to report having hypertension. Similar proportions of Indigenous people in WA and Australia-wide reported having hypertension.

In 2010-11, there were 21 new and recurrent cases of acute rheumatic fever (ARF) notified in WA, all of which occurred among Indigenous people [54]. At 30 June 2011, there were 158 patients with confirmed rheumatic heart disease (RHD) registered on the WA Rheumatic Heart Disease Register. All of the RHD patients were Indigenous; the majority of patients were female (61%). Around 42% of patients with RHD were aged 0-24 years (67 cases), 36% were aged 25-44 years (57 cases), and 22% were aged 45 years and over (34 cases).

Hospitalisation

There were 2,872 hospitalisations of WA Indigenous people with a principal diagnosis of disease of the circulatory system between July 2008 and June 2010 [46]. The age-standardised hospitalisation rate for circulatory diseases was 1.9 times higher for Indigenous people living in WA than that for their non-Indigenous counterparts. The hospitalisation rate for Indigenous people living in WA was similar to the rate for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT combined.

Indigenous:non-Indigenous rate ratios were highest for the 35-44 years and 45-54 years age-groups (3.4 and 3.6 respectively) and lowest for people in the 15-24 years and 65 years and over age-groups (1.6 and 1.2 respectively) (Table 7) [46]. Indigenous females and males were hospitalised at 2.3 and 1.6 times the rates of their non-Indigenous counterparts. Rate ratios were particularly high for Indigenous females aged 45-54 years (rate ratio of 4.2).

Table 7. ***Age-specific hospitalisation rates for cardiovascular disease, by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, WA, 2008-10***

Age-groups (years)	Males			Females			Persons		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0–4	1.9	0.6	3.0	1.1	0.5	2.3	1.5	0.5	2.7
5–14	2.0	0.9	2.1	2.1	0.7	2.9	2.0	0.8	2.4
15–24	2.8	1.8	1.6	2.9	1.7	1.7	2.8	1.7	1.6
25–34	12	3.8	3.2	9.0	3.1	2.9	11	3.5	3.1
35–44	30	9.3	3.2	27	7.1	3.8	28	8.2	3.4
45–54	66	21	3.2	52	12	4.2	59	17	3.6
55–64	85	43	2.0	76	21	3.6	80	32	2.5
65+	108	104	1.0	98	72	1.4	102	87	1.2
All ages	20	22	1.6 *	19	16	2.3 *	19	19	1.9 *

Notes: 1 Rates per 1,000 population

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

3 Rate ratios for 'All ages' have been directly age-standardised using the 2001 Australian standard population (*)

Source: AIHW, 2013 [46]

Between 1998-99 and 2009-10, there were significant decreases in the hospitalisation rates for circulatory diseases for Indigenous and non-Indigenous people in WA; between 2004-05 and 2009-10, there was a significant decrease for Indigenous people, but no significant decrease for non-Indigenous people [43].

Of the different diseases of the circulatory system, coronary heart disease (including heart attack) was the condition accounting for the highest rate of hospitalisation among Indigenous people in WA in 2010-11 (Table 8) [46]. Indigenous people in WA were hospitalised for coronary heart disease at nearly three times the rate of non-Indigenous people. Indigenous people in WA were hospitalised at 7.4 times the rate for non-Indigenous people for ARF/RHD, and at nearly four times the rate for hypertension.

Table 8. ***Age-standardised hospitalisation rates for Indigenous people for a principal diagnosis of disease of the circulatory system, by type of circulatory disease, and Indigenous:non-Indigenous rate ratios, WA, 2008-10***

Principal diagnosis	Indigenous rate	Rate ratio
Coronary heart disease	16	2.8
Acute myocardial infarction	6.6	3.6
Subsequent myocardial infarction	0.1	9.0
Pulmonary heart disease and other forms of heart disease	12	2.0
Cerebrovascular disease	3.0	2.0
Stroke	2.7	2.2
Acute rheumatic fever and chronic rheumatic heart disease	0.6	7.4
Hypertension disease	0.8	3.8
Other diseases of the circulatory system	3.7	0.7
All circulatory diseases	36	1.9

Notes: 1 Rates are per 1,000 population, directly age standardised using the Australian 2001 standard population

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

Source: AIHW, 2013 [46]

Mortality

In 2006-2010, disease of the circulatory system was the leading cause of death among Indigenous people living in WA, accounting for 26% of Indigenous deaths [46]. After age-adjustment, the death rate was 2.3 times higher for Indigenous people than for non-Indigenous people. The death rate was higher for Indigenous people living in WA than that for Indigenous people living in NSW, Qld, WA, SA and the NT combined. Coronary heart disease, cerebrovascular disease, and rheumatic and other valvular heart diseases were the most common avoidable causes of CVD-related death among Indigenous people in WA.

There was a significant decrease in mortality from circulatory disease among WA Indigenous people between 1997-2010 and a significant increase among their non-Indigenous counterparts, but the change in the gap was not statistically significant [43]. Between 2001-2010, mortality from circulatory diseases decreased among non-Indigenous people but there was no significant change for Indigenous people.

Cancer

Cancer is a disease which affects the body's cells [55, 56]. Cells normally grow and multiply in a controlled manner, but when damage occurs in the genetic blueprint (DNA) of a cell, uncontrolled growth can occur; this is cancer. Cancer cells are benign if they do not spread into surrounding areas, or to different parts of the body, and are not considered dangerous; however, if these cells 'spread into surrounding areas, or to different parts of the body [metastasise], they are known as malignant' [55]. Cancerous cells can arise from almost any cell, so cancer can occur almost anywhere in the body.

The impact of cancer on Indigenous people has attracted much less attention than it deserves for two main reasons. First, the level of identification of Indigenous people in cancer notifications is known to be poor [57, 58]. Indigenous identification in the registries has been improving [59, 60], but, due to poor data quality in several jurisdictions, there are currently no national data on cancer incidence among Indigenous people [61]. Compared with other states and territories, reasonable incidence data are available for WA (and SA and the NT [62] and, more recently, NSW and Qld [61]). There is concern that not all Indigenous patients with cancer are correctly identified as Indigenous in cancer registries [58]. Provision for the identification of Indigenous people is not yet included on all pathology forms and the extent to which Indigenous cancer patients are identified in hospital inpatient statistics varies across Australia [60]. Second, the fact that cancer has often been reported in terms of the proportions of deaths it causes rather than by rates has tended to give the erroneous impression that cancer does not have a great impact among Indigenous people. An analysis of rates, rather than comparisons of proportions, reveals that during 2006-2010 the ratio of cancer-related deaths was 1.5 for Indigenous and non-Indigenous people living in WA [46].

Many of the cancers affecting Indigenous people are preventable – for example, cancers related to tobacco use, to which Indigenous people are particularly prone due to high levels of smoking [62-64]. (See 'tobacco use' in the section on 'factors contributing to health'.)

Extent of cancer among Indigenous people in WA

According to the 2004-2005 NATSIHS, 1.1% of Indigenous people living in WA reported suffering from neoplasms/cancer, compared with 2.1% of non-Indigenous people [65]. In 2007-2011, after age-adjustment, the overall cancer incidence rates were the same for Indigenous and non-Indigenous people in WA (Table 9) [66]. Age-adjusted incidence rates were, however, much higher for Indigenous people than non-Indigenous people for a number of cancers, including cancers of the: lung, bronchus and trachea; pharynx; oesophagus; and liver. High rates of smoking are the likely cause of a high incidence of lung cancers [67]. Age-standardised rates for cervical cancer in WA in 2004-2008 were twice as high for Indigenous women as for non-Indigenous women [46].

Table 9. ***Age-standardised incidence rates for selected cancers, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, WA, 2007-2011***

Cancer type	Indigenous		Non-Indigenous		Rate ratio	
	Males	Females	Males	Females	Males	Females
Prostate gland	47		120		0.4	
Breast		70		83		0.8
Pancreas	10.8	7.5	7.3	5.5	1.5	1.4
Lung, bronchus and trachea	69	41	32	20	2.2	2.1
Tongue	9.6	2.6	2.6	1.1	3.7	2.4
Lip, gum and mouth	12	0.6	7.3	2.6	1.7	0.2
Pharynx	21	3.8	3.9	0.7	5.4	5.4
Larynx	7.7	1.2	2.6	0.4	3.0	3.0
Oesophagus	15	6.5	5.4	1.3	2.8	5.0
Liver and intrahepatic bile ducts	22	6.7	4.8	1.7	4.5	3.9
Unknown primary site	26	12.2	6.9	4.6	3.8	2.7
All cancers	377	278	375	266	1.0	1.0

Notes: 1 Rates are per 100,000 population

2 Ratio is the Indigenous rate divided by the non-Indigenous rate

Source: Western Australian Cancer Registry, 2013 [66]

In 2007-2011, cancer incidence rates in WA were similar or slightly higher for Indigenous males and females than for their non-Indigenous counterparts across all age-groups (Table 10) [66]. For males, the greatest difference occurred among those aged 25-29 years, with an Indigenous:non-Indigenous rate ratio of 1.6; the greatest difference for females was among those aged 10-14 years, with an Indigenous:non-Indigenous rate ratio of 2.3.

Table 10. ***Age-specific incidence rates for cancers, by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, WA, 2007-2011***

Age-group (years)	Males		Females		Rate ratios	
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Males	Females
0-4	30	25	30	20	1.2	1.5
5-9	n.p.	14	n.p.	8		
10-14	n.p.	12	24	10		2.3
15-19	31	24	n.p.	16	1.3	
20-24	n.p.	43	36	34		1.0
25-29	86	55	63	67	1.6	0.9
30-34	n.p.	79	63	112		0.6
35-39	81	111	135	183	0.7	0.7
40-44	183	171	247	267	1.1	0.9
45-49	285	303	404	420	0.9	1.0
50-54	844	574	613	542	1.5	1.1
55-59	1128	1004	527	720	1.1	0.7
60-64	1514	1539	901	932	1.0	1.0
65-69	1971	2256	1634	1216	0.9	1.3
70-74	3264	2709	1956	1398	1.2	1.4
75 +	2805	3572	1898	1921	0.8	1.0

Notes: 1 Rates are per 100,000 population

2 Ratio is the Indigenous rate divided by the non-Indigenous rate

3 n.p. refers to numbers not available for publication

Source: Western Australian Cancer Registry, 2013 [66]

Hospitalisation

There were 845 hospitalisations for the principal diagnosis of cancer among the WA Indigenous population between July 2008 and June 2010 [46]. Age-standardised hospitalisation rates for cancer were lower for Indigenous people than that for non-Indigenous people (11 and 17 per 1,000, respectively) [68]. Hospitalisation rates increased with age in WA in 2008-2010, but Indigenous:non-Indigenous rate ratios were highest for the 0-34 years age-group [46] (Table 11).

Table 11. Age-specific hospitalisation rates for cancer, by Indigenous status, and Indigenous:non-Indigenous rate ratios, WA, 2008-10

Age-group (years)	Indigenous	Non-Indigenous	Rate ratio
0-34	1.7	1.5	1.1
35-44	4.6	6.1	0.8
45-54	14	15	0.9
55-64	28	35	0.8
65+	38	76	0.5

Note 1 Ratio is the Indigenous rate divided by the non-Indigenous rate

Source: AIHW, 2013 [46]

In terms of specific cancers, the age-standardised hospitalisation rate for lung cancer for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2008-09 was 1.5 times higher than for their non-Indigenous counterparts [69]. The hospitalisation rate for cervical cancer for Indigenous women living in NSW, Vic, Qld, WA, SA and the NT for the period 2005-06 to 2009-10 was 3.1 times higher than that for other females [70].

Between 1998-99 to 2009-10, there were increases in the hospitalisation rates for cancer among Indigenous and non-Indigenous people living in WA; between 2004-05 and 2009-10, there was no increase for Indigenous people, but a significant increase for non-Indigenous people [43].

Mortality

Indigenous incidence rates may be lower than non-Indigenous rates for some cancers, but Indigenous death rates tend to be higher than non-Indigenous rates [62]. There were 351 deaths from cancer among Indigenous people living in WA in 2006-2010; after age-adjustment, the death rate for cancer was 1.5 times higher for Indigenous people than that for non-Indigenous people [46]. The Indigenous death rate for WA rate was higher than the Indigenous death rate for NSW, Qld, WA, SA and the NT combined.

Age-standardised death rates for cancer were higher for Indigenous people living in WA than those non-Indigenous peoples for all types of cancer in 2006-2010 (Table 12) [46]. Indigenous people died from lung cancer at 1.8 times the rate and from cervical cancer at 6.0 times the rate of non-Indigenous people.

Table 12. Age-standardised cancer death rates, by Indigenous status and type of cancer, and Indigenous:non-Indigenous rate ratios, WA, 2006-2010

Type of cancer	Indigenous	Non-Indigenous	Rate ratio
Digestive organ cancers	75	47	1.6
Lung cancer	61	35	1.8
Cervical cancer	7.0	1.2	6.0
All cancers	265	177	1.5

Notes: 1 Rates are per 100,000 population
2 Ratio is the Indigenous rate divided by the non-Indigenous rate
3 Rates are directly age-standardised using the 2001 Australian estimated resident population
4 Cervical cancer is for females only

Source: AIHW, 2013 [46]

The patterns of Indigenous cancer incidence and mortality are largely explained by the higher level of risk factors, most notably tobacco use [62-64]. For example, high rates of smoking are the likely cause of a high incidence of cancers of the lung, mouth and throat [67].

The lower Indigenous:non-Indigenous ratio for cancer incidence (0.6) than for deaths from cancer (1.5) could be due to a number of factors [58]:

- Indigenous people are more likely to have cancers that have a poor prognosis
- Indigenous people are usually diagnosed with cancer at a later stage (probably due to a combination of later presentation for health care and lower participation in screening programs)
- Indigenous people are less likely to receive optimal treatment for their cancers.

Diabetes

There are several types of diabetes, of which the most frequently occurring are type 1, type 2 and gestational diabetes mellitus (GDM) [71]. Type 1 diabetes is relatively uncommon in the Indigenous population, but type 2 diabetes represents a serious health problem for many Indigenous people, who tend to develop it at earlier ages than do other Australians, and often die from it at younger ages [60]. GDM, which can occur during pregnancy, is more common among Indigenous women than among non-Indigenous women [72].

Statistics on diabetes among Indigenous people are often underestimated for several reasons, including under-identification of Indigenous status, and information only being collected routinely for types of diabetes that require insulin treatment [71]; self-reported diabetes information may underestimate the prevalence of diabetes by up to 50% [73].

Diabetes can lead to life-threatening health complications, some of which may develop within months of diagnosis, while others may take years to develop [74]. Complications of diabetes include disease of the large blood vessels (macrovascular disease), which can cause heart disease and stroke, and disease of the small blood vessels (microvascular disease), which can cause eye disease and kidney disease. For many Indigenous people, diabetes is not diagnosed until after complications have started to develop; when diagnosis occurs in the presence of end-stage disease it results in higher death rates, a greater dependency on tertiary level care, and higher health care costs [75].

Extent of diabetes among Indigenous people in WA

According to the 2004-2005 NATSIHS, diabetes/high sugar levels were reported by 8.8% of Indigenous people living in WA, with proportions similar for Indigenous people living in remote and non-remote areas [65]. The overall proportion for WA was higher than that for any other state or territory, and higher than the national proportion of 6.1%. After age-adjustment, diabetes/high sugar levels were 3.7 times more common for Indigenous people living in WA than for their non-Indigenous counterparts.

Information from Australia's National Diabetes Register (NDR)[11] reveals that in 2005-2007, 5.6% of people in WA who began using insulin to treat their diabetes were Indigenous [71]. This figure was higher than the national proportion (2.9%), but lower than that for the NT (39%) and Qld (6.3%).[12] For insulin-treated type 2 diabetes, 5.8% of new cases in WA were identified as Indigenous (compared with 2.6% Australia-wide). Around 6.5% of new cases of insulin-treated GDM among women aged 15-49 years in WA were identified as Indigenous (compared with 2.2% Australia-wide).

Hospitalisation

Between July 2008 and June 2010, the WA age-standardised rates for hospital separations for a principal diagnosis of diabetes were 6.2 times higher for Indigenous females, and 4.4 times higher for Indigenous males, than the rates for their non-Indigenous counterparts [46]. Age-adjusted hospital separation rates for diabetes were higher for Indigenous people living in WA than for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT combined.

In WA in 2008-2010, age-specific separation rates for diabetes were higher for Indigenous people than those for non-Indigenous people in every age-group, except for the 0-4 years and 5-14 years age-groups (Table 13) [46]. The Indigenous:non-Indigenous rate ratio was highest for the 45-54 years age-group.

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[11] The NDR collects information on those people who use insulin to treat their diabetes, and as such does not reflect the much higher prevalence of type 2 diabetes that is not managed with insulin.

[12] These figures largely reflect the relative proportion of the Indigenous populations in these states and territories but, it is possible that the NDR may underestimate the number of Indigenous registrants due to low registration rates for the NDR and under-reporting of Indigenous status.

Table 13. Age-specific hospitalisation rates for a principal diagnosis of diabetes, by age-group and Indigenous status, and Indigenous:non-Indigenous rate ratios, WA, 2008-10

	Age-group (years)								
	0–4	5–14	15–24	25–34	35–44	45–54	55–64	65+	All ages
Indigenous	0.2	0.5	1.3	5.3	16	35	63	57	21
Non-Indigenous	0.2	0.8	0.8	0.9	1.2	2.3	5.7	21	4.0
Rate ratio	0.8	0.7	1.5	6.2	13.6	15.1	11.0	2.7	5.3 *

Notes: 1 Ratio is the Indigenous rate divided by the non-Indigenous rate

2 Rate ratio for 'All ages' are directly age-standardised using the 2001 Australian standard population (*)

Source: AIHW, 2013 [46]

Between 2001-02 and 2009-10, there were significant increases in age-standardised hospitalisation rates for diabetes for both Indigenous and non-Indigenous people in WA and an increase in the gap between these two populations; between 2004-05 and 2009-10 there was no increase for Indigenous people but a significant increase for non-Indigenous people [43].

After age-adjustment, hospitalisation rates for NSW, Vic, Qld, WA, SA and the NT combined for 2008-09 show [76]:

- Indigenous people with type 2 diabetes as a principal diagnosis were hospitalised at 4.7 times the rates for non-Indigenous people, with hospitalisations for complications of diabetes accounting for 84% of Indigenous hospitalisations for potentially preventable chronic conditions
- hospitalisations for kidney-related complications of diabetes were 11 times higher for Indigenous people than for non-Indigenous people.

Mortality

In 2006-2010, diabetes was responsible for 8.5% of deaths among Indigenous people in WA [43]. After age-adjustment, the death rate for diabetes was 8.7 times higher for Indigenous people than for non-Indigenous people in WA; this rate ratio was the highest of all health conditions. The age-standardised rate for Indigenous living in WA (146 per 100,000) was higher than that for Indigenous people living in NSW, Qld, WA, SA and the NT combined (102 per 100,000).

Social and emotional wellbeing

Mental health problems and mental illnesses (or disorders) are a significant public health issue [77]. Within the Indigenous population, mental illnesses accounted for 16% of the disease burden in 2003, making them the second leading contributor to the overall burden [78].

Addressing mental illness and its impacts remains an important challenge for Australia, which is made more difficult by the 'glaring deficiencies in our knowledge' about mental health disorders [79, p.150]. The deficiencies in knowledge are complicated by the complexity of the general area of mental health, and the diverse views and subsequent varying terminology that exist within the field [79, 80].

The World Health Organization (WHO) has defined mental health as a state of wellbeing whereby a person is aware of their own abilities, can cope with everyday stressors, work productively, and make contributions to their community [81]. Mental health problems and mental illnesses or disorders are identified through a diagnostic process and refer to the spectrum of 'cognitive, emotional and behavioural disorders that interfere with the lives and productivity of people' [80, p.5].

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 [80, 82]. Mental health problems usually stem from a response to a life stressor and are more common than mental illnesses [80]. Mental health problems do, however, have the potential to develop into a mental illness. Conversely, a mental illness is a clinically diagnosable disorder that significantly interferes with an individual's cognitive, emotional, or social abilities, and is generally determined according to the classification system of the Diagnostic and Statistical Manual of Mental Disorders (DSM) or the ICD [80, 82]. Widespread grief and loss, child removals and unresolved trauma, cultural dislocation and identity issues, economic and social disadvantage, physical health problems, incarceration, child removal by care and protection orders, juvenile justice supervision, violence (including family violence), and substance use/misuse have been identified as underlying the great burden among Indigenous people with 'mental health problems' and 'mental illness' [83].

Mental health, mental health problems, and mental illness are not discrete entities, rather they occur on a continuum, and it is expected that people will fluctuate between periods of good mental health, and periods of not-so-good mental health during their lifetime [80, 82, 84]. This broader conceptualisation of mental health has been recognised in Australia and is fundamental to the aims of current mental health policy. This conceptualisation also closely aligns with the Indigenous view of mental health and wellbeing, termed social and emotional wellbeing [82, 84].

Social and emotional wellbeing refers to the social, emotional, spiritual, and cultural wellbeing of an individual [84]. It goes beyond conventional mental health concepts to encapsulate the importance of connection to land, culture, spirituality, ancestry, family and community, and how these impact on an individual while also recognising the influence of political and historical factors on mental health and wellbeing [84, 85]. Analogous to the Indigenous 'whole of life' view, social and emotional wellbeing is interrelated with physical health, and is concerned not just with individual wellbeing, but also the wellbeing of the whole Indigenous community [31, 84, 86]. It is the preferred terminology by many Indigenous people because of its more positive and holistic connotations.

Extent of social and emotional wellbeing among Indigenous people in WA

Historically, the extent of mental illness and mental health problems in the Indigenous population has been poorly documented [86]. It was not until the 2004-2005 NATSIHS, and, particularly, the 2008 NATSISS, that information on the social and emotional wellbeing of Indigenous people was systematically collected at a national level [87, 88]. The NATSISS utilised several measures to provide a broad understanding of the social and emotional wellbeing of Indigenous people [88]. Among the information collected was data on the levels of psychological distress experienced by Indigenous people aged 18 years and over. Among Indigenous people living in WA, almost two-thirds (65%) reported having experienced low to moderate levels of psychological distress, and 33% reported high to very high levels of psychological distress in the previous 12 months [46]. Indigenous people in WA experienced high to very high levels of psychological distress at almost three times the rate reported by non-Indigenous people.

More detailed information on the psychological distress experienced by Indigenous people living in WA is provided by the 2004-2005 NATSIHS – the first survey to report on the social and emotional wellbeing of the Australian Indigenous population [89]. In the four weeks prior to the survey, Indigenous people aged 18 years and over reported feeling nervous (9.5%), without hope (8.2%), restless (13%), that everything was an effort (18%), and so sad that nothing could cheer them up (11%) either all or most of the time [65]. These indicators of psychological distress were experienced to a greater degree by Indigenous people living in non-remote areas than those living in remote areas.

Despite one-third of WA Indigenous people reporting high to very high levels of psychological distress, the 2008 NATSISS also found that Indigenous people living in WA experienced high levels of positive wellbeing [46]. Using several indicators of positive wellbeing, it was found that 92% of Indigenous people felt happy either some, most, or all of the time. Similar proportions of people reported feeling calm and peaceful, and full of life some, most, or all of the time (84% and 85% respectively), and 80% reported having lots of energy some, most, or all of the time. The proportion of people reporting these positive feelings was higher for Indigenous people in WA than it was for the Indigenous population Australia-wide.

Social and emotional wellbeing is influenced by the support a person receives from their social networks [90]. Information collected in the 2008 NATSISS showed 90% of Indigenous people aged 15 years and over living in WA were able to obtain emotional, physical, or financial help from someone else during a time of crisis [91]. In terms of remoteness, the proportions of Indigenous people reporting that they were able to get support in a time of crisis was similar for major cities, inner/outer regional areas, and remote/very remote areas in WA (86%, 93%, and 92% respectively). Similarly, 89% of the national Indigenous population reported being able to access support in a crisis [92].

Comprehensive information on the social and emotional wellbeing of Indigenous children is provided by the WAACHS.[13] Conducted over a two year period (beginning in 2000), the survey remains the most detailed source of information on the developmental and environmental factors that foster positive physical, social, emotional, and developmental health in Indigenous children aged 0-17 years [93]. The findings on the emotional and behavioural wellbeing of Indigenous young people centre on three main areas: emotional and behavioural difficulties; conduct difficulties; and suicide attempts. The survey found that nearly one-quarter (24%) of

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[13] The information collected from the carers of Aboriginal children and by Aboriginal young people aged 12-17 years was accepted as given. Responses were not verified by interviewers, and medical practitioners were not involved to validate or diagnose reports of given conditions.

Indigenous children aged 4-17 years were at high risk of clinically significant emotional or behavioural difficulties, with Indigenous male children twice as likely as Indigenous female children to be at high risk of such difficulties [94]. This compares with 15% of similarly aged children in the State's general population. The factors most strongly associated with Indigenous children developing clinically significant emotional or behavioural difficulties included: living in families where seven or more major life stress events had occurred (for example, family break-up, arrest, financial difficulty); poor quality parenting; and poor family functioning.

The WAACHS also collected information on suicidal thoughts and behaviours of young Indigenous people. The survey revealed that almost 16% of Indigenous young people aged 12-17 years had seriously considered ending their life in the 12 months prior to the survey; of these, 39% had attempted suicide in the previous 12 months [94]. The factors associated with suicidal thoughts included: being female; at high risk of clinically significant emotional or behavioural difficulties; exposure to family violence; racism; low self-esteem; and having friends who have attempted suicide.

The information collected by the WAACHS demonstrates the significant burden of emotional and behavioural difficulty among Indigenous children. Providing a possible means for moderating this burden, the survey identified location and household occupancy levels as protective factors for Indigenous children [94]. It was found that children living in areas of extreme isolation and those living in homes with high household occupancy levels were substantially less likely to be at high risk of clinically significant emotional or behavioural difficulties.

Hospitalisation

Hospitalisation data for mental health-related conditions further highlights the burden of mental illness on the Indigenous population and the wider community. Specific to WA, for the two year period 2008-10 [46]:

- after age-adjustment, the hospitalisation rate for Indigenous males with mental health-related conditions was 3.1 times the rate for non-Indigenous males
- after age-adjustment, the hospitalisation rate for Indigenous females with mental health-related conditions was 2.1 times the rate for non-Indigenous females
- among Indigenous people, hospitalisation rates for mental health-related conditions were highest among those aged 35-44 years
- ICD 'Mental and behavioural disorders due to psychoactive substance use' and ICD 'Schizophrenia type disorders' accounted for 78% of mental health-related hospitalisations among Indigenous males; the Indigenous:non-Indigenous hospitalisation rate ratios for these two disorder types were 5.8 and 5.1, respectively
- more than 55% of mental health-related hospitalisations among Indigenous females were for 'Mental and behavioural disorders due to psychoactive substance use' (rate ratio 6.4) and for ICD 'Neurotic, stress-related disorders' (rate ratio 1.6).

Analysis of the hospitalisation rates in WA for mental health-related conditions over a 12 year period revealed minimal change in the hospitalisation rate for Indigenous people from 1998-1999 to 2009-2010 [46]. In contrast, there was a significant decline in the rate for non-Indigenous people during this period (decreasing from 17 per 1,000 to 12 per 1,000).

Mortality

Of the 2,400 Indigenous deaths recorded in WA in 2005-2009, 3% were attributed to ICD 'Mental and behavioural disorders' [76]. The death rate for 'Mental and behavioural disorders' for Indigenous people was 3.4 times the rate for non-Indigenous people. The rate for Indigenous males was 4.0 times the rate for non-Indigenous males, and the rate for Indigenous females was 3.0 times that for non-Indigenous females.

Deaths due to ICD 'Intentional self-harm' (suicide) are not included among the deaths for ICD 'Mental and behavioural disorders' and are therefore reported separately. In 2011, 'Intentional self-harm' was the third leading cause of death for Indigenous people in WA, but was ranked 11th in the leading causes of death in the non-Indigenous population [95].

More detailed information is available for the period 2005-2009, where the death rate for 'Intentional self-harm' for Indigenous people living in WA was reported to be 3.1 times the rate for their non-Indigenous counterparts; the rate ratios were 3.1 for males and 3.3 for females [76]. The death rates for 'Intentional self-harm' increased for both Indigenous males and females in WA between 2003-2007 and 2005-2009: for males, the rate increased from 40 per 100,000 to 51 per 100,000, and for females, it increased from 6.7 per 100,000 to 15 per 100,000 [76, 96].

Kidney health

Kidney disease, renal disease and renal disorder are terms that refer to a variety of different disease processes involving damage to the working units of the kidneys and associated structures [97, 98].[14] Of particular importance to Indigenous people is chronic kidney disease (CKD), which is defined as kidney damage or reduced kidney function that lasts for three months or more [98, 99]. Diabetes (diabetic nephropathy) and high blood pressure are the most common causes of CKD [97-99]; other causes include glomerular disease, inherited disorders (such as polycystic kidney disease), and hypertensive renal disease. The most severe form of CKD, known as end-stage kidney disease (ESKD; also known as end-stage renal disease (ESRD)), occurs when kidney function has decreased to the point where kidney replacement therapy (KRT) is necessary to avoid death. KRT involves either 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). CKD is expensive to treat 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 [99, 100].

A number of risk factors are associated with kidney disease, including diabetes, high blood pressure, infections, LBW, and obesity [98]. These conditions are common among Indigenous people and contribute to high rates of CKD [67, 101]. A number of pathways linking disadvantage and kidney disease underlie these high rates including: poor social determinants (e.g. sub-standard living conditions, inadequate environmental sanitation and poverty), engagement in high risk behaviours that can adversely affect health (e.g. poor diet, low activity levels, alcohol and tobacco use) and factors relating to the health-care system and government policies including limited access to medical care [102].

Australia-wide, the level of CKD is higher among Indigenous people than among other Australians [67, 103-106]. Between 2001 and 2004-2005, there was a significant increase in the proportion of Indigenous Australians reporting kidney problems; after age-adjustment, the level of kidney disease in 2004-2005 was ten times higher for Indigenous people than for non-Indigenous people [67].

Extent of kidney disease among Indigenous people in WA

With information on CKD mainly limited to self-reported data, the primary focus in the literature has been on ESKD [107-109]. In 2008-2010, 132 new Indigenous patients were identified with ESKD in WA; after the age-adjustment, the notification rate for Indigenous people was 11.7 times the rate for non-Indigenous people (Table 14) [46].

Table 14. Numbers and age-standardised incidence rates of end stage kidney disease, by Indigenous status, and Indigenous:non-Indigenous rate ratios, WA and Australia, 2008-2010

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
WA	132	107	610	9.2	11.7
Australia	644	68	6,560	9.5	7.2

Notes 1 Rates per 100,000 population

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

Source: AIHW, 2013 [46]

In 2008-2010, age-specific notification rates were higher across all age-groups for Indigenous people in WA than for their non-Indigenous counterparts, except for the 0-24 years age-group (Table 15) [46]. Indigenous:non-Indigenous rate ratios were particularly high for the 25-44 years, 45-54 years, and 55-64 years age-groups. Notification rates were higher in all age-groups for Indigenous people living in WA than those for Indigenous people Australia-wide (except for the 0-24 years age-group).

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[14] Renal (and urologic) disease includes conditions affecting the function of the body's urinary system, which involves the kidneys, ureters, bladder and urethra.

Table 15. *Age-specific notification rates of end-stage kidney disease, by Indigenous status, and Indigenous:non-Indigenous rate ratios, WA and Australia, 2008-2010*

Age-group (years)	Western Australia			Australia		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0-24	0.0	1.3	0.0	1.4	1.1	1.3
25-44	64	4.4	15	42	4.4	9.6
45-54	172	8.1	21	133	10.6	12.6
55-64	344	18	19	202	19	10.8
65+	241	37	6.5	132	37	3.6
All ages	107	9.2	11.7	68	9.5	7.2

Notes 1 Rates per 100,000 population

2 Ratio is the Indigenous rate divided by the non-Indigenous rate

3 Rates and rate ratios for 'All ages' are age-standardised

Source: AIHW, 2013 [46]

In 2006-2008, the incidence rate of ESKD was 12 times higher for Indigenous people than that for non-Indigenous people in WA [105]. Incidence rates were 8.1 times higher for Indigenous males and 20 times higher for Indigenous females than those for their non-Indigenous counterparts.

The high rates of ESKD are a major public health problem for Indigenous people, particularly those living in remote parts of the country. Australia-wide in 2006-2008, the incidence of ESKD for Indigenous people increased with remoteness, with rates ranging from 40 per 100,000 in major cities to 168 per 100,000 in very remote areas [105]. Indigenous:non-Indigenous rate ratios also increased with remoteness: Indigenous people in major cities were 3.6 more likely to have ESKD than non-Indigenous people in major cities; Indigenous people living in very remote areas were 20 times more likely to have ESKD than non-Indigenous people in very remote areas.

Treatment for CKD involves dialysis or, for those with ESKD, KRT [110]. Dialysis, specifically haemodialysis (HD) conducted in urban or regional clinics and hospitals, is the most common form of treatment for Indigenous people with ESKD [111-116]. A total of 193 Indigenous people Australia-wide commenced dialysis during 2010, an increase from 187 in 2009, but a decrease from 249 in 2008 [117, 118].

In 2010, HD accounted for a majority of treatment among Indigenous people in WA (82%); the number of Indigenous people commencing peritoneal dialysis (PD) (35 patients) was the same as the previous year [118]. In 2010, 246 (3,227 per 1,000,000 population) prevalent dialysis patients in WA (including both PD and HD) were Indigenous, a rate more than seven times higher when compared with the total population (439 per 1,000,000 population) [118].

Hospitalisation

After age-adjustment, hospitalisation rate for dialysis and CKD was 15.3 times higher for Indigenous people than that for non-Indigenous people living in WA in 2008-10 (Table 16) [46]. Rates were higher for Indigenous females than for Indigenous males. Indigenous females were hospitalised at 24 times the rate, and Indigenous males at 11 times the rate, of their non-Indigenous counterparts. Hospitalisation rates were higher for Indigenous people living in WA than those for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT combined.

Table 16. Age-standardised hospitalisation rates for dialysis and chronic kidney disease, by Indigenous status and sex, WA and NSW, Vic, Qld, WA, SA and NT combined, 2008-10

	Indigenous	Non-Indigenous	Rate ratio
WA			
Males	729	68	10.7
Females	826	35	23.6
Persons	774	51	15.3
NSW, Vic, Qld, WA, SA and NT combined			
Males	450	55	8.1
Females	461	31	14.9
Persons	453	42	10.7

Notes 1 Rates per 1,000 population

2 Ratio is the Indigenous rate divided by the non-Indigenous rate

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

Source: AIHW, 2013 [46]

Factors that contribute to the higher rates of CKD for Indigenous females than for Indigenous males include the higher prevalence of type 2 diabetes and the large proportion of Indigenous females carrying high levels of body fat around their abdomen; both factors placing them at higher risk for CKD [119].

Mortality

In 2006-2010, the age-standardised death rate for kidney disease for Indigenous people was 5.4 times the rate for non-Indigenous people in WA [43]. The rate was higher for Indigenous people living in WA than for those living in NSW, Qld, WA, SA and the NT combined.

Injury

Injury includes both physical harm to a person's body and non-physical harm, including grief, loss and suffering [120], but in public health practice attention is almost entirely confined to physical harm [121]. Even restricted to physical harm, assessing the total impact of injury is difficult because the vast majority of injuries do not result in hospitalisation or death and there are few systematic data other than those collected as part of population surveys, such as the ABS *National health surveys* (NHS) [122]. As a result, many injuries are not brought to the attention of health policy-makers and program managers.

The classification of injury has generally followed the WHO's ICD, which includes particular attention to the external cause and intention of the injury [123]. This system is followed in this section, but it has its limitations (for more details, see [124]).

Understanding injury within an Indigenous context needs to take a diverse range of issues into consideration including: disruption to cultural, environmental, and lifestyle variables; socioeconomic disadvantage; geographical isolation; increased road usage; exposure to hazardous environments; substance use; violence; social and familial dysfunction; risky behaviour; risky home environments; and limited access to health and social support services [120, 122].

Extent of injury among Indigenous people in WA

The precise extent of injury among Indigenous people in WA is not known, due to a lack of specific data, but health conditions 'as a result of an injury or accident' were reported to the 2004-2005 NATSIHS more frequently by Indigenous people aged 15 years and older than by their non-Indigenous counterparts across all age-groups [87]. Reporting of injury-caused health conditions increased substantially among Indigenous adults over the age of 24 years, and was highest in the 35-44 and 45-54 years age-groups. Within these age-groups, 24% of Indigenous people reported a health condition as a result of an injury or accident. After age-adjustment, the reporting of a long-term condition as a result of an injury or accident was 1.4 times higher for Indigenous people than for non-Indigenous people, with the ratio for males (1.5) being slightly higher than that for females (1.3).

According to the 2008 NATSISS, over one-quarter (27%) of Indigenous people in WA aged 15 years and over reported that they had been a victim of physical or threatened violence in the previous 12 months, a level greater than that reported nationally (23%) and similar to the WA proportion in 2002 (26%) [125]. Levels of victimisation were higher among younger Indigenous people, with males and females aged 15-24 years having the highest reported proportions (34% and 32%, respectively) [125]. Levels of victimisation were similar for Indigenous males and females in all age-groups. For Indigenous people living in non-remote areas of WA, victimisation levels were substantially higher for those with a disability (37% compared with 26% for those aged 15-24 years and 25% compared with 19% for those aged 35 years and over). In WA, victimisation levels were highest in major cities (28%) and remote/very remote areas (27%), followed by regional areas (24%).

According to the 2008 NATSISS, 75% of Indigenous people aged 15 years or over in WA reported at least one problem in their neighbourhood or community, with around one-third reporting family violence (34%) or assault (29%) [125]. These reported proportions were higher than the national proportions, which were 71% for problems in the neighbourhood or community, 25% for family violence, and 23% for assault. In WA, Indigenous people living in remote/very remote areas reported neighbourhood or community problems (78%), family violence (37%), and assault (40%) more frequently than those living in non-remote areas (72%, 24% and 30%, respectively). Indigenous females reported neighbourhood or community problems (78%), family violence (37%) and assault (32%) more frequently than did males (70%, 30% and 26%, respectively).

Hospitalisation

In 2008-10, injuries were responsible for 8,796 hospitalisations among Indigenous people living in WA [46]. This was the most common cause of hospitalisation for Indigenous people, accounting for 15% of all Indigenous hospitalisations in WA (excluding those for dialysis) [43, 46]. After age-adjustment, the separation rate for Indigenous people was 2.9 times higher than that for non-Indigenous people; the rate ratio for females (3.3) was higher than that for males (2.6). Hospitalisation rates for injury were higher for Indigenous males and females than for their non-Indigenous counterparts in all age-groups.

The leading causes of injury-related hospitalisations in WA in 2008-10 were assault (31%), falls (16%), ICD 'Complications of medical and surgical care' (12%), ICD 'Exposure to inanimate mechanical forces' (11%), and transport accidents (9.2%) (Table 17). After age-adjustment, hospital separation rates were higher for Indigenous than non-Indigenous people for all types of injury-related hospitalisations.

Table 17. ***Numbers and proportions of injury-related hospital separations, and age-standardised Indigenous rates, by principal diagnosis, and Indigenous:non-Indigenous rate ratios, WA, 2008-10***

Principal diagnosis	Number	Proportion	Indigenous rate	Rate ratio
Assault	2,749	31	19	20.5
Falls	1,365	16	12	1.9
Complications of medical and surgical care	1,075	12	11	2.4
Exposure to inanimate mechanical forces	984	11	5.9	2.3
Transport accidents	806	9.2	5.1	1.9
Other accidental exposures	522	5.9	3.8	1.5
Intentional self-harm	405	4.6	2.7	2.4
Exposure to animate mechanical forces	345	3.9	2.1	3.1
Exposure to electric current/smoke/fire/venomous animals and plants/forces of nature	251	2.9	1.6	3.0
Accidental poisoning by and exposure to noxious substances	148	1.7	0.9	2.1
Other external causes	141	1.6	1.0	5.5
No external causes	5	0.1	0.0	4.8
Total	8,796	100.0	65.2	2.9

Notes 1 Rate per 1,000 population directly age-standardised using the 2001 Australian standard population

2 Ratio is the Indigenous rate divided by the non-Indigenous rate

Source: AIHW, 2013 [46]

There was a significant decrease in the hospitalisation rate for injury for Indigenous people in WA between 1998-99 and 2009-10, and a significant increase in the rate for non-Indigenous people [43].

Mortality

Injury was the second most common cause of death among Indigenous people living in WA in 2006-2010, responsible for 18% of Indigenous deaths (CVD was responsible for 26% of Indigenous deaths) [43]. The proportion in WA was slightly higher than that for NSW, Qld, WA, SA and NT combined (15%), where injury was the third most common cause of death. After age-adjustment, the death rate from injury for Indigenous people in WA was 3.4 times the rate for non-Indigenous people. In NSW, Qld, WA, SA and NT, Indigenous people died as a result of injury at 2.3 times the rate of non-Indigenous people.

Intentional self-harm (suicide) accounted for 137 deaths among Indigenous people aged 0-74 years in WA in 2006-2010, representing almost one-tenth of avoidable Indigenous deaths [43]. After age-adjustment, the Indigenous rate of avoidable deaths for intentional self-harm was 3.2 times higher than the non-Indigenous rate. In 2011, intentional self-harm accounted for 7.9% of all Indigenous deaths in WA [95]. After age-adjustment, the Indigenous death rate for intentional self-harm was 4.5 times higher than that for non-Indigenous people.

Road traffic injuries accounted for 127 deaths in WA between 2006 and 2010, representing 9.0% of avoidable Indigenous deaths [43]. After age-adjustment, the Indigenous rate of avoidable deaths from road traffic injury was 5.0 times the rate for non-Indigenous people. In 2011, land transport accidents accounted for 5.5% of deaths among Indigenous people in WA [95]. After age-adjustment, the Indigenous death rate for land transport accidents was 4.5 times higher than the rate for non-Indigenous people.

In the five-year period 2006-2010, there were 44 Indigenous deaths from violence in WA, representing 3.1% of avoidable Indigenous deaths [43]. After age-adjustment, the Indigenous rate of avoidable deaths from violence was 16 times higher than the rate for non-Indigenous people.

Respiratory disease

'Respiratory disease' refers to a number of conditions that affect the lungs or their components; each of these conditions is characterised by some level of impairment of the lungs in performing the essential function of gas exchange [126]. Respiratory disease, which includes asthma, chronic obstructive pulmonary disease (COPD), and pneumonia (including pneumococcal pneumonia), represents a significant burden of ill-health, hospitalisation, and mortality among Indigenous people, particularly among the very young and older people [127, 128].

Respiratory disease is associated with a number of contributing factors, including poor environmental conditions, socioeconomic disadvantage, risky behaviours (particularly tobacco, alcohol, and substance use), and previous medical conditions [129, 130]. Infants and children under the age of 5 years are particularly susceptible to developing respiratory conditions, due to factors like low levels of childhood immunity, parental smoking, poor nutrition (including aspects related to infant-feeding and weaning practices), and poor environmental conditions [129, 131-133]. Among Indigenous adults, factors contributing to respiratory disease include tobacco use, use of alcohol and other substances, diabetes mellitus, and chronic renal disease [129].

The risk of developing asthma is affected by environmental, lifestyle (e.g. diet and tobacco use), and genetic factors (e.g. allergies) [60]. Asthma attacks can be triggered by exercise, viral infections, irritants (e.g. tobacco smoke and air pollutants), and specific allergens. These attacks cause a narrowing of the airways, resulting in symptoms including wheezing and breathlessness. The symptoms of asthma are generally reversible.

COPD, a term for long-term lung disease for which the symptoms are not fully reversible, includes chronic bronchitis, emphysema, and some cases of asthma [126]. These diseases are characterised by shortness of breath. A major risk factor for COPD is tobacco use, but exposure to irritants like dust and fumes can also increase the risk of developing COPD [134].

Extent of respiratory disease among Indigenous people in WA

In WA, after age-adjustment, the overall levels of respiratory disease were similar for Indigenous and non-Indigenous people in 2004-2005 [65]. A higher proportion of Indigenous females than Indigenous males reported having a respiratory condition.

In 2004-2005, 14% of Indigenous people living in WA reported having asthma, making it the most commonly reported respiratory condition among Indigenous people, and the third most commonly reported health condition [65]. Asthma was reported more frequently by Indigenous people living in non-remote areas (17%) than by those living in remote areas (11%), and was reported more commonly by Indigenous females than by Indigenous males.

Hospitalisation

In the two year period from July 2008 and June 2010, there were 6,722 hospital separations with a principal diagnosis of respiratory diseases among Indigenous people living in WA [43, 46]. After age-adjustment, the rate for Indigenous people was 4.0 times that for non-Indigenous people. The age-adjusted rate for Indigenous people living in WA was 1.3 times higher than that for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT combined.

Age-specific hospitalisation rates in WA in 2008-10 were higher for Indigenous people than those for non-Indigenous people for all age-groups (Table 18) [46]. Rates were particularly high for Indigenous people in the 0-4 years and 65 years and older age-groups. The rates for Indigenous people aged 35-44 years and 45-54 years were around eight times higher than the rates for their non-Indigenous counterparts.

Table 18. Age-specific hospitalisation rates for respiratory diseases, by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, WA, 2008-10

Age-group (years)	Males			Females			Persons		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0–4	147	47	3.1	110	33	3.3	129	40	3.2
5–14	17	12	1.4	15	11	1.4	16	12	1.4
15–24	13	7.0	1.9	14	10	1.4	14	8.5	1.6
25–34	20	6.0	3.3	31	6.4	4.8	25	6.2	4.0
35–44	41	6.2	6.7	59	6.5	9.0	50	6.4	7.8
45–54	49	7.2	6.9	69	7.3	9.5	59	7.2	8.2
55–64	70	12	5.9	80	12	6.9	75	12	6.4
65+	132	42	3.1	124	32	3.9	128	36	3.5
All ages	43	15	3.6*	46	13	4.5*	45	14	4.0*

Notes:
1 Rates are per 1,000 population
2 Ratio is the Indigenous rate divided by the non-Indigenous rate
3 Rate ratios for 'All ages' are directly age-standardised using the 2001 Australian standard population (*)

Source: AIHW, 2013 [46]

Between 1998-99 and 2009-10 there were significant reductions in separation rates for both Indigenous people and non-Indigenous people in WA, but there were no significant reductions between 2004-05 and 2009-10 [43].

Mortality

In 2006-2010, diseases of the respiratory system were responsible for 6.6% of all deaths of Indigenous people living in WA [46]. After age-adjustment, the death rate for Indigenous people was 2.9 times that for non-Indigenous people. The death rate was higher for Indigenous people living in WA than that for Indigenous people living in NSW, Qld, WA, SA and the NT combined.

Eye health

Eye health can be affected by a number of factors including genetic factors, ageing, premature birth, other diseases (such as diabetes), smoking, injuries, ultra violet (UV) exposure, and nutrition [90]. Poor vision can increase the risk of injury and limit opportunities in education, employment and social engagement, and be a reason for dependence on services and other people [127, 135]. Even mild vision loss can reduce an individual's ability to live independently and increase the risk of mortality [127, 136, 137].

There has been progress in improving the eye health of Indigenous people, but Indigenous people are still more likely than non-Indigenous people to have higher levels of preventable eye conditions [138-140]. For example, Australia is the only developed country in the world where trachoma is still found, almost exclusively among Indigenous people [139]. Nationally, eye and vision health issues increase mortality at least two-fold, are responsible for 11% of years life lost to disability for Indigenous people, and constitute the fourth leading cause of the gap between Indigenous and non-Indigenous people [136, 137, 141].

A number of factors can limit the timely identification, management and treatment of eye health problems for Indigenous people, including geographical location, economic disadvantage, lack of access to transportation, and lack of access to services [142]. The eye health of many Indigenous people is further compromised by difficulty in accessing optometrist or specialist services [140, 143]. For example, people with refractive error commonly have issues with access to and utilisation of testing, cost of spectacles, the administrative difficulty of dispensing, and the repair of spectacles [140].

Extent of eye conditions among Indigenous people in WA

According to the 2004-2005 NATSIHS, eye and sight problems were the most common long-term health conditions reported by Indigenous people in WA (29%) [87].

In 2008, the *National Indigenous eye health survey* (NIEHS), conducted by the Indigenous Eye Health Unit (IEHU) at the University of Melbourne, found that major causes of vision loss and blindness among Indigenous adults in WA were similar to those nationally: refractive error was responsible for 5.0%, cataract 5.0%, diabetic retinopathy 1.8%, trachoma 0.7% and other causes 1.4% [144, 145]. Of all jurisdictions, WA had the highest prevalence of low vision among Indigenous adults (12%) and the second highest prevalence among Indigenous children (1.9%).

In the 2008 NIEHS, the prevalence of vision loss due to cataract was reported by 5.0% of respondents in WA, a higher prevalence than any other state or territory [144, 145]. Around 61% of Indigenous Western Australians affected by cataract had cataract surgery, which was slightly lower than the national average (65%).

Of Indigenous people living in WA who had diabetes: 12% also had vision loss; 16% had had an eye exam; and 48% of Indigenous people with diabetic retinopathy requiring laser surgery received treatment in 2008 [144]. In a study in the Eastern Goldfields region of WA in 1995-2007, 25% of the Indigenous population with diabetes had signs of diabetic retinopathy [146].

In 2012, the overall prevalence of active trachoma among Indigenous children aged 1-14 years screened in WA was 4%. [147]. The prevalence was highest (10%) among screened children in the Goldfields region, followed by 4% in the Mid-West region, and 2% in the Pilbara and Kimberley regions. Since screening began in 2007, there has been significant increase in the coverage of trachoma screening among children aged 5-9 years in WA, especially during 2011 and 2012. Trachoma prevalence decreased in all regions of WA in 2012 compared to 2011.

WA was one of only two Australian states where the 2008 NIEHS identified trachoma as a cause of vision loss among adults [145]. Among Indigenous children aged 5-15 years, the highest levels of active trachoma in Australia were found in remote areas of WA, with the prevalence slightly higher in coastal than in inland areas (13% compared with 11%) [144].

In 2008-10, hospitalisation rates with a principal diagnosis of diseases of the eye and adnexa were lower for Indigenous people than for non-Indigenous people in WA (7.7 and 11.4 per 1,000 respectively) [43]. Rates were lower for Indigenous people than for non-Indigenous people in all age-groups, except for those aged the 0-4 years. The rate for Indigenous males was higher than that for Indigenous females (9.9 and 6.3 per 1,000 respectively) [46]. From 2004-05 to 2009-10, the hospitalisation rate for eye disease among Indigenous people in WA remained relatively unchanged, but this has been suggested as due to less access to hospital services rather than a lower prevalence of eye diseases [43].

Access to eye care services for Indigenous people in WA

Overall, Indigenous people are less likely to access eye care services than non-Indigenous people [148, 149]. A review of outreach eye services across Australia, conducted by IEHU in 2009, found that regional and remote areas of WA had variable levels of service provision by eye care providers (ophthalmologists and optometrists) [150]. The average number of people served by one equivalent-full-time eye care provider Australia-wide was 4.9 per 1,000. There was less access to eye care providers for people living in WA; the number of people served by one equivalent-full-time eye care provider ranged from 11 per 1,000 in the Great Southern region to 21 per 1,000 in the East Kimberley. The review also found areas with a majority of Indigenous patients had higher costs per attendance.

In 2013, a new website aimed at improving access of eye care for rural, remote and Indigenous communities in WA was launched [151]. The *Lions outback vision* website and portal provides patients with access to information regarding general eye health, diseases, treatment, tele-ophthalmology and the Patient Assisted Travel Scheme (PATS). The initiative aims to better coordinate treatment with collaboration between optometrists and eye specialists, leading to improved outcomes for patients.

Ear health and hearing

There are three main parts of the ear (external, middle and inner ear) and diseases of the ear are classified according to the part where the disorder occurs [152]. Inflammation and infection of the middle ear, which are nearly always associated with fluid in the middle ear space, are referred to as otitis media (OM) [153].

OM, caused generally by viruses or bacteria or both, often occurs as a result of another illness (such as a cold) [152]. It can cause intermittent or persistent hearing impairment; the risk of permanent hearing loss may increase if OM becomes chronic and is not adequately treated and followed up. Persistent ear discharge through a perforation (hole) in the eardrum is referred to as chronic suppurative otitis media (CSOM) [153]. For a diagnosis of CSOM, the perforation must be able to be seen and large enough to allow the discharge to flow out of the middle ear space. OM, particularly in suppurative forms, is associated with some impairment of hearing, with major implications for language development and learning [90, 154, 155].

The level of ear disease and hearing loss among Indigenous people remains higher than that of the general Australian population, particularly among children and young adults [152, 154, 156]. Exceptionally high levels of ear disease and hearing loss have been reported for many years in many Indigenous communities, particularly those in remote areas [154, 157-159]. OM can affect Indigenous babies within weeks of birth and a high proportion of children living in some remote communities may continue to suffer from CSOM throughout their developmental years [155].

Australia-wide, ear/hearing problems were reported by 12% of Indigenous people who participated in the 2004-2005 NATSIHS [87]. These problems were reported slightly more frequently by Indigenous people living in remote areas (13%) than by those living in non-remote areas (12%), but the difference is not statistically significant. The level of OM was higher for Indigenous people living in remote areas (4%) than for those living in non-remote areas (2%). Complete or partial deafness was reported by 9% of Indigenous people living in both remote and non-remote areas.

Extent of ear disease among Indigenous people in WA

In WA, the 2004-2005 NATSIHS found that 4.2% of WA Indigenous children aged 0-14 years reported having OM [46], a prevalence more than twice as high as that for non-Indigenous children (1.8%) [160]. The prevalence of diseases of the ear and mastoid was higher among Indigenous children aged 5-14 years (14%) than among those aged 0-4 years (5.0%) [46]. The prevalence of diseases of the ear and mastoid was higher among Indigenous children aged 0-14 years living in remote areas of WA (16% males and 12% females) than among those living in non-remote areas (9% males and 7% females). The prevalence of complete/partial deafness or hearing loss was more than twice as high among Indigenous children (5.0%) than among their non-Indigenous counterparts (2.3%). Levels of other diseases of the ear and mastoid were more than twice as high among Indigenous children (1.7%) than among their non-Indigenous counterparts (0.6%).

The 2008 NATSISS collected information on Indigenous children's ear and hearing problems including total/partial deafness, OM, ringing in ears (tinnitus), and otitis externa (infection of the ear canal) [90]. In WA, 9.0% of Indigenous children aged 0-14 years were reported has having ear/hearing problems; 4.7% had OM; and 2.3% had total or partial hearing loss [46, 161].

Information collected by the WAACHS in 2001-2002 revealed that 18% of WA Indigenous children aged 0-17 years were reported by carers as having had recurring ear infections [41]. Children aged 0-3 years (20%) and 4-11 years (20%) were more likely to have recurring ear infections than children aged 12-17 years (14%). Abnormal hearing was reported for 6.8% of the children aged 4-17 years. Of children aged 4-11 years who experienced recurring ear infections with discharge, 28% had abnormal hearing, compared with 1.4% of those without ear infections.

General practice attendances and hospitalisation

According to the national *Bettering the evaluation of care and health* (BEACH) survey, the Australia-wide rates of general practitioner (GP) attendances for the period from April 2006 to March 2011 for Indigenous children aged 0-14 years were 1.1 times the non-Indigenous rate for OM/myringitis (inflammation of the tympanic membrane) and 1.2 times the non-Indigenous rate for all disease of the ear [127].

In the two-year period from July 2008 to June 2010, after age-adjustment, the hospitalisation rate for disease of the ear and mastoid process was 1.5 times higher for Indigenous people than for non-Indigenous people in WA [46].

As with many other areas of Indigenous health, high levels of recurring ear infections are associated with poverty, nutritional problems, crowded housing conditions, inadequate access to clean water and functional sewerage systems, and poor access to health care [76]. Importantly, ear infections can lead to hearing loss which may be a major contributor to poor education and to unemployment, which are risk factors for contact with the justice system [154].

Oral health

Oral health is defined as 'a standard of health of the oral and related tissues which enables an individual to eat, speak and socialise without active disease, discomfort or embarrassment and which contributes to general wellbeing' ([162] cited in ([163, p.55]). Therefore, it is more than simply the absence of disease in the mouth; it is a standard of oral functioning that enables comfortable participation in everyday activities.

Two major threats to oral health are dental caries and periodontal disease [164]. Dental caries is caused by acid-producing bacteria living in the mouth, which can proliferate on sweet and sticky food. Caries is reversible in its early stages, but, if untreated, can cause irreversible damage. Periodontal disease (affecting the gums) is caused by bacterial infection and associated with poor oral hygiene, infrequent dental visits, age, tobacco use, low education and income levels, and certain medical conditions [164], especially diabetes mellitus [165] and osteoporosis [166].

Extent of oral health problems among Indigenous people in WA

The 2004-2005 NATSIHS was the first ABS survey to collect substantial information about the oral health of Indigenous people [87]. More than three-quarters (77%) of all Indigenous people aged 15 years or older in WA had lost fewer than five adult teeth in their lifetime [65]. The proportion of Indigenous people who had lost teeth increased with age (Table 19). Older people in non-remote areas reported higher levels of tooth loss and greater use of dentures than those in remote areas.

Table 19. Proportions (%) of Indigenous people reporting number of lost teeth and denture use, by age-group and type of condition, WA, 2004-2005

	Age-group (years)			
	15-24	**25-44**	**45+**	**All ages**
Number of teeth lost				
0	80	41	9.3	46
1-4	19	41	34	32
5-14	n.p.	14	32	14
15+	n.p.	1.5	19	5.7
Dentures				
Wears dentures	n.p.	2.9	18	5.8
Requires dentures	1.3	7.8	19	8.4

Notes: 1 Some proportions should be viewed with caution because of sampling variability

2 n.p. refers to numbers not available for publication, but included in totals where applicable

Source: ABS, 2006 [65]

Among Indigenous people aged 15 years or older in WA, 17% had never visited a dentist or other health professional about their teeth in 2004-2005 (compared with 11% of Indigenous people Australia-wide) [65, 87]. A higher proportion of Indigenous people living in remote areas of WA reported never visiting a health professional than those living in non-remote areas (24% and 12% respectively)

[65]. After age-adjustment, Indigenous people aged two years and older in WA were about half as likely as non-Indigenous people to have visited a dentist in the two weeks prior to interview.

A study of 253 pre-school children living in five rural and remote communities in WA found that decay was more widespread and more severely experienced among Indigenous children than among their non-Indigenous counterparts [167]. Indigenous children also more commonly experienced toothache than did non-Indigenous children. The study found that only half of the Indigenous children included in the study brushed their teeth daily, and one-third never brushed their teeth.

According to the WAACHS, 19% of Indigenous children were reported by their carers to have holes in their teeth [41]. The prevalence of caries was lowest for children aged 0-3 years (8.2%) and highest for children aged 4-7 years (31%). Carers reported that 28% of children had a tooth filled and 9.3% had a tooth removed because it had not been amenable to restorative dental care. Overall, 38% of Indigenous children experienced tooth decay, removals, or fillings.

The 2008 NATSISS collected information on oral health problems among Indigenous children aged 0-14 years [43, 90]. In WA, 28% of Indigenous children were reported to have problems with their teeth or gums in 2008, a level slightly lower than that for Indigenous children Australia-wide (32%) [43].

In 2008-10, the hospitalisation rate for oral health problems was lower for Indigenous people living in WA than that for their non-Indigenous counterparts [46]. The hospitalisation rate for Indigenous males was slightly higher than that for Indigenous females. Hospitalisation rates in WA were lower for Indigenous people than those for non-Indigenous people in all age-groups, except the 0-4 years age-group. The lower rates may be due a lack of access to hospital services for oral health conditions rather than a lower prevalence of oral health problems among the Indigenous population in WA [43]. A data-linkage study comparing hospital admission for Indigenous and non-Indigenous children born between 1980 and 1995 found that Indigenous children in WA were four times more likely than their non-Indigenous counterparts to be diagnosed with oral 'soft-tissue' diseases (including gingivitis and abscesses), but less likely to be diagnosed with diseases of the 'dental hard tissues' [168, p.358].

Disability

At some point in their lives, most people in a population will experience a disability, defined by the ABS as a limitation, restriction or impairment which has lasted, or is likely to last, for at least six months and restricts everyday activities [169]. A disability can be considered in terms of the nature of the impairment (such as genetic disorders, illnesses, accidents, or ageing) or the interaction between the individual's health condition and their environment [110, 170].

Information about disability among Indigenous people has been collected in the 2002 and 2008 NATSISSs [90, 171]. Some information about disability at a population level is also collected in Australia's five-yearly censuses. Being based on self-reported information, each of these sources has limitations in capturing precise estimates of disability. This is particularly true for Indigenous people, whose level of participation in surveys and censuses is lower than that of non-Indigenous people [172]. Also, some Indigenous people 'find the concept of disability hard to understand or irrelevant' [172, p.532].[15]

Despite these limitations, it is clear that disability is a serious issue for Indigenous people: half of Indigenous people aged 15 years and older reported a disability in 2008 [173]. The greater burden of disability experienced by Indigenous people is due to higher levels of morbidity in a range of areas (including mental health, diabetes, CVD, injuries, and respiratory diseases), as well as higher levels of socio-economic disadvantage [172].

Extent of disability among Indigenous people in WA

The 2008 NATSISS found that 52% of Indigenous people aged 18 years and older living in non-remote areas of WA reported that they had a disability or long-term health condition (Table 20) [46].

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[15] In attempting to address these conceptual difficulties, there have been some methodological differences in collecting information about disability, particularly related to core activity restriction.

Table 20. Age-standardised prevalence (%) of adults with a disability, non-remote areas, by Indigenous status, WA and Australia, 2008

Jurisdiction		Profound/severe core activity limitation	Has unspecified limitation or restriction	Total with disability or long-term health condition
WA	Indigenous	8.0	44	52
	Non-Indigenous	4.9	34	39
	Ratio	1.6	1.3	1.3
Australia	Indigenous	9.9	47	57
	Non-Indigenous	4.7	37	41
	Ratio	2.1	1.3	1.4

Notes: 1 Proportions are age-standardised

2 Caution should be exercised in comparing these estimates with those from other sources because these estimates (a) are restricted to people living in non-remote areas; and (b) being age-standardised, are not directly comparable with the actual prevalences

3 Ratio is the Indigenous rate divided by the non-Indigenous rate

Source: Derived from AIHW, 2013 [46]

According to counts from the 2011 Census, 3,046 Indigenous people in WA needed assistance with core activities [33]. The need for assistance with core activities generally increased with age (Table 21). The proportion of Indigenous males needing assistance with core activities was higher than that of Indigenous females up to the age of 35 years, but the reverse was true beyond that age.

Table 21. Prevalence (%) of people needing assistance with core activities, by sex, Indigenous status, and age-group, WA, 2011

Age-group (years)	Males			Females		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0-4	1.4	1.0	1.3	0.7	0.6	1.2
5-14	2.7	2.7	1.0	1.8	1.3	1.4
15-19	2.4	1.8	1.3	1.6	1.1	1.5
20-24	2.4	1.2	2.0	1.4	0.8	1.7
25-34	2.2	1.0	2.2	2.1	0.9	2.4
35-44	3.7	1.3	2.8	3.9	1.3	2.9
45-54	5.9	2.0	2.9	6.9	2.2	3.1
55-64	14	4.1	3.3	14	3.7	3.9
65+	32	13	2.5	37	18	2.1
All ages	4.2	3.2	2.4 *	4.5	3.8	2.3 *

Notes: 1 Prevalences are expressed as percentages

2 Ratio is the Indigenous proportion divided by the non-Indigenous proportion

3 Rate ratios for 'All ages' are age-standardised using the 2001 Australian standard population (*)

4 The information in this table is based on counts from the 2011 Census

Source: Derived from ABS, 2013 [33], ABS, 2001 [174]

Services

Increasing the access to disability services for the Indigenous population is one of the priority areas identified by the National Disability Agreement (NDA), endorsed in 2012 by the Council of Australian Governments (COAG) to improve the outcomes for Indigenous people with disability [175, 176]. The *National Indigenous access framework* forms part of the NDA and aims to ensure that the needs of Indigenous people with disability are addressed through accessible and appropriate service delivery [177]. Services include accommodation support, community support, community access, respite and employment services [178, 179].

In 2010-11, 53% of the Indigenous 'potential population'[16] in WA used disability support services [180]. The proportion of the Indigenous potential population requiring support services has increased steadily from 43% in 2008-09, to 49% in 2009-10, and 53% in 2010-11.

The use of NDA support services was higher among Indigenous people than among non-Indigenous people in WA in 2011. The most commonly used specialist disability support service by Indigenous people was community support services (44% of the potential population) [180] (Table 22).

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[16] The 'potential population' refers to the number of people aged 0-64 years 'with the potential to require disability support services, including individuals who meet the service eligibility criteria but who do not demand these services' [179, p.322].

Table 22. Proportions (%) of 'potential' users accessing NDA specialist disability support services, by Indigenous status and type of service, WA, 2010-11

	Indigenous	Non-Indigenous	Ratio
Accommodation support	14	5.6	2.5
Community support	44	24	1.9
Community access	14	8.3	1.7
Respite services	0.6	0.2	3.7

Notes 1 'Potential' users are people aged 0-64 years with the 'potential to require disability support services, including individuals who meet the service eligibility criteria but who do not demand these services'

2 Ratio is the Indigenous rate divided by the non-Indigenous rate

Source: Steering Committee for the Review of Government Service Provision, 2013 [180]

Communicable diseases

Communicable diseases can be caused by: bacteria (e.g. pertussis and tuberculosis); viruses (e.g. influenza and HIV); fungi (e.g. tinea); or protozoan parasites (e.g. malaria) [181, 182]. Communicable diseases also include infestation with larger parasites, such as head lice, as well as diseases which are spread through infectious particles, such as transmissible spongiform encephalopathies [182]. Risk factors for communicable diseases vary according to the type of disease [183]. Improvements to sanitation, and the increased use of vaccination and antibiotics (for bacterial infections), have markedly reduced some communicable diseases in Australia [110].

Communicable diseases of particular importance to Indigenous people include hepatitis (A, B, and C), sexually transmissible infections (STIs), and human immunodeficiency virus (HIV) [183].

Information regarding specific communicable diseases comes from a variety of sources, including individual studies and the WA notifiable disease collection. Data from state and territory notifiable disease collections are collected and published by the National Notifiable Disease Surveillance System (NNDSS), but Indigenous status is often not reported for large proportions of notifications. Information about some communicable diseases is analysed and published by specialised external agencies, including the Kirby Institute (formerly the National Centre in HIV Epidemiology and Clinical Research) for STIs, hepatitis and HIV/AIDS, and the National Centre for Immunisation Research and Surveillance for vaccine-preventable diseases. Information about some other communicable diseases, including gastroenteritis, has not been included because of a lack of relevant data.

Hepatitis

Hepatitis is an inflammation of the liver and in most cases is caused by a viral infection [184]. Five main hepatitis viruses have been identified; these are known as types A, B, C, D, and E. Infection with viral hepatitis is often asymptomatic, but some common symptoms include jaundice, dark urine, nausea, fatigue, and fever [184, 185]. The following sections summarise information on the most common hepatitis viruses: hepatitis A, B, and C.

The hepatitis A virus (HAV) is an infection of the liver predominantly transmitted by the faecal-oral route, either through ingesting contaminated food or water, or by direct contact with an infected person (including sexual contact, particularly between men) [186, 187]. A treatment vaccine for HAV is not currently available, and recovery can be slow, taking up to several months [188]. Encouragingly hepatitis A does not lead to chronic liver disease, and death is extremely rare [186, 188]. Furthermore, infection with HAV leads to life-long immunity [186]. The most effective means for preventing HAV include improved sanitation, food safety, and immunisation (several hepatitis A vaccinations exist) [185, 188].

Transmission of hepatitis B virus (HBV) is from contact with blood and other body fluids (semen, vaginal fluids, and saliva) from an infected individual, commonly through use of contaminated injecting equipment or sexual contact [189, 190]. A mother may also transmit HBV to the foetus during pregnancy or to the child during birth. Hepatitis B is potentially life-threatening as it can cause chronic liver disease, cirrhosis, and liver cancer [187, 190]. There is no specific treatment for people with acute hepatitis B, but those with chronic hepatitis B may be treated with drugs, such as interferon and antiviral agents [190]. A safe and effective hepatitis B vaccine is available and remains the principal means of preventing hepatitis B.

Transmission of the hepatitis C virus (HCV) typically occurs via blood-to-blood contact [191]. Injecting drug use is the most common method of contracting the virus and is responsible for the vast majority of cases [192, 193]. The likelihood of transmission of HCV via sexual contact is generally very low [185, 194]. Some people with HCV can live relatively normal lives, largely unaffected by the virus, while others may develop cirrhosis, liver cancer, or liver failure [195]. HCV can be treated using pegylated interferon and ribavirin, but treatment success is often dependent on the HCV genotype [185, 194, 195]. Currently, there is no vaccine to protect people against HCV, but the risk of infection can be reduced by avoiding sharing injecting equipment, unsafe blood products and sharps waste, sharing of sharp personal items that may contain infected blood, and unprotected sex with a person with HCV [191, 194].

Extent of hepatitis A among Indigenous people in WA

In 2011, there were no notifications in WA of hepatitis A among the Indigenous population, with the 12 cases reported occurring in the non-Indigenous population [192]. It is possible that the absence of hepatitis A in the WA Indigenous population is due to the introduction of hepatitis A vaccination into the national childhood vaccination schedule in 2005 for Indigenous children living in Qld, WA, SA, and the NT [196]. The vaccine has been shown to be at least 89% effective among Indigenous people in the NT, compared with 72% effectiveness among non-Indigenous people [186].

Extent of hepatitis B among Indigenous people in WA

In 2009-2011, Indigenous people accounted for 6.4% of the 2,235 notifications of hepatitis B (including 'newly acquired' and 'unspecified' infections) in WA [46]. During this time Indigenous age-standardised rate for hepatitis B notifications was almost three times the rate reported for other Western Australians (91 and 31 per 100,000 respectively).

The impact of hepatitis B was experienced most greatly by an older age cohort in the Western Australian Indigenous population, with those aged 65 years and older having the highest age-specific rate of hepatitis B in 2009-2011 (203 per 100,000) [46]. Indigenous people aged 55-64 years had the second highest age-specific notification rate at 166 per 100,000. For other Western Australians, hepatitis B was more common among young and middle-aged adults, with those aged 25-34 years and 35-44 years reporting the highest age-specific notification rates for hepatitis B in 2009-2011 (75 and 48 per 100,000 respectively). The greatest disparity between Indigenous and other Western Australians in age-specific notification rates of hepatitis B was in the 65 years and older age-group, where the rate for Indigenous people was 24 times that for other Western Australians.

There is a higher incidence of hepatitis B among males in both the Indigenous and non-Indigenous populations in WA. In 2010, the male to female notification rate ratio for hepatitis B (including 'newly acquired' and 'unspecified' cases) in the Western Australian Indigenous population was 1.9 [197]. The male to female rate ratio for the non-Indigenous population in WA was 1.6.

In terms of the distribution of hepatitis B throughout the WA regions, the non-Indigenous population in the Kimberley region reported the highest age-standardised notification rate for hepatitis B in 2010 at 840 per 100,000 (this includes 'newly acquired' and 'unspecified' notifications) [197]. The Indigenous population in the Goldfields region reported the second highest hepatitis B notification rate at 340 per 100,000. The most significant disparity between the Indigenous and non-Indigenous populations in the age-standardised notification rates of hepatitis B in WA in 2010 occurred in the Midwest region where the Indigenous rate was 37 times that reported for non-Indigenous people. Some regions reported no hepatitis B among Indigenous people; with recent improvements in the identification of Indigenous status in hepatitis B notifications, there appears to be an uneven distribution of hepatitis B in the Indigenous population of WA.

Extent of hepatitis C among Indigenous people in WA

During 2009-2011, there were 3,293 notifications of hepatitis C ('newly acquired' and 'unspecified' infections) in WA, of which 13% were identified as involving Indigenous people [46]. After age-adjustment, the rate of hepatitis C notifications was four times higher for WA Indigenous people than for other Western Australians.

In WA in 2009-2011, hepatitis C was most common among young and middle-aged adults in the Indigenous population, with the highest age-specific rates reported for the 25-34 years and 35-44 years age-groups (410 and 341 per 100,000 respectively) [46]. For other Western Australians, the highest age-specific notification rates for hepatitis C were reported for people aged 25-34 years and 45-54 years (80 per 100,000 for each age-group). The greatest disparity between Indigenous and other Western Australians in age-specific rates for hepatitis C in 2009-2011 was for the 15-24 year age-group: the rate for Indigenous people was more than eight times the rate for other Western Australians.

Hepatitis C occurs more frequently among males than females in both the Indigenous and non-Indigenous populations. In 2010, the male to female rate ratio for hepatitis C (including 'newly acquired' and 'unspecified' diagnoses) was 1.7 for both the Indigenous and non-Indigenous populations [197]. The burden of hepatitis C in the Indigenous population in WA is highlighted by the fact that, despite the greater frequency of hepatitis C among males, the age-adjusted notification rate for Indigenous females was 2.8 times that for non-Indigenous males.

The highest age-standardised rate for hepatitis C ('newly acquired' and 'unspecified' cases) among Indigenous people in 2010 was reported for the Great Southern region, where the rate for Indigenous people (415 per 100,000) was more than nine times the rate for non-Indigenous people [197]. Rates for Indigenous people were also very high in the South West and North Metropolitan regions (357 and 321 per 100,000 respectively). The highest age-standardised notification rate for hepatitis C ('newly acquired' and unspecified' diagnoses) for non-Indigenous people was in the Kimberley region (137 per 100,000), where the age-standardised notification rate was higher for non-Indigenous people than for Indigenous people.

A history of risk factors was the main reason for hepatitis C testing in WA in 2010: Indigenous people were most likely to be identified as having hepatic C as a part of prison screening, whereas non-Indigenous people were most likely to be diagnosed as a part of the assessment of liver function [197]. The main risk factor for hepatitis C was injecting drug use for both the Indigenous and non-Indigenous populations in WA in 2010. Imprisonment was also identified as a high risk factor for hepatitis C for both populations (particularly the Indigenous population). Having a partner of the opposite sex with HCV was also recognised as a risk factor for Indigenous people. Tattooing was also a commonly identified risk factor for hepatitis C, particularly for non-Indigenous people.

Pneumococcal disease

Pneumococcal disease results from infection by the bacterium *Streptococcus pneumoniae* (pneumococcus), which may cause pneumonia when in the respiratory tract [198]. Invasive pneumococcal disease (IPD) occurs when the bacterium infects normally sterile sites, such as blood and cerebrospinal fluid, causing bacteraemia, septicaemia and meningitis [198, 199]. Rates of IPD are highest in infants and the elderly. Recognised risk factors for pneumococcal disease include diabetes, chronic respiratory, cardiac and kidney diseases, other immune-compromised conditions, tobacco use, and high levels of alcohol consumption [199-201]. In children, recurrent or chronic OM and attendance at childcare increase susceptibility to IPD.

Nationally-funded vaccination for pneumococcal disease was made available in 1999 to Indigenous adults aged 50 years and older and to Indigenous people aged 15-49 years at high risk [198]. In 2001, vaccination was funded for Indigenous infants and young children and for other Australian children medically at risk. From 2005, nationally-funded vaccination was made available to all Australian infants and to all people aged 65 years and older in addition to the populations eligible since 1999 [198-200].

Detailed data are available for IPD, which has been notifiable since 2001 [200]. Australia-wide, Indigenous children and adults have a significantly higher incidence of IPD than do non-Indigenous children and adults [105, 200, 202]. The higher notification rates of IPD for Indigenous people are reflected in hospitalisation rates for pneumococcal septicaemia and meningitis [203].

There are no national pre-vaccination data available for Indigenous people because vaccination programs began prior to IPD being made notifiable, but regional and recent data indicate that vaccination programs have had a significant impact on the number of cases of IPD among both Indigenous and non-Indigenous populations [200-202, 204-206]. Vaccination has reduced the burden of IPD in Australia, but the number of cases of non-vaccine type IPD has increased (this is most pronounced in non-Indigenous children [200, 207, 208]); the recent increase in IPD in Indigenous adults has raised some concerns that the adult vaccination program may be less than adequate [200, 201].

Extent of pneumococcal disease (invasive) among Indigenous people in WA

There were 117 IPD notifications among Indigenous people living in WA in 2011, with the numbers of notifications similar for males and females [209]. After age-adjustment, the notification rate for Indigenous people was 156 per 100,000; the rate for Indigenous males (179 per 100,000) was slightly higher than the rate for Indigenous females (140 per 100,000). (Data from 2011 are preliminary and include a small number of notifications for Indigenous people, so caution should be exercised when interpreting rates.) The total number of IPD notifications increased from 32 in 2007 to 117 in 2011. Over that period, the Indigenous people most affected by IPD were those aged 25-44 years (Table 23).

Table 23. Proportions (%) of invasive pneumococcal disease notifications among Indigenous people, by age-group and sex, WA, 2007-2011

	Age-group (years)					
	0-4	5-14	15-24	25-44	45-64	65+
Males	17	8.7	13	35	23	2.7
Females	17	14	9.7	31	27	2.1

Source: Western Australian Department of Health, 2013 [209]

In WA during the period 1997-2007, after age-adjustment, the IPD notification rate was 6.7 times higher for Indigenous people than that for non-Indigenous people [210].

IPD rates for Indigenous adults living in the Kimberley region of WA decreased after the introduction of vaccination programs [204]. After introduction of the vaccine in 2001, IPD rates among Western Australian Indigenous children decreased by 46% for those aged less than 2 years, and by 40% for those aged 2-4 years (rates decreased by 64% and 51% respectively for their non-Indigenous counterparts) [210].

Of the 37 deaths from IPD reported in WA in 2007-2008, eight were identified as Indigenous (deaths from IPD may be under-reported) [200].

Sexually transmissible infections

Sexually transmissible infections (STIs) are spread by heterosexual or homosexual contact with an infected person [183]. STIs are caused by microorganisms that are transmitted from one person to another through semen, fluid from the vagina, anal or throat secretions, and blood [211]. Some STIs can also be transmitted under some circumstances via skin to skin contact, or from mother to baby during pregnancy and/or birth.

Infections that can be transmitted through sexual contact include gonorrhoea, syphilis, HIV/AIDS, hepatitis B, chlamydia, human papilloma virus (HPV), genital herpes, and donovanosis. Hepatitis C is typically not regarded as an STI because it is only in rare circumstances that the infection is transmitted sexually [212]. Some STIs, such as herpes, increase the risk of HIV, and because HIV depresses immune system functioning, the risk of acquiring other STIs subsequently increases [212, 213].

Most STIs are asymptomatic or produce only mild symptoms [214, 215]. Many people affected often find out they have an infection through screening and contact tracing. STIs can usually be effectively treated if diagnosed early, but, if left untreated, they may lead to complications [212, 213]. Importantly, all STIs are preventable and access to and use of condoms has been identified as fundamental in preventing STI transmission [212, 213, 216].

The NNDSS collects information on some STIs, including chlamydia, gonorrhoea, syphilis, donovanosis, hepatitis B, and HIV/AIDS [110, 212]. HPV and genital herpes are believed to be the most common STIs in Australia, but they are not notifiable diseases so it is difficult to monitor incidence [212, 217]. Variations in notification rates over time may reflect real changes in incidence, but could also be due to the introduction of easier and more sensitive testing procedures, greater targeted screening, public awareness campaigns, and changes in surveillance practices [218]. It is also likely that, in some instances, notifications underestimate the incidence of STIs in the Indigenous population due to incomplete information on Indigenous status [219].

Extent of sexually transmissible infections among Indigenous people in WA

In WA, rates of notifiable STIs in Indigenous people have been unacceptably high for many years; of particular concern is the continuing high incidence of STIs in Indigenous youth [220, 221]. The WAACHS reported that Indigenous youth have sex at an earlier age (consequently increasing the risk of contracting STIs) in comparison with the general population [94]. Survey responses indicated that 44% of Indigenous young people aged 16 years reported having had sex, compared with 24% of 16 year-olds in the general population. Sexual activity among young Indigenous people in WA was shown to be associated with school non-attendance, cigarette smoking, alcohol consumption, and marijuana use [94, 222].

The surveillance of STIs in WA is restricted to infections that are notifiable under the provisions of the Health Act 1911 [213]. The most common newly acquired notifiable STIs among Indigenous people in WA include gonorrhoea, infectious syphilis and chlamydia [197, 223].

Gonorrhoea

Gonorrhoea is caused by the bacterium *Neisseria gonorrhoea* [224]. In women, gonorrhoea can affect the urethra, cervix, and rectum, and in men it can affect the penis and rectum. Gonorrhoea can also infect the throat in women and men. Gonorrhoea is highly contagious and, if left untreated, the infection can cause pelvic inflammatory disease in women and may cause damage to the testes in men. In some instances, untreated gonorrhoea can lead to infertility in both men and women. The infection can, however, be successfully treated with oral antibiotics.

Extent of gonorrhoea among Indigenous people in WA

In 2011, after age-adjustment, the notification rate for gonorrhoea for Indigenous people living in WA was 1,315 per 100,000 population, 44 times the rate for non-Indigenous people [192]. The rate for Indigenous people in WA in 2011 was the second highest notification rate of those health jurisdictions where Indigenous status was reported for more than 50% of the diagnoses, second only to the NT (2,505 per 100,000). This pattern has remained constant for the past five years.

From 2007 to 2010, the rate of gonorrhoea notifications in the Indigenous population in WA declined steadily from 1,569 per 100,000 in 2007 to 968 per 100,000 in 2010 [192]. The rate in 2011 was, however, an increase of more than 35% from the previous year. The rate of gonorrhoea notifications for non-Indigenous people living in WA was more variable between 2007 and 2011, but the Indigenous:non-Indigenous rate ratio was very high throughout the period, ranging from 78 in 2007 to 39 in 2010.

Gonorrhoea disproportionately affects adolescents and young adults in both the Indigenous and non-Indigenous populations. In 2009-2011, Indigenous people in WA aged 15-24 years had the highest notification rate for gonorrhoea at 3,812 per 100,000, almost 70 times the rate reported for other Western Australians of the same age [46]. Indigenous people aged 25-34 years had the second highest gonorrhoea notification rate in WA, 2,150 per 100,000, which was more than 38 times the rate reported for other WA people in this age-group.

The incidence of gonorrhoea in the male and female Indigenous populations in WA is very similar. In 2010, the age-standardised notification rate for Indigenous males living in WA was 894 per 100,000 and the rate for Indigenous females was 902 per 100,000 [197]. Conversely, in the non-Indigenous population, the burden of gonorrhoea was experienced more greatly by males (39 per 100,000) than females (10 per 100,000). The difference in the distribution of gonorrhoea among males and females in the Indigenous and non-Indigenous populations suggests the mode of transmission for the infection differs for the two populations [223].

In 2010, the highest age-standardised notification rate for gonorrhoea by region for Indigenous people living in WA was reported in the Pilbara region (2,476 per 100,000), a rate 58 times higher than the rate for non-Indigenous people in the same region [197]. The second highest age-standardised notification rate for gonorrhoea by region was for Indigenous people in the Goldfields region. The highest Indigenous:non-Indigenous rate ratio, 88, was reported for the Goldfields region.

Syphilis

Syphilis, caused by the organism *Treponema pallidum*, is a complex infection that has four identified stages: primary, secondary, latent, and tertiary [225]. In the initial stage of the infection, syphilis causes painless ulcers or sores around the mouth or genital area. If detected early, syphilis can be easily treated, but, if left untreated, the infection can be very serious causing damage to the brain, heart, blood vessels, skin, intestinal tract, and bones [223, 226]. For pregnant women, untreated syphilis poses a further serious health threat as the infection can be passed on to the child, possibly resulting in physical deformities and brain damage [226]. Penicillin is the usual treatment for syphilis [223, 225].

Extent of syphilis among Indigenous people in WA

After age-adjustment, the notification rate for infectious syphilis for Indigenous people living in WA was 44 per 100,000 in 2011, which was 11 times the rate reported for their non-Indigenous counterparts [192]. Analysis of the infectious syphilis notification rates for the states and territories where Indigenous status was reported for more than 50% of the diagnoses showed Indigenous people in WA had the second highest notification rate in 2011; the notification rate for Indigenous people living in Qld was 60 per 100,000.

The rate of infectious syphilis notifications in the WA Indigenous population varied over the five years from 2007-2011, with the lowest notification rate reported in 2010 (26 per 100,000) and the highest in 2008 (87 per 100,000) [192]. In comparison, the non-Indigenous notification rate for infectious syphilis remained relatively stable during this period at either 3 or 4 per 100,000. Reflecting these differences, the Indigenous:non-Indigenous rate ratios ranged from 8.6 to 22 times over this period.

In WA, Indigenous people aged 25-34 years had the highest rate of infectious syphilis notifications (117 per 100,000) in 2009-2011, more than nine times the rate reported for other West Australians of the same age [46]. Similarly high notification rates notifications were reported for most of the other age-groups in the Indigenous population. In contrast, the highest notification rates for non-Indigenous people were reported for the 25-34, 35-44, and 45-54 years age-groups (the rates ranged from 9.1 to 12 per 100,000). The greatest disparity in notification rates between Indigenous people and other West Australians was among those aged 55-64 years where the rate ratio was 20.

In 2010, the age-standardised notification rate for all forms of syphilis was the same for Indigenous males and females living in WA (62 per 100,000) [197]. A different pattern was observed in the non-Indigenous population, with males accounting for 82% of diagnoses (male:female rate ratio of 4.2). This suggests differences in modes of transmission for syphilis in the Indigenous and non-Indigenous populations in WA [223].

In terms of the regional distribution of syphilis in WA, the Goldfields region had the highest age-standardised notification rate of infectious and non-infectious syphilis for Indigenous people in 2010 at 152 per 100,000 [197]. The second highest rate was among Indigenous people in the Kimberley region (140 per 100,000). The age-standardised notification rate for all forms of syphilis for non-Indigenous people was elevated for the Kimberley region (55 per 100,000), but it was low in all other WA regions. The highest Indigenous:non-Indigenous notification rate ratio for all forms of syphilis (28) was in the Goldfields region.

Chlamydia

Chlamydia, caused by the bacterium *Chlamydia trachomatis*, is the most commonly notified STI in Australia [192, 214]. The infection in women can cause cervicitis, endometritis, and pelvic inflammatory disease, which can lead to tubal factor infertility and ectopic pregnancy [214]. In men, it can cause urethritis, epididymo-orchitis, and prostatitis. Azithromycin treatment for chlamydial infection has been a major advance in recent years. Due to the lack of obvious symptoms of the disease, the incidence of chlamydia is likely to be underestimated in notification data.

Extent of chlamydia among Indigenous people in WA

The age-standardised notification rate for chlamydia for Indigenous people living in WA in 2011 (1,771 per 100,000) was almost four times higher than the rate for their non-Indigenous counterparts [192]. The 2011 notification rate for chlamydia among Indigenous people in WA was the second highest of all jurisdictions after the NT (2,146 per 100,000).

Between 2007-2011, the age-standardised rate of chlamydia diagnoses increased in both the Indigenous and non-Indigenous populations in WA [192]. The Indigenous notification rate increased by 34% and the non-Indigenous rate by 54%.

Chlamydia is most prevalent among adolescents and young adults in both the Indigenous and non-Indigenous populations in WA: Indigenous people aged 15-24 years had the highest rate of chlamydia notifications in 2009-2011 (6,937 per 100,000), nearly four times the rate for other Western Australians in that age-group [46]. Notification rates were also high for people aged 25-34 years: the rate for Indigenous people (2,288 per 100,000) was more than three times the rate for other Western Australians. The greatest disparity between Indigenous and non-Indigenous people in chlamydia notification rates was for those aged 0-14 years, where the rate ratio was 27.

For both the WA Indigenous and non-Indigenous populations, females accounted for a greater proportion of chlamydia diagnoses in 2010 (62% and 57% of the diagnoses respectively) [197]. The female to male ratio was 1.6 for Indigenous people and 1.5 for non-Indigenous people.

Indigenous people living in the Kimberley region of WA had the highest age-standardised rate for chlamydia in 2010 (2,533 per 100,000), which was more than three times the rate for non-Indigenous people in the region [197]. Chlamydia rates were also particularly high for Indigenous people in the Goldfields and Pilbara regions (2,390 and 2,308 per 100,000 respectively), with the Pilbara region also having the highest Indigenous to non-Indigenous rate ratio at 6.4.

HIV/AIDS

The human immunodeficiency virus (HIV) is a retrovirus that destroys cells in the body's immune system [227]. Untreated, the virus weakens immune system functioning to the point where infections that are usually not life-threatening may become fatal [227, 228]. This late stage of HIV is referred to as acquired immune deficiency syndrome (AIDS). At present, there is no vaccine to prevent HIV, nor is there a cure, but antiretroviral therapy has dramatically reduced the number of HIV cases progressing to AIDS [191, 227].

The transmission of HIV occurs in one of three ways: unprotected sexual contact with an infected person; infected blood passing into another person's bloodstream; and an infected mother passing HIV on to her child either during birth or through breast-feeding [229]. The behaviour that presents the greatest risk of exposure to HIV is unprotected anal sex. Other unsafe behaviours that can put people at high risk of HIV include: unprotected vaginal sex; unprotected oral sex; and sharing injecting equipment (such as syringes and needles).

To date, Australia has successfully prevented an uncontrolled spread of HIV, and the overall rates of HIV are low in comparison with other countries [60, 192, 223]. However, great concerns have been expressed about the possible impact of HIV/AIDS among Indigenous people, for whom AIDS has been seen as having the potential 'to further erode the social and economic fabric of Indigenous communities' [227, p.6]. Indigenous people are regarded as being at particular risk of HIV infection due to: the geographical, cultural, and social circumstances of their communities (e.g. highly mobile population, lower health literacy, poorer health status); higher rates of STIs; and over-representation in prisons and juvenile detention [230].

Extent of HIV/AIDS among Indigenous people in WA

In 2011, there were 98 cases of newly diagnosed HIV infection in WA, of which five were identified as Indigenous [192]. Qld was the jurisdiction with the highest number of newly diagnosed cases of HIV among Indigenous people (eight cases), but WA, along with NSW, had the second highest number.

Information on the exposure leading to HIV infection is not available for 2011, but heterosexual exposure and 'men who have sex with men' accounted for the two Indigenous HIV cases reported in WA in 2010 [197]. Similarly, the most common forms of exposure to HIV among non-Indigenous males living in WA were 'men who have sex with men' (52% of HIV notifications) and heterosexual exposure (41% of HIV notifications); the majority of HIV diagnoses among non-Indigenous females were due to heterosexual exposure (92%).

From 2006 to 2010, the age-standardised rate for Indigenous HIV notifications decreased from 9.7 per 100,000 to 3.1 per 100,000 [197]. Conversely, the notification rate for non-Indigenous people increased from 3.3 per 100,000 to 5.0 per 100,000. The Indigenous:non-Indigenous rate ratio varied over these five years, with the lowest rate ratio reported in 2010 at 0.6

Factors contributing to Indigenous health

Selected health risk and protective factors

The factors contributing to the poor health status of Indigenous people should be seen within the broad context of the 'social determinants of health' [13, 30]. These 'determinants', probably more appropriately called 'ecologic' [231], are complex and interrelated; they include income, education, employment, stress, social networks and support, working and living conditions, gender, and behavioural aspects, all of which are 'integrated' in terms of autonomy and the capacity to participate fully in society [29]. Related to these are cultural factors, such as traditions, attitudes, beliefs, and customs. Together, these social and cultural factors also have a major influence on a person's behaviour [13, 30, 231].

Limited information about some of these ecologic factors is available (see 'The context of Indigenous health'), but attention still tends to be focused on the so-called 'health risk and protective factors', including those summarised in the following sections. These risk and protective factors are more proximal to adverse health outcomes, but the interpretation of the following information needs to recognise the potential roles of the underlying ecologic factors ('determinants' of health).

Nutrition

The nutritional status of Indigenous people is influenced by socio-economic disadvantage, and geographical, environmental, and social factors [232]. Poor nutrition is a common risk factor for overweight and obesity, malnutrition, CVD, type 2 diabetes, certain cancers, osteoporosis, and tooth decay [60, 233].

Fruit and vegetable consumption is strongly linked to the prevention of chronic disease and to better health, therefore the nutritional status of Australian populations is usually determined by assessment of the amount of fruit and vegetables consumed on a daily basis [234]. The National Health and Medical Research Council (NHMRC) recommend a daily intake for adults of at least two serves of fruit and five of vegetables. Other recommendations are to limit saturated fats and moderate total fat intake, and to choose foods low in salt. In 2003, low fruit and vegetable consumption contributed to 3.5% of the total burden of disease, and 5.7% of deaths, among Indigenous people [78].

Nutrition among Indigenous people in WA

According to the 2004-2005 NATSIHS, 94% of Indigenous people aged 12 years and older living in WA consumed vegetables daily, with 28% consuming one serve or less, 56% having two-four serves, and 15% having five or more serves (NHMRC's recommended minimum consumption) [65]. Consumption of vegetables was similar for non-Indigenous people with 16% consuming one serve or more, 66% consuming two-four serves, and 19% having the recommended five or more serves. The reported figures for daily consumption of fruit revealed that 85% of Indigenous people in WA consumed fruit daily, with 52% consuming one serve or less (slightly more than their non-Indigenous counterparts (44%)), and 48% having two or more serves daily (almost 10% less than non-Indigenous people (56%)). Detailed information about the consumption of fruit and vegetables was not collected for respondents in the 2004-2005 NATSIHS by remoteness, but the proportions of people who did not consume these dietary items daily was substantially higher for Indigenous people living in remote areas than for those living in non-remote areas – 12% and 0.7% respectively for vegetable consumption, and 24% and 7.6% respectively for fruit consumption.

In 2008, 42% of Indigenous children aged 4-14 years living in non-remote areas of WA reported consuming the recommended daily intake of vegetables, and 79% reported consuming the recommended daily amount of fruit [46].

The 2004-2005 NATSIHS also provided data on the consumption of salt and milk among Indigenous people by remoteness. Among Indigenous people aged 12 years or older in WA living in remote areas, 86% reported 'sometimes' or 'usually' adding salt after cooking compared with 70% of those living in non-remote areas [65]. (Data on the consumption of salt by non-Indigenous people was not available.) Over three-quarters of Indigenous people aged 12 years or older in WA reported drinking whole milk (including full-cream powdered milk) as their usual choice, with those living in remote areas reporting higher levels of consumption than those in non-remote areas (87% and 70% respectively). The level of whole milk consumption for non-Indigenous people living in WA was slightly more than one-half the level of consumption for Indigenous people. Around 17% of Indigenous people in WA reported consuming low/reduced fat/skim milk, with those living in non-remote areas consuming more than those in remote areas (25% compared with 7.1%). This proportion was lower than that for their non-Indigenous counterparts, with 39% of non-Indigenous people drinking reduced fat/skim milk. Overall, 4.1% of Indigenous people reported not drinking milk at all, which was less than their non-Indigenous counterparts (5.4%).

People living in rural and remote areas of Australia are often limited in their food choices because of transport, distance, cost, and geographical or climatic conditions creating barriers for adequate and accessible food supply [235]. The *Environmental health needs survey*, conducted in 2007-2008 (the third in a series surveying housing, services, utilities, community infrastructure, and the immediate living environment in discrete Indigenous communities in WA), found that 10% of Indigenous communities in WA reported having no access to fresh food, fruit and vegetables [236]. This was a reduction from the 17% of communities surveyed in 2004 that had no access to fresh food, fruit and vegetables. The same survey found that the average distance travelled by community members for fresh food supplies was 49km; the majority of communities (62%) were within 30km of fresh food supplies, while 15% of communities were more than 100km from the nearest fresh food supplies.

Physical activity

The *National physical activity guidelines for Australians* recommend at least 30 minutes of moderate activity on at least five days of the week to reduce the risk of CVD and other chronic conditions [237, 238]. The recommended daily activity can be a combination of shorter activities, such as two lots of 15 minute activities. The guidelines also suggest that adults think of all body movement as a benefit and incorporate as much active body movement as they can every day. Insufficient levels of physical activity have shown to be a risk factor for CVD, type 2 diabetes, certain cancers, depression, and overweight and obesity [60, 239].

Physical activity among Indigenous people in WA

According to the 2008 NATSISS, 29% of Indigenous people aged 15 years and older living in WA took part in sport or other physical activities in the 12 months prior to the survey [Derived from 240]. Participation in sport or other physical activities was slightly higher for Indigenous males than for Indigenous females in WA (32% compared with 27%). Around two-thirds (66%) of WA Indigenous children aged 4-14 years took part in physical activity in the 12 months prior to the survey.

The 2004-2005 NATSIHS collected information relating to the frequency, intensity and duration of exercise undertaken by Indigenous people living in non-remote areas across Australia [65, 87]. In non-remote areas of WA, 71% of Indigenous people aged 15 years or older reported being sedentary (less than 100 minutes or no exercise) or practicing low levels of exercise (100 minutes to less than 1,600 minutes). The proportions of physical activity among WA Indigenous people by level were: high level (5%); moderate level (24%), low level (25%), and sedentary level (46%) [105]. The proportion of Indigenous people in non-remote areas across Australia who were sedentary or engaged in low level exercise in the two weeks prior to interview was higher in 2004-2005 (75%) than in 2001 (68%) [87].

Bodyweight

The standard measure for classifying a person's weight for height is body mass index (BMI – weight in kilograms divided by height in metres squared) [234]. Being overweight (BMI 25.0 to 29.9) or obese (BMI of 30.0 or more) increases a person's risk for CVD, type 2 diabetes, certain cancers, and some musculoskeletal conditions. A high BMI can be a result of many factors, either alone or in combination, such as poor nutrition, physical inactivity, socioeconomic disadvantage, genetic predisposition, increased age, and alcohol use. Being underweight (BMI less than 18.5) can also have adverse health consequences, including decreased immunity (leading to increased susceptibility to some infectious diseases) and osteoporosis (bone loss). The 2013 NHMRC dietary guidelines for adults recommend that adults prevent weight gain by being physically active and eating according to their energy needs.

Overweight and obesity were responsible for 11% of the total burden of disease among Indigenous people in Australia in 2003, second only to tobacco [78]. It is possible, however, that this may be an under-estimate because it has been suggested that BMI cut-offs may be uncertain for the Indigenous population (due to differences in body shape and other physiological factors) [241]. It has been suggested that a BMI of 22 might be more appropriate than 25 as a measure of acceptable weight for Indigenous people. There is also evidence that measuring the waist to hip ratio (WHR) in Indigenous people is more sensitive and easier to measure than BMI [242, 243].

Bodyweight among Indigenous people in WA

According to the 2004-2005 NATSIHS, Indigenous people aged 15 years or older living in WA were 1.3 times more likely than their non-Indigenous counterparts to be overweight/obese [65]. No significant difference was reported according to remoteness of residence: 58% of Indigenous people living in remote areas of WA were obese/overweight compared with 59% of Indigenous people living in non-remote areas.

In 2004-2005, a higher proportion of Indigenous adults in WA were overweight/obese than non-Indigenous adults in every age-group (Table 24) [46]. The highest proportion was among Indigenous people aged 45-54 years. Proportions were similar for Indigenous people in WA and Australia-wide. The disparity between Indigenous and non-Indigenous people was greater for females than for males in each age-group in WA in 2004-2005 [65].

Table 24. Proportions (%) of overweight or obese adults, by Indigenous status and age-group, and Indigenous:non-Indigenous rate ratios, WA and Australia, 2004-2005

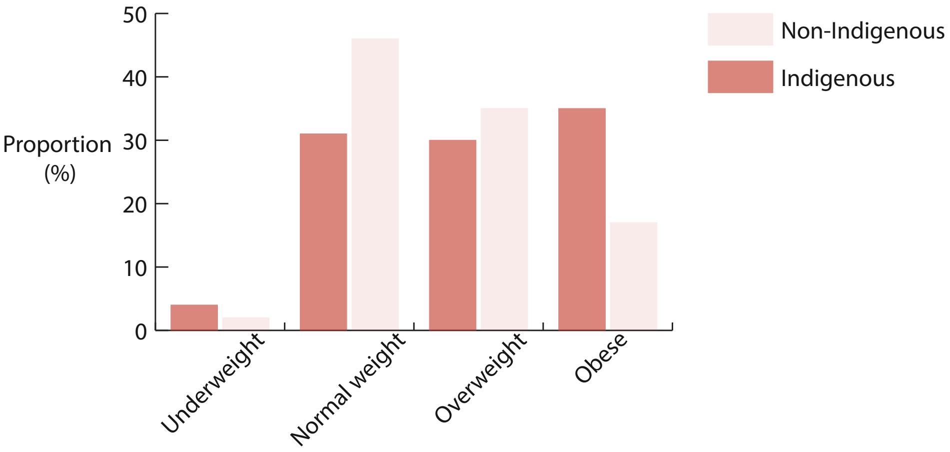
Age-group (years)	WA			Australia		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
18-24	44	30	1.5	43	32	1.3
25-34	60	47	1.3	59	49	1.2
35-44	67	55	1.2	65	56	1.2
45-54	73	55	1.3	69	61	1.1
55+	70	61	1.1	74	59	1.3

Note Proportions are age-standardised

Source: AIHW, 2013 [46]

After age-adjustment, 4.5% of Indigenous people in WA were underweight 31% were normal weight, 30% were overweight and 35% obese (Figure 2) [46].

Figure 2. Weight status of adults, by Indigenous status and weight classification, WA, 2004-2005



Source: AIHW, 2013 [46]

Immunisation

In response to the greater burden of communicable diseases among Indigenous people, the latest version of the *Australian immunisation handbook*, endorsed by the NHMRC, includes a special section devoted to vaccination for Aboriginal and Torres Strait Islander people [181].

Immunisation among Indigenous people in WA

According to the Australian Childhood Immunisation Register, 82% of 1 year-old Indigenous children in WA and 91% of their non-Indigenous counterparts were fully vaccinated against hepatitis B, diphtheria and tetanus (DTP), polio, and *Haemophilus influenza* type B (Hib) in 2011 [46]. The level of vaccination of 1 year-old Indigenous children Australia-wide was 85%, slightly higher than in WA.

For Indigenous children aged 2 years, 88% were fully vaccinated (with the additional immunisation against measles, mumps and rubella (MMR)) in 2011, compared with 91% of non-Indigenous children [46]. The level of vaccination of 2 year-old Indigenous children Australia-wide was 92%.

In WA in 2011, 80% of Indigenous children aged 5 years and 87% of their non-Indigenous counterparts were fully vaccinated [46]. The level of vaccination of 5 year-old Indigenous children Australia-wide was 87%, higher than in WA.

In 2004-2005, nearly two-thirds (60%) of Indigenous people in WA aged 50 years or older had been vaccinated against influenza in the previous 12 months and 35% had been vaccinated against pneumonia in the previous five years [46]. WA and Australia-wide vaccination levels were similar for Indigenous people. Vaccination levels were higher for Indigenous people living in remote areas of WA than for those living in non-remote areas: 73% of Indigenous people living in remote areas were vaccinated for influenza (compared with 48% for those living in non-remote areas); 48% of Indigenous people living in remote areas were vaccinated for pneumonia (compared with 24% in those living in non-remote areas) [65]. Australia-wide, vaccination levels for both influenza and pneumonia were higher among Indigenous people aged 50 years and older than among their non-Indigenous counterparts [87].

Breastfeeding

Breast milk, which is the natural and optimum food for babies, contains proteins, fats and carbohydrates at levels that are appropriate for an infant's metabolic capacities and growth requirements [232, 244]. Breast milk also has anti-infective properties and contains immunoglobulins which provide some immunity against early childhood diseases [245]. Subsequently, breastfeeding is considered as having many positive effects on the survival, growth and development of infants [67, 232, 244]. Evidence suggests that breastfeeding may lower the risk of obesity and protect against a range of chronic illnesses that can develop in adulthood, including type 2 diabetes, heart disease, atherosclerosis, and high blood pressure [244]. Preliminary results from the Australian Institute for Economic Research on Health suggest that between 11% and 28% of the chronic disease burden in Australia could be attributed to a lack of breastfeeding during infancy. The NHMRC recommends exclusive breastfeeding of infants aged 0-6 months, to be continued after the introduction of solid foods until the age of 12 months and older [234].

Extent of breastfeeding among Indigenous women in WA

Surveys indicate that a majority of Indigenous women in WA breastfeed their babies. The WAACHS reported that Western Australian mothers of Indigenous children, particularly those living in more isolated areas, were more likely than mothers in the general population to initiate breastfeeding and breastfeed for longer [41]. According to the 2004-2005 NATSIHS, 81% of Indigenous babies aged 0-3 years living in non-remote areas of WA had been breastfed or were being breastfed at the time of the survey, compared with 90% of non-Indigenous babies [65]. In 2008, 85% of Indigenous babies aged 0-3 years in WA had been breastfed, a higher proportion than that for Indigenous children Australia-wide (77%) [46]. Around 22% of Indigenous babies aged 1-3 years in WA were being breastfed at the time of survey, compared with 11% Australia-wide. The median age at which Indigenous babies in WA stopped breastfeeding entirely was 22 weeks, compared with 17 weeks for Indigenous babies Australia-wide.

The introduction of solid food to Indigenous infants in WA in 2008 occurred most frequently among those aged 3-6 months (41%), followed by those aged 6-9 months (38%) [46]. Around 2.0% were given solid foods at less than 3 months-of-age. These figures compare favourably with Indigenous infants Australia-wide (43%, 30% and 4.7%, respectively).

Tobacco use

Tobacco use increases the risk of chronic disease, including CVD, certain cancers, and lung diseases, as well as a variety of other health conditions [127]. 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 notable concern to health, with children particularly susceptible to problems that include middle ear infections, asthma, and sudden infant death syndrome (SIDS).

In 2003, tobacco use was the leading cause of burden of disease and injury among Indigenous people in Australia, responsible for 12% of the total burden of disease [78]. Tobacco use accounted for one-in-five deaths in the Indigenous population.

Extent of tobacco use among Indigenous people in WA

The 2008 NATSISS found that 44% of the Indigenous population in WA aged 15 years and over were current smokers [246]. This figure has not changed from the prevalence reported in the 2004-2005 NATSIHS[17] [65], but there has been a slight decrease from the level reported in 2002 (48%) [91]. After age-adjustment, the 2004-2005 NATSIHS found that daily smoking among Indigenous people aged 18 years and older in WA was 2.0 times more common than among their non-Indigenous counterparts [65].

In WA, a higher proportion of Indigenous people living in remote or very remote areas in 2008 were current smokers (52%) compared with those living in inner/outer regional areas (43%) or major cities (36%) [91]. The age-groups with the highest proportion of Indigenous smokers were the 25-34 years and 35-44 years age-groups (56% and 55% respectively).

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[17] The 2004-2005 NATSIHS collected information on tobacco use from people aged 18 years and over; there is likely to be a slight discrepancy in the prevalences between the NATSIHS and the 2008 NATSISS.

The proportion of Indigenous men who were currently smokers (49%) was higher than the proportion of Indigenous women (46%) in 2008 [43]. Indigenous males and females living in remote areas were more likely to report being a current smoker (53% and 52%, respectively) than Indigenous males and females living in non-remote areas (45% and 42%, respectively).

More than half (51%) of Indigenous mothers in WA smoked during pregnancy in 2009 [43]. After age-adjustment, this level was more than four times higher than the level among non-Indigenous mothers.

In 2008, 67% of Indigenous children aged 0-14 years in WA lived with someone who was a daily smoker, a level almost twice as high as that for non-Indigenous children [43]. Around 18% of Indigenous children aged 0-14 years lived in households where someone smoked inside the house on a daily basis. A higher portion of Indigenous children in remote areas lived with a current smoker than among those living in non-remote areas.

Alcohol use

Excessive alcohol use has been found to contribute to a wide range of diseases including stroke, coronary heart disease, high blood pressure, some cancers, and pancreatitis [60]. It also contributes to a wide range of injuries, including motor vehicle accidents, drowning, homicides, and falls. Consumption of alcohol in pregnancy can also affect the unborn child, and abstinence from drinking alcohol is advised for women when pregnant or breastfeeding [247]. Consumption of alcohol during pregnancy may lead to fetal alcohol spectrum disorder (FASD), an umbrella term that describes a range of disorders (comprising abnormalities such as growth retardation, characteristic facial features, and central nervous system anomalies - including intellectual impairment) [248, 249]. These disorders are wholly preventable, but incurable.

In 2003, the burden of disease attributable to alcohol use among Indigenous people was almost twice that among other Australians (5.4% compared with 3.2%) [250, 251]. Of 11 selected risk factors, alcohol use was the fifth leading cause of the burden of disease among Indigenous people [251]. The highest levels of disease burden attributable to alcohol use among Indigenous people were for injury (22%), mental disorders (16%), and cancers (6.3%).

Surveys have consistently shown that Indigenous people are less likely to drink alcohol than non-Indigenous people[18] [252], but those who do drink are more likely to consume it at harmful levels [253, 254].

The 2010 *National drug household survey* (NDSHS) found that Indigenous people aged 14 years or older were 1.4 times more likely than their non-Indigenous counterparts to abstain from drinking alcohol, and 1.5 times more likely to drink alcohol at risky levels for both single occasion and lifetime harm [255].

The 2008 NATSISS found that 35% of Indigenous people aged 15 years and over had never consumed alcohol or had not done so in the previous 12 months, compared with 17% of the total Australian population aged 14 years or older [92, 256]. NATSISS data are not directly comparable with the 2004-2005 NATSIHS (due to conceptual and methodology differences), but the surveys report similar results for those drinking at risky/high risk levels: the 2008 NATSISS found that 17% of the Indigenous population aged 15 years or older reported drinking at medium/high risk levels, and the 2004-2005 NATSIHS found that 16% of the Indigenous population aged 18 years and over reported drinking at risky/high risk levels [87, 92]. After age-adjustment, the proportion of Indigenous adults who reported drinking at risky/high risk levels was similar to that of the non-Indigenous population (15% and 14% respectively) in 2004-2005 [87].

Extent of alcohol use among Indigenous people in WA

The 2008 NATSISS found that 34% of the Indigenous population in WA aged 15 years or older had never consumed alcohol or had not done so in previous 12 months [92]. Analysis of the 2004-2005 NATSIHS found that 26% of the Indigenous population aged 18 years or over in WA had abstained from alcohol in the last 12 months [257]. Further analysis of the 2004-2005 NATSIHS and the 2004-2005 NHS found that 30% of the Indigenous population abstained from alcohol in the previous 12 months compared with 14% of the non-Indigenous population in WA.

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[18] The assessment of abstinence includes both life-time abstainers and people who previously drank; the higher level of abstinence among the Indigenous population reflects the greater proportion of people who used to drink but have quit.

The 2008 NATSISS also found that 19% of Indigenous people in WA aged 15 years or older drank alcohol at medium/high risk levels [92]. While not directly comparable, this is similar to the 2004-2005 NATSIHS which found that 19% of Indigenous people in WA aged 18 years and older drank at risky/high risk levels [65]. Analysis of the 2004-2005 NATSIHS and the 2004-2005 NHS found similar levels of long-term risky/high risk levels for Indigenous and non-Indigenous people in WA (16% and 15% respectively), but the proportion of the Indigenous population who drank at short-term risky/high risk levels on a weekly basis was more than twice that of the non-Indigenous population (18% and 8% respectively) [257].

Hospitalisation

In 2008-09, Indigenous people living in WA were hospitalised for ICD 'Mental and behavioural disorders' relating to alcohol use at 6.8 times the rate of non-Indigenous people (Table 25) [76]. The most common type of 'Mental and behavioural disorder' was acute intoxication, for which Indigenous people were hospitalised at more than 14 times the rate of non-Indigenous people. The hospitalisation rate for alcoholic liver disease was 9.3 times higher for Indigenous people than that for non-Indigenous people.

Table 25. Age-standardised hospitalisation rates for alcohol-related conditions, by sex, Indigenous status, and diagnosis, and Indigenous:non-Indigenous rate ratios, WA, 2008-09

	Males		Females		Persons		
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Rate ratio
Mental/behavioural disorders	13.9	2.0	9.1	1.3	11.4	1.7	6.8
acute intoxication	7.9	0.7	6.6	0.4	7.2	0.5	14.3
harmful use	1.0	0.1	0.8	0.0	0.9	0.1	14.3
dependence syndrome	2.3	1.0	0.7	0.7	1.5	0.9	1.7
other	2.8	0.3	1.0	0.2	1.8	0.3	7.3
Alcoholic liver disease	2.7	0.3	0.9	0.1	1.8	0.2	9.3
Other inflammatory liver disease	n.p.	0.1	n.p.	0.1	0.2	0.1	3.2
Toxic effect of alcohol	0.2	0.0	0.1	0.0	0.1	0.0	5.2
Intentional self-poisoning by and exposure to alcohol	0.3	0.2	0.5	0.3	0.4	0.3	1.5
Poisoning by and exposure to alcohol, undetermined intent	n.p.	0.0	0.2	0.0	0.1	0.0	5.0

Notes: 1 Rates are directly standardised using the 2001 Australian standard population

2 Ratio is the Indigenous rate divided by the non-Indigenous rate

3 Non-Indigenous includes responses where Indigenous status was unknown

Source: Steering Committee for the Review of Government Service Provision, 2011 [76]

In 2005–06, Indigenous males and females living in WA experienced significantly higher rates of alcohol-related attendance at hospital emergency departments than did their non-Indigenous counterparts [258]. In 2005, admissions and bed-days from the harmful use of alcohol that were wholly attributable to alcohol were also higher among Indigenous males compared with their non-Indigenous counterparts (37% for admissions and 38% for bed-days compared with 30% and 26% respectively) and Indigenous females compared with their non-Indigenous counterparts (31% for admissions and 27% for bed-days compared with 23% and 18% respectively). For the total population, the Kimberley and Pilbara had the highest hospitalisation rates from alcohol consumption among the nine health regions compared with the State rate. For the Indigenous population, the Goldfields, Great Southern, Kimberley, Midwest, and Pilbara had significantly higher rates compared with the State rate.

Mortality

In 2005-2009, the age-standardised death rate for alcohol-related deaths was 11 times higher for Indigenous people than that for non-Indigenous people in WA [76]. The rate for Indigenous males (62 per 100,000) was higher than that for Indigenous females (36 per 100,000). The Indigenous:non-Indigenous rate ratio was higher for females (17) than for males (9.5).

In 2006-2010, alcohol-related diseases accounted for 5.8% of avoidable deaths among Indigenous people aged 0-74 years in WA [43]. After age-adjustment, the Indigenous death rate for aviodable deaths was 10 times higher than the rate for non-Indigenous people in WA.

In WA, for the years 1997-2005, person years of life lost (PYLL) (a measure of the level of premature death resulting from alcohol use) was almost four times higher for Indigenous males than for their non-Indigenous counterparts (22 compared with 5.5 per 1,000 population) and over seven times higher for Indigenous females than for non-Indigenous females (9.5 compared with 1.3 per 1,000 population) [258]. The proportion of alcohol-related deaths in 1997-2005 wholly attributable to alcohol was twice as high for Indigenous males as those for their non-Indigenous counterparts (43% compared with 20%), and over three times as high for Indigenous females than for non-Indigenous females (55% compared with 16%).

Illicit drug use

Illicit drug use describes the use of those drugs which are illegal (e.g. cannabis, heroin, ecstasy and cocaine), the use of volatile substances (e.g. petrol, glue and solvents), and the non-medical use of prescribed drugs (e.g. analgesics) [60]. Illicit drug use is a risk factor for ill-health including conditions such as HIV/AIDS, hepatitis, chronic conditions (such as CVD and social and emotional wellbeing), poisoning and self-inflicted injury, and can cause death.

In 2003, illicit drug use accounted for 2.0% of the burden of disease in Australia and was responsible for 8.0% of the mental health burden of disease, and 3.6% of the injury burden of disease [250]. For the same year, illicit drug use was responsible for 3.4% of the burden of disease among the Indigenous population; the highest level of disease burden attributable to illicit drugs was for mental health (13%) and injury (3.6%) [251].

Australia-wide, the 2008 NATSISS found that 23% of Indigenous people aged 15 years and over had used an illicit substance in the 12 months prior to the survey [105]. This level was 1.6 times that reported for the non-Indigenous population aged 14 years or over (14%) in the 2010 NDSHS, but less than that reported in the 2004-2005 NATSIHS for the Indigenous population aged 18 years and over (28%) [87, 105, 255].

Extent of illicit drug use among Indigenous people in WA

According to the 2008 NATSISS, 45% of Indigenous people in WA aged 18 years and older reported ever having used an illicit substance, and 25% reported having used one in the previous 12 months [43]. These proportions were slightly lower than those reported in the 2004-2005 NATSIHS, in which 54% of Indigenous people in WA reported ever using a substance and 31% having used a substance in the previous 12 months [65]. Comparison of the 2008 NATSISS and the 2010 NDSHS found that a higher proportion of Indigenous people (25%) than of the total population (19%) had used an illicit substance in the previous 12 months in WA [43, 255].[19]

Among Indigenous people in WA in 2008, the most commonly used illicit substances were marijuana, hashish or cannabis resin (used by 21% of Indigenous people in WA in the previous 12 months), followed by amphetamines/speed (4.1%), and ecstasy/designer drugs (2.4%) [43].

Indigenous males had a higher proportion of use of illicit substances than did Indigenous females in WA in 2008: 54% of Indigenous males reported ever having used an illicit substance compared with 37% of Indigenous females; 31% of Indigenous males reported use within the previous 12 months, compared with 20% of Indigenous females [43]. The proportions for use in the previous 12 months were slightly higher for Indigenous males and females in WA than the national proportions for Indigenous people.

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[19] Comparisons between the 2010 NDSHS and the 2008 NATSISS should be viewed with caution because of differences in the ages of respondents and survey design.

Conclusion

It is clear from this *Overview* of current health status that Indigenous people remain the least healthy sub-population in WA. Being a 'snapshot' of the most recent indicators of health status – with little attention to trends – the *Overview*, however, doesn't reflect the evidence that the health status of Indigenous people in WA continues to improve slowly.

For a start, there have been significant reductions in recorded mortality in recent years in a number of jurisdictions, including WA. Between 1991 and 2010, there was a 35% reduction in the death rates for Indigenous people in WA (there was a 31% reduction for other Western Australians) [43]. Much of the decline appears to have been in the first half of the 20-year period, however, since there has been no significant change in the total mortality rate for Indigenous people between 2001 and 2010.

The most recent estimates of life expectancy at birth for Indigenous people in WA – 65.0 years for males and 70.4 years for females in 2005-2007 – are higher than previous estimates, but, as the ABS warns, the apparent improvements are likely to be due largely to revised statistical methods [259].

Indigenous infant mortality rates for WA declined significantly over the 20-year period 1991-2010 [43]. The Indigenous rate declined by 62% over that period, slightly more than the 46% decline of the rate for other people in WA. The gap between Indigenous and other Australians closed significantly (67%).

The declines in infant mortality rates have occurred despite the lack of real changes in the birthweights of babies born to Indigenous mothers – the mean weights of babies born to Indigenous mothers were still 214 grams less than the weights of those born to non-Indigenous mothers in WA in 2010 [39]. Babies born to Indigenous women in WA in were more than twice more likely to be of LBW than were those born to all women in WA. There was no significant change to the proportions of LBW babies born to Indigenous mothers during the period 2001 to 2009 in WA [43].

In terms of specific health conditions in WA, substantial improvements have occurred in the overall impact of many infectious diseases (including improvements due to immunisation programs):

- substantial declines in death rates from invasive pneumococcal pneumonia (mostly due to the introduction of vaccination programs) [200-202, 204-206]
- reductions in the incidence and severity of trachoma (though inflammatory trachoma remains endemic in some remote communities of central and northern Australia) [145, 147, 260]
- a substantial reduction in the prevalence of HBVinfection (since the introduction of vaccination programs) [203].

There is, no doubt, other evidence of improvement in some measures of health status, and of deterioration in others, but clearly, the gap between the health status of Indigenous people and that of other Australians is still very, very wide.

The vast gap between the health of Indigenous and other Australians was highlighted in the *Social justice report 2005*, which called on Australian governments to commit to achieving Indigenous health equality within 25 years [261].

Following the release of the report, 40 of Australia's leading Indigenous and non-Indigenous health peak bodies and human rights organisations joined forces to launch a campaign to 'close the gap' on health inequality [262]. In December 2006, the coalition published an open letter to the Prime Minister, the State Premiers and Territory Chief Ministers, parliamentarians and the Australian public calling for an end to Indigenous health inequality. The *Close the gap* campaign was launched in April 2007.

Importantly, Australian governments, through the Council of Australian Governments (COAG) committed in December 2007 to 'closing the gaps' in disadvantage between Indigenous and other Australians [263].

The Indigenous Health Summit, held in March 2008, concluded with the Prime Minister issuing, on behalf of the Australian Government and the Indigenous peoples of Australia, a statement of intent 'to work together to achieve equality in health status and life expectancy between Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians by the year 2030' [264, p.1].

In March 2008, the Prime Minister also announced establishment of the National Indigenous Health Equality Council, which 'advises the [Australian Government's] Minister for Health and Ageing, the Hon Nicola Roxon MP, on the achievement of equitable and sustainable health outcomes for Aboriginal and Torres Strait Islander peoples' [265, p.546].

Each state and territory was tasked with developing implementation plans detailing their respective *Closing the gap* initiatives which for WA committed them to a process that involves genuine engagement and partnership with the Western Australian Aboriginal community [266, 267].

Reflecting the increased attention directed to Indigenous reform, it is a standing item on all COAG meetings. As a part of its deliberations about 'closing the gap', COAG has agreed on a number of specific targets for reducing Indigenous disadvantage in the areas of education, early childhood development, health and employment [266, 268]. Particular targets are to:

- close the life expectancy gap within a generation
- halve the gap in death rates for Indigenous children aged under five years within a decade
- halve the gap in reading, writing and numeracy achievements for children within a decade.

In addressing these targets, COAG committed $4.6 billion in 2008 over four years across early childhood development, health, housing, economic participation and remote service delivery, and has also achieved a number of supportive commitments by the corporate and community sectors [268]. Of these funds, $1.57 billion was allocated to the *National partnership agreement on closing the gap in Indigenous health outcomes* to 'reduce the biggest risk factors, such as smoking, to improve chronic disease management and follow-up, and to expand the capacity of the health workforce to tackle chronic disease in the Indigenous population' [268, p.20]. Agreement was also reached on the establishment of a new national Indigenous representative body, which led to the formation of the National Congress of Australia's First Peoples in 2010.

In April 2013, the Australian Government announced $777 million to fund its share of a renewed *National partnership agreement on closing the gap in Indigenous health outcomes* for a further three years to 30 June 2016 [269]. The state and territory governments were asked to continue their investment to renew the *National partnership agreement*. In June 2013, the WA State government announced new funding of $31 million to continue services to improve the health and wellbeing of Aboriginal West Australians [270].

This is the first time that such a high level of commitments has been made by the Australian, state and territory governments and others, raising the possibility of substantial reductions in the health and other disadvantages experienced by Indigenous people.

As encouraging as these commitments are, achievement of substantial improvements in the health and wellbeing of Indigenous people will depend largely on the effective implementation of comprehensive strategies and policies that address the complexity of the factors underlying the disadvantages experienced by Indigenous people.

Importantly, effective, integrated comprehensive strategies and policies will need to be sustained for a long time, as improvements to the extent set in the various targets will not occur in the short-term. The timeframes for the 'closing the gap' targets suggest there is some awareness by governments of the enormity of the challenge, but the real test will be to sustain the commitments through changing political and economic cycles.

Glossary

age-adjustment

see **age-standardisation**

age-specific death rate

the number of deaths of persons of a specific age-group in one year per 1,000 persons of the same age-group

age-specific fertility rate

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

age-standardisation

a procedure for adjusting rates (such as death rates) to minimise the effects of differences in age composition and facilitate valid comparison of rates for populations with different age compositions. See **direct standardisation** and **indirect standardisation**

body mass index (BMI)

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

crude rate

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

direct standardisation

the procedure for adjusting rates in which the specific rates for a study population are averaged using as weights the distribution of a standard population

excess deaths

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

expectation of life

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

fertility rate

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

hospitalisation

an episode of admitted patient care, which can be either a patient's total stay in hospital, or part of a patient's stay in hospital that results in a change to the type of care. Hospital separations are more commonly known as 'admissions', but can also be referred to as 'hospitalisations'

incidence

the number of instances of illness commencing, or of persons falling ill, during a given period in a specified population (see **incidence rate**)

incidence rate

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

Indigenous Australians

term used to refer collectively to the two Indigenous sub-populations within Australia – Australian Aborigines and Torres Strait Islanders

indirect standardisation

the procedure for adjusting rates in which the specific rates in a standard population are averaged using as weights the distribution of the study population

infant mortality rate (IMR)
number of infant deaths per 1,000 live births

International Classification of Disease (ICD)
World Health Organization's internationally accepted classification of death and disease

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

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

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

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

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

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

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

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Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AIDS	Acquired immune deficiency syndrome
AIHW	Australian Institute of Health and Welfare
ARF	Acute rheumatic fever
BEACH	Bettering the Evaluation and Care of Health
BMI	Body mass index
CKD	Chronic kidney disease
COAG	Council of Australian Governments
CSOM	Chronic suppurative otitis media
CVD	Cardiovascular disease
DSM	Diagnostic and Statistical Manual of Mental Disorders
DTP	Diphtheria, tetanus, and pertussis
ESKD	End-stage kidney disease
ESRD	End-stage renal disease
FASD	Foetal alcohol spectrum disorder
GDM	Gestational diabetes mellitus
GP	General practitioner
HAV	Hepatitis A virus
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HD	Haemodialysis
Hib	Haemophilus influenzae type b
HIV	Human immunodeficiency virus
HPV	Human papilloma virus
ICD	International Classification of Diseases
IMR	Infant mortality rate
IPD	Invasive pneumococcal disease
KRT	Kidney replacement therapy
LBW	Low birthweight
MMR	Measles, mumps, rubella
NATSIHS	National Aboriginal and Torres Strait Islander Health Survey
NATSISS	National Aboriginal and Torres Strait Islander Social Survey
NDA	National Disability Agreement
NDR	National Diabetes register
NDSHS	National Drug Strategy Household Survey
NHMRC	National Health and Medical Research Council
NHS	National Health Survey
NIEHS	National Indigenous Eye Health Survey
NNDSS	National Notifiable Diseases Surveillance System
NSW	New South Wales
NT	Northern Territory

OATSIH	Office for Aboriginal and Torres Strait Islander Health
OM	Otitis media
PD	Peritoneal dialysis
Qld	Queensland
RHD	Rheumatic heart disease
SA	South Australia
SIDS	Sudden infant death syndrome
SMR	Standardised mortality ratio
STD	Sexually transmitted disease; see STI
STI	Sexually transmissible infection
Tas	Tasmania
UV	Ultraviolet
Vic	Victoria
WA	Western Australia
WAACHS	Western Australian Aboriginal Child Health Survey
WHO	World Health Organization
WHR	Waist to hip ratio

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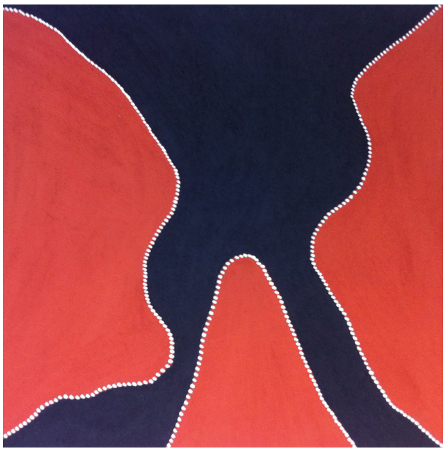

Jiyirriny Ngarrangkarni - Kangaroo Dreaming

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