The burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people 2014

Authors

Dr Stephen Begg, Senior Lecturer, Department of Public and Community Health, La Trobe University

Lucy Stanley, Lucy Stanley Consulting

Abdulla Suleman, Senior Health Data Analyst, Aboriginal and Torres Strait Islander Health Unit, Department of Health

Daniel Williamson, Manager, Performance and Accountability, Aboriginal and Torres Strait Islander Health Unit, Department of Health

Jacinta Sartori, Principal Policy and Planning Officer, Aboriginal and Torres Strait Islander Health Unit, Department of Health

Marianna Serghi, Executive Advisor, Aboriginal and Torres Strait Islander Health Unit, Department of Health

The burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people, 2014

Published by the State of Queensland (Queensland Health), November 2014

ISBN: 978–1–921021–60–2

For more information contact:
Aboriginal and Torres Strait Islander Health Unit, Department of Health, GPO Box 48, Brisbane QLD 4001, phone 3234 0017.

An electronic version of this document is available at www.health.qld.gov.au/atsihealth/

Contents

Key terms ix

Introduction 1

- Background 1
- What this study adds 3
- Purpose of the report 3
- Structure of the report 3

Methods 4

- Estimating fatal burden of disease 4
- Estimating non-fatal burden of disease 4
- Estimating burden attributable to risk factors 5

The burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people 6

- Overview 6
- Burden of disease and injury: disability adjusted life years 6
- Fatal burden of disease and injury: years of life lost to premature mortality 11
- Non-fatal burden: years of life lost to disability 14
  - Incident years lost to disability (YLD) 14
  - Prevalent years lost to disability (YLD) 17
- Health adjusted life expectancy 20
- Broad cause disease and injury categories 21
  - Mental disorders 21
  - Cardiovascular disease 23
  - Diabetes 25
  - Chronic respiratory diseases 27
  - Cancers 29
  - Unintentional injuries 31
  - Intentional injuries 33

Risks to health and their contribution to burden of disease and injury 35

- Overview 35
- Risk factor exposure definitions 35
- Combined effect 35
- Individual contribution to burden of disease and injury 37
  - High body mass 37
  - Tobacco 38
  - Physical inactivity 39
  - High blood cholesterol 40
  - Alcohol 41
  - High blood pressure 42
  - Low fruit and vegetable intake 43
  - Intimate partner violence 44
  - Illicit drug use 45
  - Child sexual abuse 46
  - Unsafe sex 47

Aboriginal and Torres Strait Islander health differentials by remoteness 48
Overview 48
Disease and injury burden differentials by remoteness 48
Health adjusted life expectancy differentials by remoteness 50
Risk factor differentials by remoteness 51
Aboriginal and Torres Strait Islander health gap 52
Overview 52
Aboriginal and Torres Strait Islander health gap 52
Health adjusted life expectancy gap 55
Discussion and conclusions 57
Differences in Aboriginal and Torres Strait Islander people burden of disease and injury and risk factors: Australia 2003 and Queensland 2007 59
Overview 59
Burden of disease and injury 60
Risk factors 60
Methods used to update selected epidemiological models 61
Mental disorders 61
Cardiovascular diseases 62
Chronic respiratory disease 62
Methods used for updating selected risk factor models 63
Alcohol 63
High body mass 63
Fruit and vegetable consumption 64
Illicit drug use 64
Physical activity 65
Tobacco 65
Unsafe sex 65
References 66

Figures

Figure 1 Queensland Aboriginal and Torres Strait Islander and non-Indigenous population distribution by age group and sex 6
Figure 2 Burden of disease and injury in Indigenous and non-Indigenous Queenslanders by major cause categories 7
Figure 3 Distribution of burden of disease and injury by sex and age group 7
Figure 4 Leading broad causes of burden of disease and injury in Aboriginal and Torres Strait Islander people by outcome type 8
Figure 5 Distribution of leading broad causes of burden of disease and injury in Aboriginal and Torres Strait Islander people by sex and age group 9
Figure 6 Broad cause contribution to the burden of disease and injury in Aboriginal and Torres Strait Islander people by age group 9
Figure 7 Queensland Aboriginal and Torres Strait Islander to non-Indigenous burden of disease rate ratio by broad cause group 10
Figure 8 Distribution of fatal burden and deaths by Indigenous status 11
Figure 9 Distribution of fatal burden by sex and age group 11
Figure 10 Leading broad causes of fatal burden in Aboriginal and Torres Strait Islander people by sex 12
Figure 11 Leading broad causes of fatal burden of disease and injury in Aboriginal and Torres Strait Islander people by sex and age group 12

Figure 12 Broad cause contribution to the fatal burden in Aboriginal and Torres Strait Islander people by age group 13
Figure 13 Queensland Aboriginal and Torres Strait Islander to non-Indigenous fatal burden rate ratio by broad cause group 13
Figure 14 Distribution of non-fatal burden by sex and age group 14
Figure 15 Leading broad causes of non-fatal burden in Aboriginal and Torres Strait Islander people 15
Figure 16 Leading broad causes of non-fatal burden of disease and injury in Queensland Aboriginal and Torres Strait Islander people by sex and age group 15
Figure 17 Broad cause contribution to the non-fatal burden in Aboriginal and Torres Strait Islander people by age group 16
Figure 18 Queensland Aboriginal and Torres Strait Islander to non-Indigenous non-fatal burden rate ratio by broad cause group 16
Figure 19 Distribution of prevalent non-fatal burden by sex and age group 17
Figure 20 Leading broad causes of prevalent non-fatal burden in Aboriginal and Torres Strait Islander people 18
Figure 21 Leading broad causes of prevalent non-fatal burden of disease and injury in Queensland Aboriginal and Torres Strait Islander people by sex and age group 18
Figure 22 Broad cause contribution to the prevalent non-fatal burden in Aboriginal and Torres Strait Islander people by age group 19
Figure 23 Queensland Aboriginal and Torres Strait Islander to non-Indigenous non-fatal burden rate ratio by broad cause group 19
Figure 24 Mental disorders: burden by specific cause, and as a proportion of total burden 21
Figure 25 Mental disorders: burden by age group 22
Figure 26 Mental disorders: burden by sex and outcome type 22
Figure 27 Cardiovascular disease: burden by age group, Indigenous and non-Indigenous Queenslanders 23
Figure 28 Cardiovascular disease: burden in Aboriginal and Torres Strait Islander people by specific cause and age group 24
Figure 29 Cardiovascular disease: burden in Aboriginal and Torres Strait Islander people by sex and outcome type 24
Figure 30 Diabetes: burden by age group, Indigenous and non-Indigenous Queenslanders 25
Figure 31 Diabetes: burden in Aboriginal and Torres Strait Islander people by specific cause and age group 26
Figure 32 Diabetes: burden in Aboriginal and Torres Strait Islander people by sex and outcome type 26
Figure 33 Chronic respiratory disease: burden by age group, Indigenous and non-Indigenous Queenslanders 27
Figure 34 Chronic respiratory disease: burden in Aboriginal and Torres Strait Islander people by specific cause and age group 28
Figure 35 Chronic respiratory disease: burden in Aboriginal and Torres Strait Islander people by sex and outcome type 28
Figure 36 Cancers: burden by age group, Indigenous and non-Indigenous Queenslanders 29
Figure 37 Cancers: burden in Aboriginal and Torres Strait Islander people by specific cause and age group 30
Figure 38 Cancers: burden in Aboriginal and Torres Strait Islander people by sex and burden type 30
Figure 39 Unintentional injury: burden by age group, Indigenous and non-Indigenous Queenslanders 31

Figure 40 Unintentional injury: burden in Aboriginal and Torres Strait Islander people by specific cause and age group 32
Figure 41 Unintentional injury: burden in Aboriginal and Torres Strait Islander people by sex and outcome type 32
Figure 42 Intentional injury: burden by age group, Indigenous and non-Indigenous Queenslanders 33
Figure 43 Intentional injury: burden in Aboriginal and Torres Strait Islander people by specific cause and age group 34
Figure 44 Intentional injury: burden in Aboriginal and Torres Strait Islander people by sex and outcome type 34
Figure 45 Proportion of burden attributed to by the single and joint risk factors 36
Figure 46 High body mass: deaths and burden (table), and proportion by specific cause 37
Figure 47 High body mass: burden rates and numbers by age group and proportion by sex 37
Figure 48 Tobacco: deaths and burden (table), and proportion of tobacco burden by specific cause 38
Figure 49 Tobacco: burden rates and numbers by age group and proportion by sex 38
Figure 50 Physical inactivity: deaths and burden (table), and proportion by specific cause 39
Figure 51 Physical inactivity: burden rates and numbers by age group and proportion by sex 39
Figure 52 High blood cholesterol: deaths and burden (table), and proportion by specific cause 40
Figure 53 High blood cholesterol: burden rates and numbers by age group and proportion by sex 40
Figure 54 Alcohol: deaths and burden (table), and proportion by specific cause 41
Figure 55 Alcohol: burden rates and numbers by age group and proportion by sex 41
Figure 56 High blood pressure: deaths and burden (table), and proportion by specific cause 42
Figure 57 High blood pressure: burden rates and numbers by age group and proportion by sex 42
Figure 58 Low fruit and vegetable intake: deaths and burden (table), and proportion by specific cause 43
Figure 59 Low fruit and vegetable intake: burden rates and numbers by age group and proportion by sex 43
Figure 60 Intimate partner violence: deaths and burden (table), and proportion by specific cause 44
Figure 61 Intimate partner violence: burden rates and numbers by age group and proportion by sex 44
Figure 62 Illicit drug use: deaths and burden (table), and proportion by specific cause 45
Figure 63 Illicit drug use: burden rates and numbers by age group and proportion by sex 45
Figure 64 Child sexual abuse: deaths and burden (table), and proportion by specific cause 46
Figure 65 Child sexual abuse: burden rates and numbers by age group and proportion by sex 46
Figure 66 Unsafe sex: deaths and burden (table), and proportion burden by specific cause 47
Figure 67 Unsafe sex: burden rates and numbers by age group and proportion by sex 47
Figure 68 Distribution of Burden of disease and injury by remoteness area 48

Figure 69 Burden of disease and injury by broad cause group and remoteness area 49
Figure 70 Ranking of specific causes of burden of disease and injury by Indigenous status and remoteness area 50
Figure 71 Health adjusted life expectancy by remoteness area 50
Figure 72 Risk factor burden rate by remoteness area 51
Figure 73 Distribution of risk factor burden by remoteness area 51
Figure 74 Contributors to the health gap by broad cause group 53
Figure 75 Leading broad causes of the health gap by outcome type 53
Figure 76 Leading broad causes of the health gap by sex and age group 54
Figure 77 Leading broad causes of the health gap by sex and age group 54
Figure 78 Population, burden and gap distribution by remoteness 55
Figure 79 Contributors to the HALE gap by broad cause 56

Tables

Table 1 Leading broad causes of burden of disease and injury by sex 8
Table 2 Leading specific causes of burden of disease and injury by sex 10
Table 3 Leading specific causes of fatal burden by sex 14
Table 4 Leading specific causes of non-fatal burden by sex 17
Table 5 Leading specific causes of prevalent non-fatal burden by sex 20
Table 6 Mental disorders: burden by specific cause as a proportion of burden 21
Table 7 Cardiovascular disease: burden by specific cause as a proportion of burden 23
Table 8 Diabetes: burden by specific cause as a proportion of burden 25
Table 9 Chronic respiratory disease: burden by specific cause as a proportion of burden 27
Table 10 Cancer: burden by specific cause as a proportion of burden 29
Table 11 Unintentional injury: burden by specific cause as a proportion of burden 31
Table 12 Intentional injury: burden by specific cause as a proportion of burden 33
Table 13 Proportion of broad cause group burden attributable to individual and joint risk factors 36
Table 14 Burden of disease and injury by broad cause group and remoteness area, number rate and rate ratio 49
Table 15 Observed burden and gap by broad cause group 52
Table 16 Health adjusted life expectancy (HALE) and contributors to the HALE gap by cause 56
Table 17 Comparison of leading specific causes of burden of disease and injury in Aboriginal and Torres Strait Islander people, Australia 2003 and Queensland 2007 60
Table 18 Comparison of burden of disease and injury in Aboriginal and Torres Strait Islander people attributable to 11 risk factors, Australia 2003 and Queensland 2007 60
Table 19 Rate ratios of prevalence of anxiety and depression between Aboriginal and Torres Strait Islanders by remoteness category and Queensland 61
Table 20 Rate ratios of prevalence of asthma between Aboriginal and Torres Strait Islanders by remoteness category and Queensland 62

Key terms

Term	Definition
Age standardised rate	All reported rates are directly standardised to the 2001 Australian population. Age standardisation removes the effect of differences in population age structure when comparing rates in different populations.
Body Mass Index (BMI)	Measure of body fat based on height and weight.
Broad cause group	A unit of disease and/or injury disaggregation that includes a group of specific conditions. Each broad cause belongs to one of three clusters: communicable; maternal, neonatal and nutritional conditions; and non-communicable diseases or injuries.
Disability adjusted life year (DALY)	Years of life lost due to disability and premature mortality calculated as the sum of fatal (YLL) and non-fatal (YLD) burden of disease and injury, cumulatively referred to, in this study, as burden of disease and injury.
Disability weight	A relative measure of a health state on a scale from 0 (full health) to 1 (death).
Health adjusted life expectancy (HALE)	The number of years free from disability that a person born in a particular year can expect to live based on current trends in deaths and disease patterns. The average number of years spent in unhealthy states (taking relative severity into account) (PYLD) is subtracted from the overall life expectancy.
Health gap	The difference between the observed and 'achievable' DALYs, where 'achievable' is based on the age, sex and condition specific rates observed in the non-Indigenous population.
Life expectancy	The average number of additional years a person of a given age and sex might expect to live if the age-specific death rates of the given period continued throughout their lifetime.
Prevalent years lost to disability (PYLD)	Prevalent years of life lost due to any short or long-term health loss. This is a prevalence-based measure that captures the current loss of healthy years of life from cases existing in the study year and is referred to, in this report, as prevalent non-fatal burden.
Rate ratio	The ratio of two age standardised rates.
Reference year	The year for standard reference life table and mortality analysis.
Specific cause/ condition	The smallest unit of disease or injury disaggregation. Each is mutually exclusive and belongs to a broad cause group.
Years of life lost (YLL)	Years of life lost due to premature mortality calculated as the number of deaths multiplied by the standard life expectancy at the age at which death occurs, referred to, in this report, as fatal burden.
Years lost to disability (YLD)	Years of life lost due to any short or long-term health loss. This is an incidence-based measure that captures the future loss of healthy years of life from new cases occurring in the study year and is referred to, in this report, as non-fatal burden.

Introduction

Since 2007 Australian governments have focused on closing the gap in health outcomes between Aboriginal and Torres Strait Islander people and other Australians. The aim is to close the life expectancy gap by 2033 and to halve the child mortality gap by 2018. In Queensland, significant effort has been directed to quantify and understand the characteristics of the health gap, and to measure improvement in health outcomes against established benchmarks, as well as to targeted health services and interventions.

This report contributes to an understanding of the health gap in Queensland. It presents a picture of the burden of disease and injury in the Aboriginal and Torres Strait Islander population of Queensland in 2007. Using the burden of disease and injury approach, the relative contribution of a comprehensive list of diseases and injuries to the health loss of the population can be described. As a decision making and strategic planning tool, the approach improves upon traditional morbidity and mortality indicators in that it summarises fatal and non-fatal outcomes in one metric (disability adjusted life year) by weighting the disease outcome. It provides a summary measure of population health.

It is well established that Aboriginal and Torres Strait Islander people have poorer health outcomes than non-Indigenous Australians. The Queensland Government recognises this inequality through its commitment to close the health gap. This commitment was made in an environment of escalating health costs where the strategic targeting of resources has become even more important. Population health data is important for informing the decision-making process. Burden of disease and injury estimates are a useful descriptive epidemiological tool for describing the health of populations, but they hold most value for informing strategic planning, decision-making and resource prioritisation.

This report describes how disease and injury burden affects Aboriginal and Torres Strait Islander people in Queensland. It provides information about which conditions, at which age, and in which geographic areas, contribute the most to the disease and injury burden experienced by Aboriginal and Torres Strait Islander people in Queenslander. It demonstrates the effect of risk factors on health. Importantly, it shows where the gaps lay between the burden in Queensland's Indigenous and non-Indigenous populations, thus highlighting areas that have the largest potential for health gain.

Background

In the early 1990s, a new metric to summarise population health was developed, the disability adjusted life year (DALY). This summary measure captures the burden of disease and injury by combining fatal and non-fatal outcomes into a single figure by introducing the concept of a disability weight as an indicator of severity ranging from full health (0) to death (1). DALY was first used in a comprehensive global assessment of health in 1990—this became known as the *Global Burden of Disease Study* (GBD). It estimated the burden of disease and injury for a hierarchically organised mutually exclusive and comprehensive list of diseases and injuries. Since this time, the burden of disease and injury approach to measuring and comparing the health of populations has become widely used and accepted. Numerous national and sub-national burden of disease and injury studies have been conducted. Recently new estimates of the global burden of disease for 1990, 1995 and 2010 were released (The Lancet, 2012). This study, known as GBD 2010, implemented a number of conceptual and methodological changes (see Global Burden of Disease 2010).

The first complete national assessment of the burden of disease in the Aboriginal and Torres Strait Islander population was released in 2007 (reference year 2003) (Vos, et al., 2007). Equivalent results have been generated for Queensland by combining burden of disease analysis for whole-of-Queensland (Queensland Health: Begg, et al., 2008) with the results of the national Indigenous study (Vos et al 2007) to provide 2003 (Queensland Health: Begg, et al., 2008) and 2006 (Queensland Health: Begg, et al., 2008) broad estimates for Aboriginal and Torres Strait Islander Queenslanders.

The 2008 Queensland Government commitment to close the gap in health status and life expectancy between Aboriginal and Torres Strait Islander people and non-Indigenous Queenslanders (Queensland Government, 2008), along with the recent development of experimental life tables for Indigenous Queenslanders by remoteness for 2005–2007 (unpublished), provided the impetus to refresh the burden of disease and injury estimates for Queensland's Aboriginal and Torres Strait Islander people. In early 2012, Queensland Health undertook a refresh of burden of disease and injury results specifically for Queensland's Aboriginal and Torres Strait Islander people.

In 2013, both the Queensland and Australian Governments signed a second *National Partnership Agreement* on closing the gap in Indigenous health outcomes, ensuring that the momentum and focus continues. The information contained in this report will underpin resource allocation and performance monitoring of effort associated with the agreement.

Global Burden of Disease 2010

The *Global Burden of Diseases, Injuries and Risk Factors Study 2010* (GBD 2010) was a major international collaboration of seven institutions and hundreds of disease, epidemiology, biostatistics and computing experts. The first results of the GBD 2010 were published in a special edition of *The Lancet* in 2012. This study was the first comprehensive effort to renew the burden of disease and injury estimates across the globe since the 1990 estimates released in 1996 (Murray, 2012). Comparisons between current and previous GBD estimates are not possible due to a number of methodological and conceptual changes, and improvements. However, to enable analysis of burden of disease and injury trends, estimates for 1990, 2005 and 2010 were calculated. Global burden of disease efforts are continuing with 2013 estimates to be published in 2014. This ongoing effort will improve the capacity to use burden results for population health monitoring, as it will provide more timely and comparable data.

With the GBD 2010 came a number of important evolutions in burden of disease methodology (Murray, 2012). Firstly, discounting and age weighting have been removed. DALY is now calculated as the sum of prevalent years lost to disability and years lost to premature mortality— previously the non-fatal component of the DALY was incident YLD. Fatal burden is calculated using a new standard life expectancy at each age. A new suite of disability weights to use in non-fatal burden estimates has been developed. These are based on judgements on health severity by the general public rather than a small group of health professionals as was used in the previous GBD analyses. In addition, uncertainty around cause specific DALYs was incorporated.

Despite the methods used to analyse the data for this report becoming somewhat out-dated, they remain the best estimates of the burden of disease and injury experience of Aboriginal and Torres Strait Islander people in Queensland. It will not be until 2015 that results using the GBD 2010 methodology will be replicated for the Aboriginal and Torres Strait Islander population although high-level GBD 2010 results are available for Australia (Institute for Health Metrics and Evaluation, 2013).

What this study adds

This study is the first comprehensive description of the burden of disease in Queensland's Aboriginal and Torres Strait Islander population. The results aid prioritisation of health programs, services and policies by highlighting areas with the largest health loss and those with the largest potential for health gain.

In the near future small area estimates for 2007 will be available. This disaggregation of results will aid local service planning and decision-making. The 2007 study also acts as a baseline, and in 2014 the 2010 burden of disease and injury estimates for Queensland's Aboriginal and Torres Strait Islander population will be available. The production of ongoing burden of disease and injury estimates will allow improved understanding of changes in disease and injury burden, thus guiding future investment for improving the health of Aboriginal and Torres Strait Islander people.

Purpose of the report

Burden of disease studies generate a large quantity of data that can be aggregated in many ways depending on the information required and the purpose of the data. This report aims to present a comprehensive analysis of the results in a way that will be useful to the majority of end users.

Structure of the report

This report outlines the methods used to update the previous Australian and Queensland results for the Aboriginal and Torres Strait Islander population of Queensland for 2007, particularly where they differ from the 2003 national studies. The results are presented in terms of total burden of disease and injury (DALY), fatal (YLL) and non-fatal burden (YLD and PYLD), and health adjusted life expectancy (HALE). The seven leading broad causes of Aboriginal and Torres Strait Islander burden of disease and injury in Queensland are then analysed separately. Results of the risk assessment are presented both for the combined effect of the 11 risk factors and then separately for each risk factor. Differentials in burden by remoteness are examined, as is the health gap between Queensland's Aboriginal and Torres Strait Islander and non-Indigenous populations. The final chapter is a discussion of the major findings. There are three appendices. Appendix 1 examines the key differences in results between the current study and the 2003 national study. Appendix 2 and 3 present further information on the epidemiological and risk factor models which were updated for this study.

Methods

The underlying assumptions and methodology for calculating the burden of disease and injury in Queensland Aboriginal and Torres Strait Islander people are largely based on those used in national studies (Vos, et al., 2007) (Begg, et al., 2007). There is evidence of a gradient in life expectancy and other health outcomes between Aboriginal and Torres Strait Islander people residing in areas of increasing remoteness. Therefore estimates were created for major cities, regional areas (inner regional and outer regional combined) and remote areas (remote and very remote combined) based on the Australian Remoteness Index of Areas (ARIA). This stratification is also useful for the future calculation of small area burden of disease and injury estimates.

Estimating fatal burden of disease

In burden of disease analysis, fatal burden is measured in years of life lost due to premature mortality (YLL). Calculation of YLL requires the number of deaths by sex, age and cause, and a standard life expectancy.

Our mortality envelope (number of deaths by sex and age) comes from experimental life tables developed by the Health Statistics Centre (Queensland Health) in 2012 (Khalidi, 2012). Life tables by remoteness (major cities, regional areas and remote areas) were developed for the Queensland Aboriginal and Torres Strait Islander population for 2002–2004 and 2005–2007. Three years of population and morality data were combined to increase the accuracy of the estimates more generally, and statistical power for the remoteness estimates. For this study, we use the 2005–2007 life tables.

Application of direct method of life table construction requires the use of death registration data and the Estimated Resident Population (ERP) by age groups to construct mortality schedules. This method requires adjusting death registration data for the estimated levels of Indigenous under-identification in death registration.

For this exercise, Experimental Life Tables had an adjustment factor of nine per cent applied to Indigenous mortality in Queensland to correct the under reporting of deaths in Queensland. This adjustment factor was derived from the *Australian Institute of Health and Welfare (AIHW) Mortality Data Linkage Study* (AIHW, 2010).

Estimating non-fatal burden of disease

Non-fatal burden of disease can be measured in two ways:

1. As an incidence based measure of years of life lost into the future due to new cases of disability occurring in the study year (YLD), or
2. As a prevalence-based measure of the years of life lost to disability due to all cases existing in the study year (PYLD).

Both measures are useful for different reasons. YLD is primarily reported as this is the non-fatal component of the DALY calculation and is most useful for strategic planning. However, PYLD is also useful for current resource distribution and is used in the calculation of HALE. Unless otherwise noted, in this report discussion of non-fatal burden refers to incident YLD.

Calculation of incident and prevalent YLD requires a number of incident or prevalent cases, duration of disability (for incident YLD) and a disability weight. Disability weights were unchanged from the national study, and unless otherwise noted the same assumptions were used regarding incidence or prevalence, remission, relative risk of mortality, duration and proportion of time symptomatic from the 2003 national study.

Due to the tight timeframe of this project, not all disease models could be explicitly updated. The refresh of disease models was therefore prioritised with only those conditions that had a specific model and were among the 10 leading specific causes in the 2006 estimates earmarked to be updated. Anxiety and depression, ischaemic heart disease, peripheral vascular disease, asthma, and chronic obstructive pulmonary disease (COPD) epidemiological models were updated with Queensland-specific and, where available, remoteness-specific data from the *National Aboriginal and Torres Strait Islander Health Survey 2004–05* (NATSIHS 2004–05) and the *National Health Survey 2004–05* (NHS 2004–05). Appendix 1 describes the methods used to update the specific disease models. Unless otherwise stated, all other assumptions and rates were unchanged from the 2003 national study.

There is an absence of survey data for mental illness to allow for the accurate estimation of prevalence for specific conditions in Queensland. While anxiety and depression was estimated from data collected in the 'Social and Emotional Wellbeing Module' of the 2004-05 *National Aboriginal and Torres Strait Islander Health Survey* (which was obtained using the SF-36 and the Kessler Psychological Distress Scale), prevalence estimates for other mental health conditions were derived using relativities from hospital data. Given these limitations, further work is being undertaken to develop prevalence estimates for Indigenous mental illness in Queensland.

Estimating burden attributable to risk factors

There are generally three pieces of information required to generate the estimated burden attributable to specific risk factors, these are:

1. DALYs (estimated as described above).
2. The relative risk of disease in persons exposed to the risk factor compared to unexposed persons.
3. The prevalence or distribution of exposure to the risk factor.

Due to time restraints and data availability, 7 of the 11 risk factors included in the national Indigenous burden of disease study (Vos et al 2007) were updated for the Queensland study. The models updated were alcohol, high body mass index (BMI), low fruit and vegetable intake, physical inactivity, illicit drugs, tobacco and unsafe sex. Relative risk of exposure and any new evidence linking a condition to exposure was not updated to enable comparisons with the total Queensland results. There was a general lack of new and representative prevalence data for Queensland's Aboriginal and Torres Strait Islander people. Therefore, while in most instances, prevalence was not sourced from newer data it was at least restricted to Queensland-specific data by remoteness. Unless otherwise noted, the same methods and assumptions used in the national Indigenous burden of disease study were applied in the current refresh. Appendix 2 describes the methods used to update the seven risk factors.

The burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people

Overview

This chapter presents the burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people in 2007. Total burden of disease and injury (DALYs) followed by the fatal (YLL) and non-fatal (YLD and PYLD) portions of burden are presented successively.

In each of these sections, the following are presented and discussed:

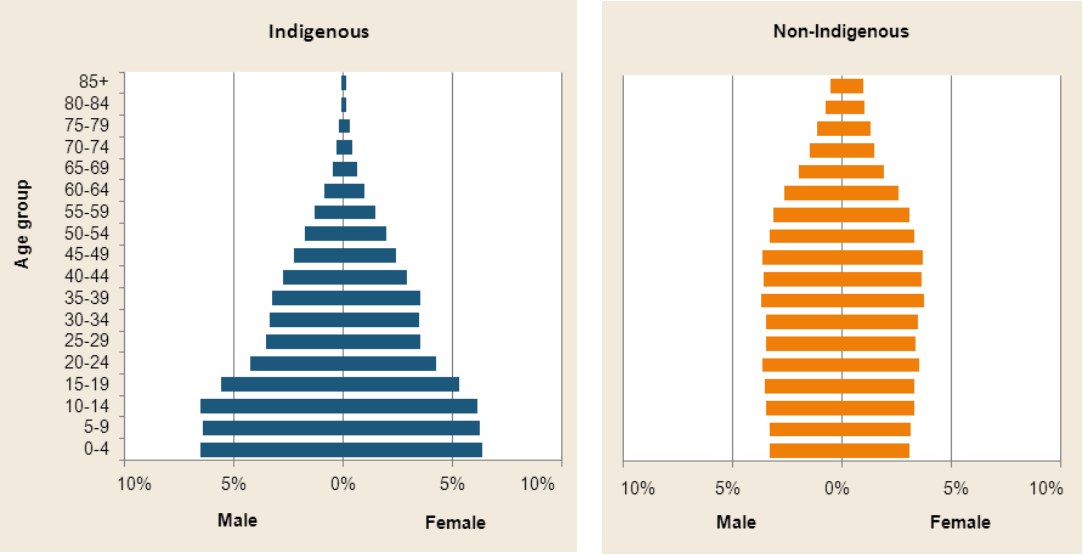
- the age-structure of burden
- leading broad causes of burden
- sex and age distribution
- Indigenous to non-Indigenous rate ratios
- leading specific causes by sex.

Health adjusted life expectancy (HALE) is briefly presented before a more in depth analysis of the seven leading broad cause groups.

Burden of disease and injury: disability adjusted life years

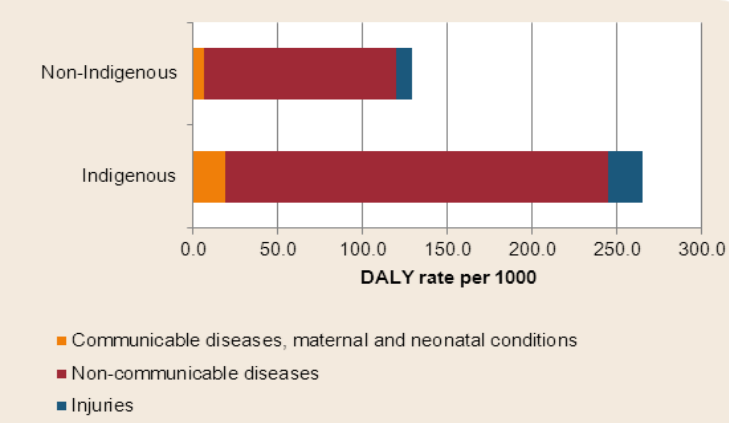
In 2007, Aboriginal and Torres Strait Islander people made up approximately 3.5 per cent of Queensland's total population. The age structure of the Aboriginal and Torres Strait Islander population is considerably younger than the non-Indigenous population with 58 per cent aged less than 25 years and 11 per cent aged 50 years or older, compared to 34 per cent and 31 per cent of the non-Indigenous population (Figure 1). Despite this, it is evident the age adjusted rate of burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people was 2.1 times that of non-Indigenous Queenslanders (Figure 2). Of the total burden of disease and injury in Queensland, 4.7 per cent is in Aboriginal and Torres Strait Islander people. This is 31 per cent higher than would be expected based on population distribution alone.

Figure 1 **Queensland Aboriginal and Torres Strait Islander and non-Indigenous population distribution by age group and sex**



Non-communicable diseases accounted for just over three-quarters (76.8 per cent) of the total burden of disease and injury in Aboriginal and Torres Strait Islander people, with a further 11.6 per cent due to injuries, and 11.6 per cent caused by communicable diseases, maternal and neonatal conditions, and nutritional deficiencies. The contribution of non-communicable diseases in the non-Indigenous population was higher at 87.8 per cent, with 7.2 per cent due to injuries, and 5.0 per cent due to communicable diseases, maternal and neonatal conditions, and nutritional deficiencies. The largest relative differential was for communicable diseases, maternal and neonatal conditions, and nutritional deficiencies where the rate in Queensland's Aboriginal and Torres Strait Islander people was 3.1 times that of non-Indigenous Queenslanders (Figure 2).

Figure 2 Burden of disease and injury in Indigenous and non-Indigenous Queenslanders by major cause categories

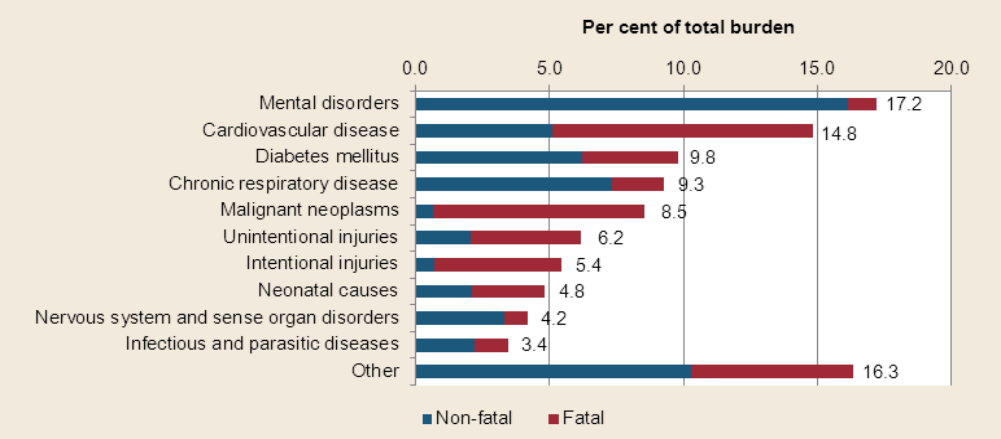


The distribution of burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people varied considerably by age and sex when compared to the burden distribution in non-Indigenous Queenslanders (Figure 3). For Aboriginal and Torres Strait Islander males and females, the youngest age group 0–4 years carried the greatest proportion of burden. In the non-Indigenous population the bulk of the burden occurred in older age groups. Non-Indigenous males aged 60–64 years and females aged 85 years and older carried the largest proportion of the burden. Almost half of the burden in Queensland's Aboriginal and Torres Strait Islander people (47.3 per cent) and one-quarter (23.8 per cent) of the non-Indigenous burden occurred in those aged less than 35 years. Just over half (51.8 per cent) of the non-Indigenous burden and 84.2 per cent of the Indigenous burden occurred in those aged less than 60 years.

Figure 3 Distribution of burden of disease and injury by sex and age group

The total burden of disease and injury is comprised of 22 broad cause groups. In 2007, mental disorders was the leading broad cause group and caused almost one-fifth of the total burden of disease and injury of Aboriginal and Torres Strait Islander people in Queensland (Figure 4). Cardiovascular disease was responsible for the second greatest proportion of burden and caused a further 14.8 per cent of burden. Diabetes, chronic respiratory disease and cancers were the third, fourth and fifth leading causes of disease and injury burden respectively. A large proportion of both the cancer and cardiovascular disease burden was due to premature mortality (92.4 per cent and 65.6 per cent fatal respectively) while for diabetes and chronic respiratory disease, the majority of the burden was due to non-fatal causes (63.7 per cent and 78.9 per cent non-fatal respectively).

Figure 4 **Leading broad causes of burden of disease and injury in Aboriginal and Torres Strait Islander people by outcome type**



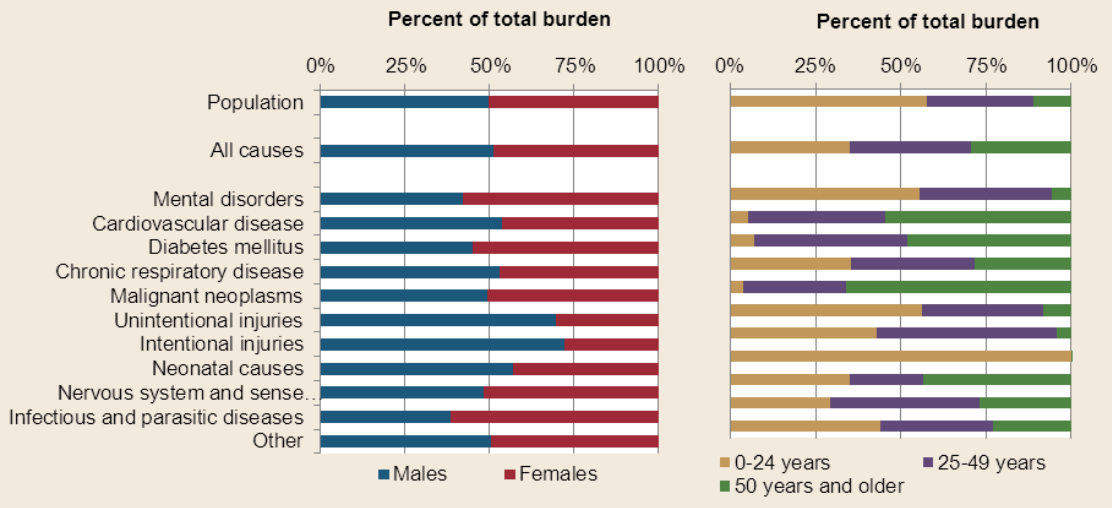
The rate of burden of mental disorders in Aboriginal and Torres Strait Islander females was 40 per cent higher than the male rate (Table 1). Diabetes and infectious and parasitic diseases are the only other two leading broad cause groups where the female rate is higher than the male rate. Cardiovascular disease was the leading cause of burden in Aboriginal and Torres Strait Islander males and was 1.2 times the female rate. The injury categories, intentional and unintentional, have the largest male to female differential. Burden from intentional injury occurs in males at a rate of 2.8 times that of females, and the unintentional injury burden rate is 2.1 times that of females.

Table 1 **Leading broad causes of burden of disease and injury by sex**

	Males			Females			Persons		
	DALYs	% of total	ASR	DALYs	% of total	ASR	DALYs	% of total	ASR
All causes	13304	100	285.4	12644	100	248.2	25949	100	264.9
Mental disorders	1881	14.1	22.9	2581	20.4	33.0	4462	17.2	28.1
Cardiovascular disease	2064	15.5	65.0	1780	14.1	52.3	3844	14.8	58.4
Diabetes mellitus	1147	8.6	32.4	1394	11.0	34.6	2541	9.8	33.5
Chronic respiratory disease	1278	9.6	29.7	1129	8.9	21.2	2407	9.3	24.9
Malignant neoplasms	1090	8.2	37.8	1121	8.9	30.2	2211	8.5	33.4
Unintentional injuries	1114	8.4	15.1	489	3.9	7.3	1603	6.2	11.1
Intentional injuries	1020	7.7	13.4	394	3.1	4.9	1413	5.4	9.1
Neonatal causes	713	5.4	4.6	541	4.3	3.6	1254	4.8	4.1
Nervous system and sense organ disorders	521	3.9	17.3	560	4.4	13.0	1082	4.2	14.7
Infectious and parasitic diseases	342	2.6	7.5	552	4.4	10.0	893	3.4	8.7
Other	2134	16.0	39.6	2103	16.6	38.2	4237	16.3	38.9

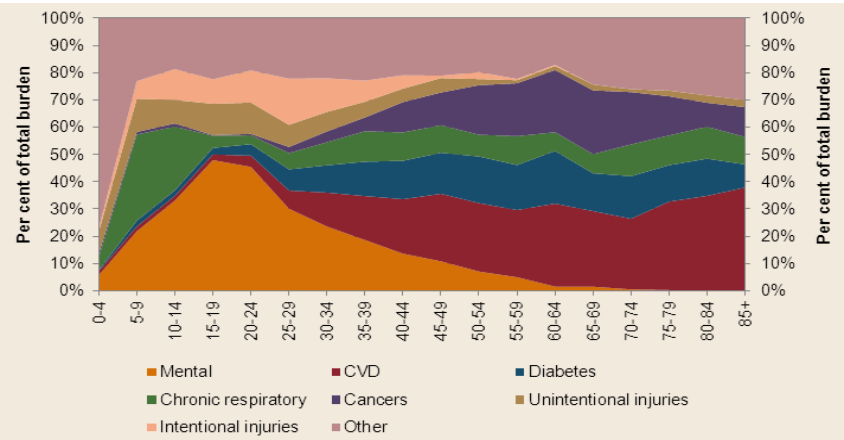
Males make up 49.7 per cent of the Queensland Aboriginal and Torres Strait Islander population, but experienced 51.3 per cent of the burden of disease and injury in 2007. Males were particularly over represented in intentional and unintentional injury burden where 72.1 per cent and 69.5 per cent of the broad cause category was male burden. Females were over represented in the mental disorders and diabetes burden.

Figure 5 **Distribution of leading broad causes of burden of disease and injury in Aboriginal and Torres Strait Islander people by sex and age group**



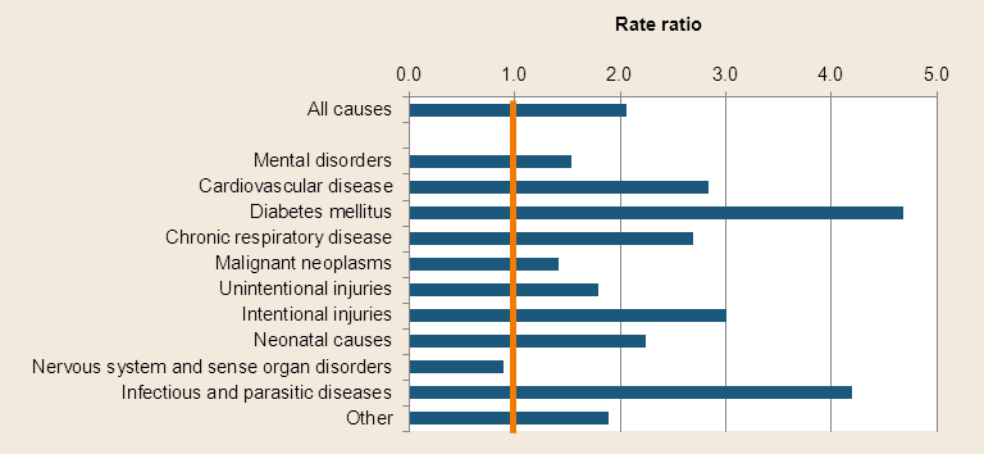
The Aboriginal and Torres Strait Islander population in Queensland is young with 57.7 per cent of the population aged younger than 25 years. In this age group, mental disorders were the leading cause of burden followed by neonatal causes and unintentional injuries (Figure 6). In the non-Indigenous 0–24 year age group, mental disorders, chronic respiratory disease and unintentional injuries were the three leading broad cause groups. By definition, the entire burden from neonatal causes occurs in the youngest age group. Those aged 0–24 years also experienced more than half the total burden due to mental disorders and unintentional injuries. Mental disorders, cardiovascular disease and diabetes were the three leading broad cause groups in 25–49 year old Aboriginal and Torres Strait Islander Queenslanders. In non-Indigenous Queenslanders, mental disorders, cancers and unintentional injuries lead the burden for this age group. More than half the burden from intentional injuries occurred in this age group. Cardiovascular disease, cancers and diabetes were the three leading causes of burden in the 50 years and older age group while in non-Indigenous Queenslanders 50 years and over age group these were cancers, cardiovascular disease, and nervous system disorders.

Figure 6 **Broad cause contribution to the burden of disease and injury in Aboriginal and Torres Strait Islander people by age group**



In 2007, the rate of burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people was 2.1 times that of the non-Indigenous population. The rate ratio between the two populations differs by broad cause with the highest differential occurring for diabetes (Indigenous to non-Indigenous RR or rate ratio=4.7), and the lowest for nervous system and sense organ disorders (Indigenous to non-Indigenous RR=0.9) where the rate is lower in Aboriginal and Torres Strait Islander people compared to non-Indigenous people.

Figure 7 Queensland Aboriginal and Torres Strait Islander to non-Indigenous burden of disease rate ratio by broad cause group



When the burden of disease and injury is further broken down from broad cause groups into specific causes, it shows the leading 10 causes (out of 188 specific causes) account for almost half the total disease and injury burden in Queensland's Aboriginal and Torres Strait Islander people. Anxiety and depression caused 10.2 per cent of the total burden of disease and injury, and was the specific cause responsible for the largest proportion of overall and female burden of disease. In females, anxiety and depression caused 15.1 per cent of burden while in males it caused only 5.6 per cent of the burden and was the third leading cause. In males, ischaemic heart disease and type 2 diabetes cause the greatest proportion of burden.

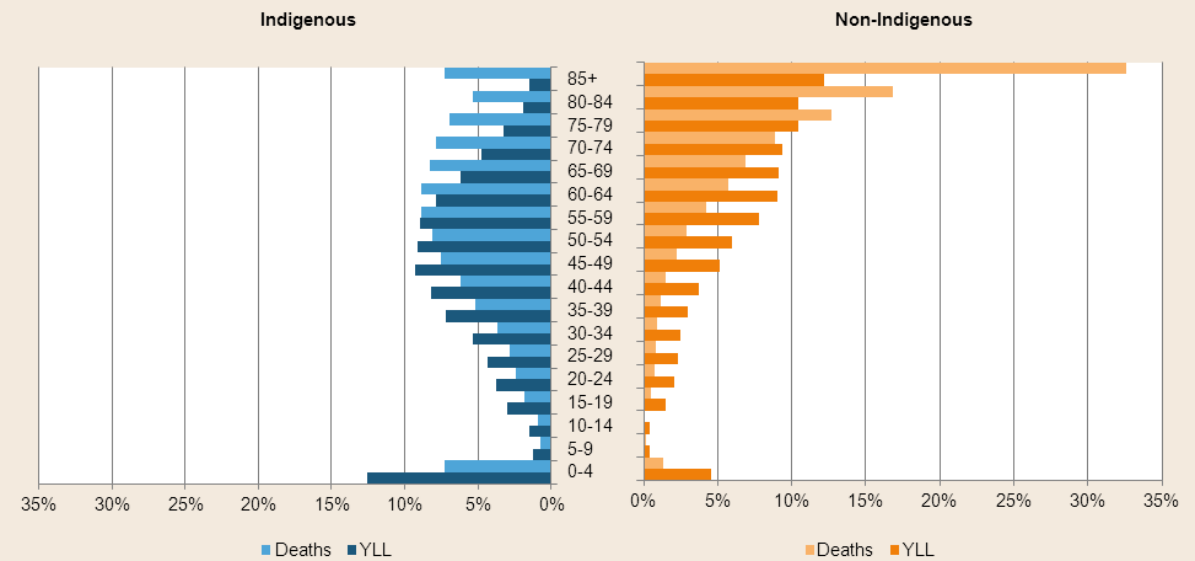
Table 2 Leading specific causes of burden of disease and injury by sex

	Males			Females			Persons		
	DALYs	% of total	ASR	DALYs	% of total	ASR	DALYs	% of total	ASR
All causes	13304	100	285.4	12644	100	248.2	25949	100	264.9
Anxiety and depression	746	5.6	9.3	1904	15.1	24.1	2650	10.2	16.8
Type 2 diabetes	1088	8.2	31.2	1317	10.4	32.5	2405	9.3	31.8
Ischaemic heart disease	1260	9.5	40.1	955	7.6	29.5	2215	8.5	34.5
Chronic obstructive pulmonary disease	636	4.8	18.6	437	3.5	10.9	1073	4.1	14.4
Asthma	395	3.0	3.7	538	4.3	5.9	933	3.6	4.8
Suicide and self-inflicted injuries	617	4.6	8.5	199	1.6	2.4	816	3.1	5.4
Stroke	309	2.3	12.2	350	2.8	11.3	659	2.5	11.7
Road traffic accidents	410	3.1	5.3	200	1.6	2.5	610	2.3	3.9
Homicide and violence	402	3.0	5.0	195	1.5	2.5	597	2.3	3.7
Low birth weight	299	2.2	1.9	258	2.0	1.7	557	2.1	1.8
Other	7142	53.7	149.7	6292	49.8	125.0	13434	51.8	136.1

Fatal burden of disease and injury: years of life lost to premature mortality

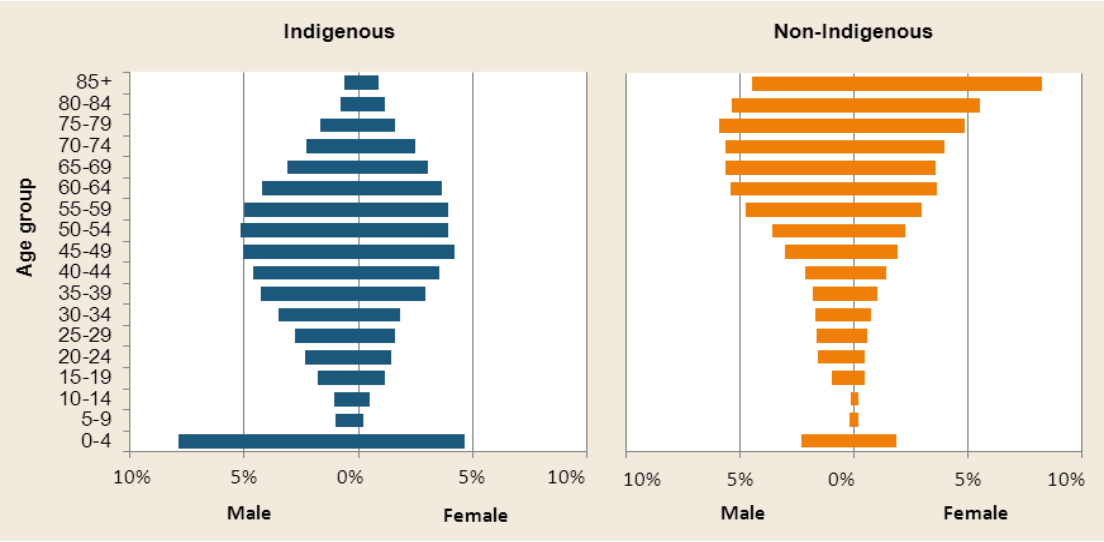
The estimation of fatal burden of disease weights deaths by age at death, so a death at old age contributes fewer YLL than a death at young age, as demonstrated in Figure 8. Also evident from this figure is the marked difference in the age distribution of deaths and fatal burden between the Aboriginal and Torres Strait Islander and non-Indigenous populations.

Figure 8 Distribution of fatal burden and deaths by Indigenous status



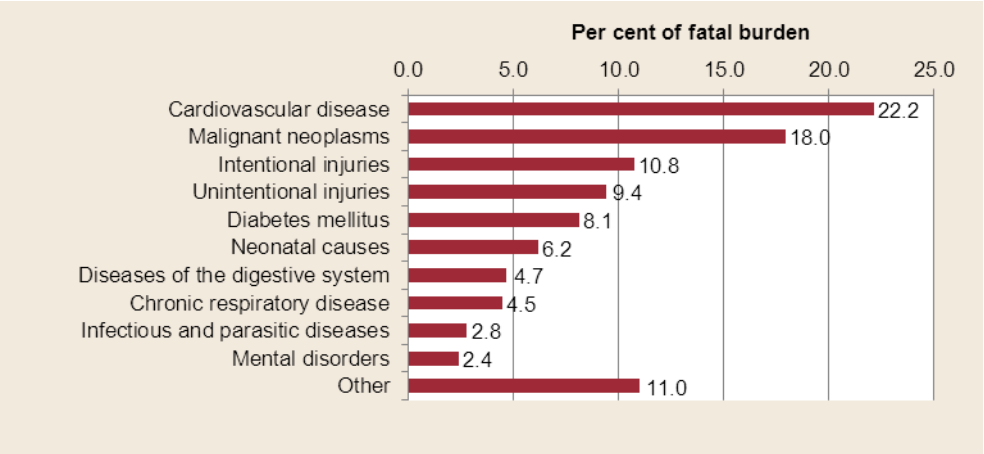
Years of life lost to premature mortality, or fatal burden, caused 43.8 per cent of the burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander population. The largest proportion of fatal burden occurred in the 0–4 year age group with a large proportion also occurring in the age groups around 50 years. The fatal burden in the non-Indigenous population is considerably different with the majority of burden falling in the oldest age groups reflecting the older age profile of the population.

Figure 9 Distribution of fatal burden by sex and age group



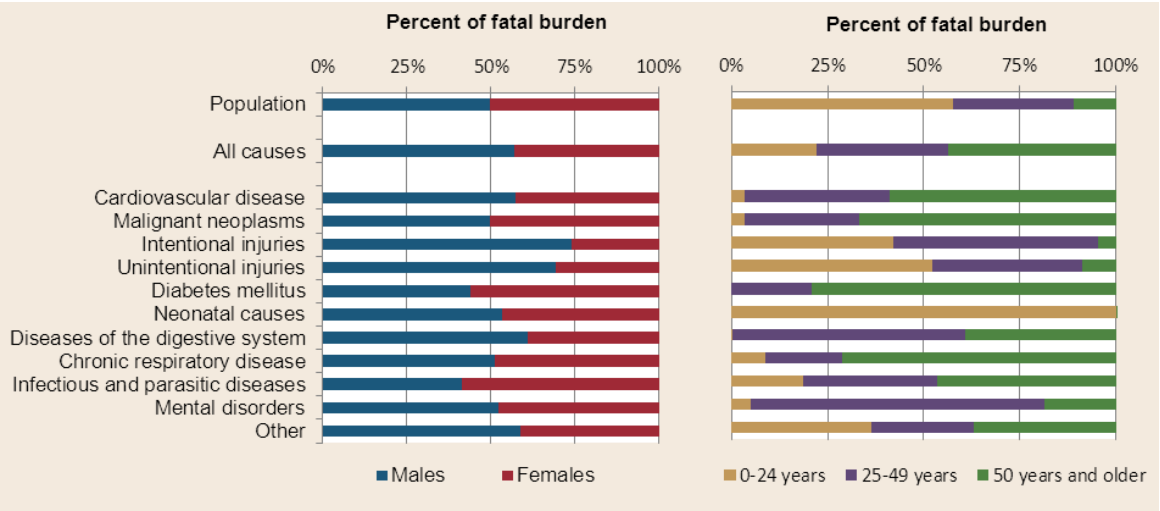
Of the broad cause groups, cardiovascular disease caused the largest proportion of the fatal burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander population (22.2 per cent). Cancers caused a further 18 per cent and intentional injuries 10.8 per cent (Figure 10).

Figure 10 Leading broad causes of fatal burden in Aboriginal and Torres Strait Islander people by sex



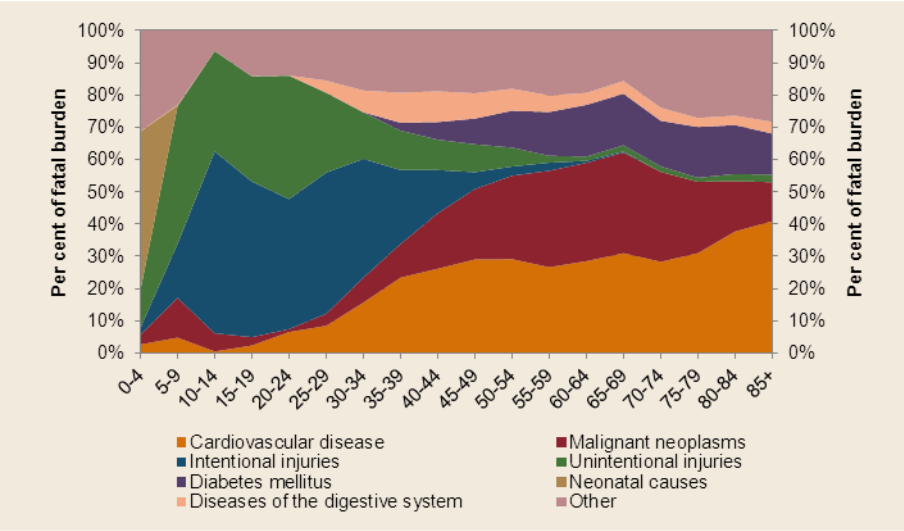
Queensland's male Aboriginal and Torres Strait Islander population account for a disproportionate amount of fatal burden. Comprising 49.7 per cent of the population they experience 57.1 per cent of the fatal burden (Figure 11). Of the broad cause groups, intentional injuries, unintentional injuries, diseases of the digestive system and cardiovascular diseases are dominated by male fatal burden.

Figure 11 Leading broad causes of fatal burden of disease and injury in Aboriginal and Torres Strait Islander people by sex and age group



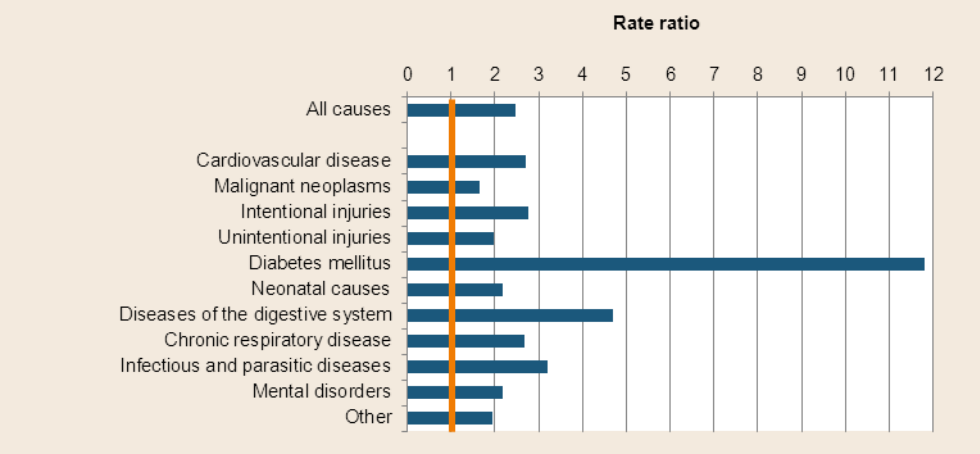
The distribution of the fatal burden by broad cause group differs by age (Figure 12). In the earliest years, neonatal causes were responsible for the largest proportion of fatal burden. In older children and young adults, intentional and unintentional injuries are the prevailing cause. In later adulthood, cardiovascular disease, cancers and diabetes become dominant causes of fatal burden.

Figure 12 Broad cause contribution to the fatal burden in Aboriginal and Torres Strait Islander people by age group



The all cause rate of fatal burden in Queensland's Aboriginal and Torres Strait Islanders people was 2.5 times that of non-Indigenous Queenslanders (Figure 13). There was a huge disparity in the rate of fatal burden due to diabetes with Aboriginal and Torres Strait Islander people having a rate 11.8 times that of non-Indigenous Queenslanders. This is due to the much higher incidence rate and younger age distribution of Aboriginal and Torres Strait Islander diabetes deaths.

Figure 13 Queensland Aboriginal and Torres Strait Islander to non-Indigenous fatal burden rate ratio by broad cause group



Ischaemic heart disease was the specific cause responsible for the greatest proportion of fatal burden in Aboriginal and Torres Strait Islander people causing almost double the number of years of life lost to premature mortality than the second leading cause of type 2 diabetes (Table 3). While ischaemic heart disease was the leading specific cause for both males and females, the rate was around one-third higher in males than females. For males, the second leading specific cause of fatal burden was suicide and self-inflicted injuries which caused 9.4 per cent of the male and 4.0 per cent of the female fatal burden. Fatal diabetes burden was the second leading specific cause in females

and third in males causing 9.5 per cent and 5.7 per cent of burden respectively, although the rate was the same in males and females.

Table 3 Leading specific causes of fatal burden by sex

	Males			Females			Persons		
	YLL	% of total	ASR	YLL	% of total	ASR	YLL	% of total	ASR
All causes	6495	100	171.4	4875	100	123.8	11370	100	145.6
Ischaemic heart disease	999	15.4	33.0	630	12.9	21.4	1628	14.3	26.8
Type 2 diabetes	372	5.7	15.5	461	9.5	15.5	833	7.3	15.4
Suicide and self-inflicted injuries	611	9.4	8.4	195	4.0	2.3	806	7.1	5.3
Lung cancer	297	4.6	10.9	242	5.0	7.1	539	4.7	8.8
Road traffic accidents	349	5.4	4.5	182	3.7	2.3	531	4.7	3.4
Homicide and violence	298	4.6	3.7	121	2.5	1.6	420	3.7	2.6
Stroke	182	2.8	8.0	187	3.8	7.1	369	3.2	7.5
Low birth weight	161	2.5	1.0	159	3.3	1.1	320	2.8	1.0
Chronic obstructive pulmonary disease (COPD)	156	2.4	8.5	137	2.8	5.0	293	2.6	6.5
Other digestive system diseases	119	1.8	3.1	88	1.8	1.9	206	1.8	2.4
Other	2952	45.4	74.9	2472	50.7	58.8	5424	47.7	65.9

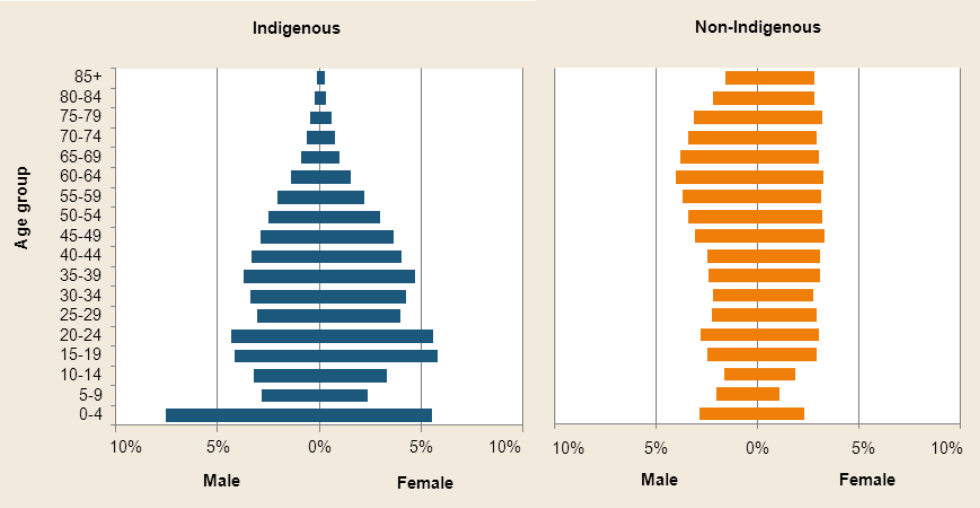
Non-fatal burden: years of life lost to disability

Non-fatal burden of disease and injury can be measured in two ways, as an incidence-based measure, or a prevalence-based measure. In this study, non-fatal burden (or YLD) is based on incident cases and the impact of this incidence into the future. This non-fatal burden is added with fatal burden (YLL) to get total burden of disease and injury. Another way the non-fatal burden of disease and injury can be measured is with prevalent years of life lost to disability which can be interpreted as the current disability experience of a population.

Incident years lost to disability (YLD)

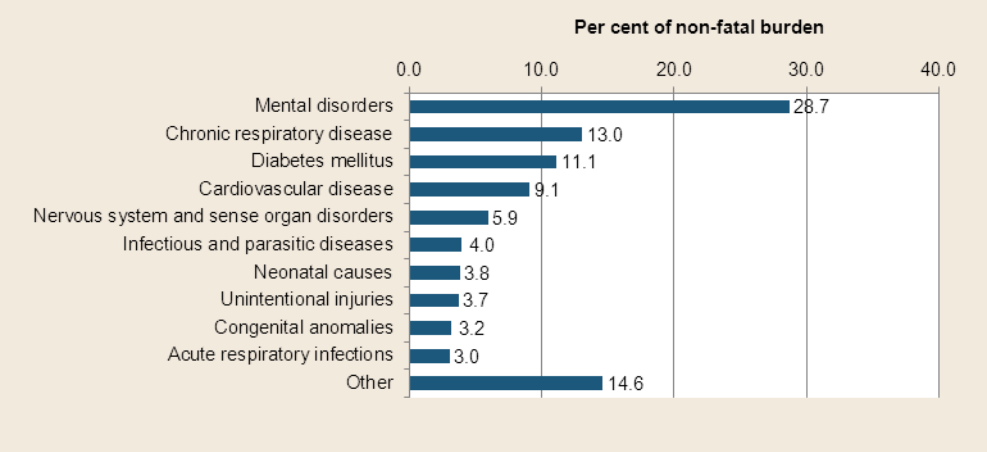
Consistent with the total burden and fatal burden, the non-fatal burden has a considerably younger distribution in the Aboriginal and Torres Strait Islander population compared to the non-Indigenous population. There are noticeable peaks in the proportion of non-fatal burden in the youngest age group 0–4 years and young people aged 15–24 years (Figure 14) driven first by the neonatal causes in infancy, and then the onset of mental illness in adolescence and young adulthood.

Figure 14 Distribution of non-fatal burden by sex and age group



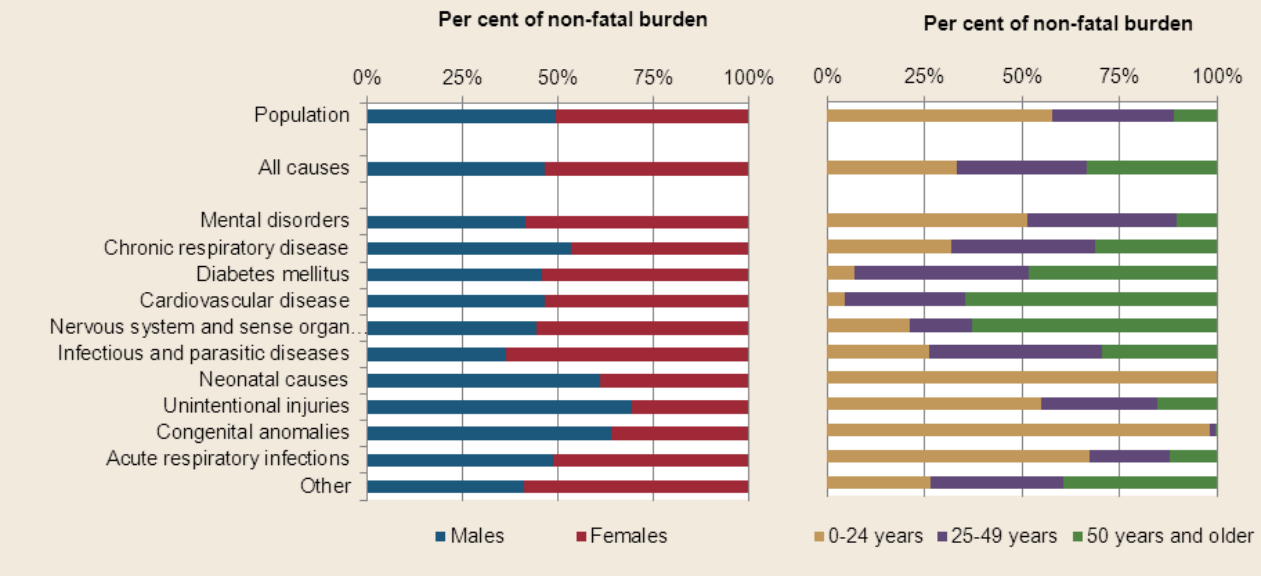
Mental disorders caused more than a quarter (28.7 per cent) of the non-fatal burden in Aboriginal and Torres Strait Islander people (Figure 15). Chronic respiratory disease and diabetes caused the second and third largest proportions (13.0 per cent and 11.1 per cent of non-fatal burden respectively).

Figure 15 Leading broad causes of non-fatal burden in Aboriginal and Torres Strait Islander people



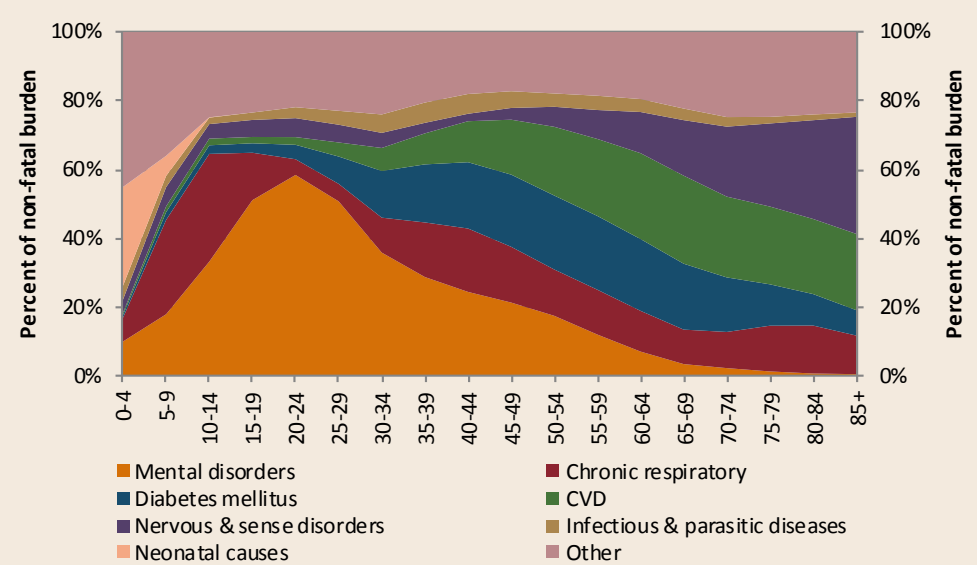
Non-fatal burden of disease and injury is fairly evenly distributed between the sexes with slightly more occurring in females than would be expected given the population distribution (Figure 16).

Figure 16 Leading broad causes of non-fatal burden of disease and injury in Queensland Aboriginal and Torres Strait Islander people by sex and age group



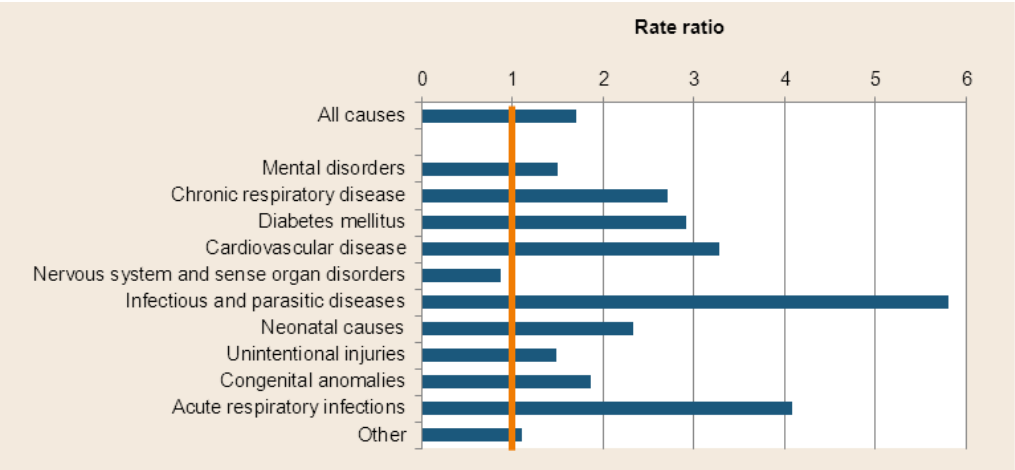
In young children, non-fatal burden is dominated by neonatal causes, mental disorders and chronic respiratory disease (Figure 17). Mental disorders contribute more than half of the non-fatal burden in those aged 15–29 years. The contribution of mental disorders to non-fatal burden decreases from its peak in the 20–24 year age group, when diabetes, chronic respiratory disease and cardiovascular diseases become more dominant. In those aged 75 years and older, nervous system and sense organ disorders contribute the largest proportion of non-fatal burden.

Figure 17 **Broad cause contribution to the non-fatal burden in Aboriginal and Torres Strait Islander people by age group**



Queensland's Aboriginal and Torres Strait Islander people experienced a rate of non-fatal burden that was 70 per cent higher than the non-Indigenous population (Figure 18). Among the 10 leading broad cause groups, the largest rate ratio was for infectious and parasitic diseases where the rate in Aboriginal and Torres Strait Islander people was 5.8 times that of the non-Indigenous population.

Figure 18 **Queensland Aboriginal and Torres Strait Islander to non-Indigenous non-fatal burden rate ratio by broad cause group**



Of the specific causes, anxiety and depression were responsible for the largest proportion of non-fatal burden in Aboriginal and Torres Strait Islander people (Table 4). It alone caused almost one-quarter of female non-fatal burden (24.5 per cent) and 10.9 per cent of male non-fatal burden. The rate in females was 2.6 times that of males. Type 2 diabetes was the second leading specific cause of non-fatal burden in both males and females causing 10.8 per cent of the non-fatal burden in the Aboriginal and Torres Strait Islander population at a similar rate in males and females.

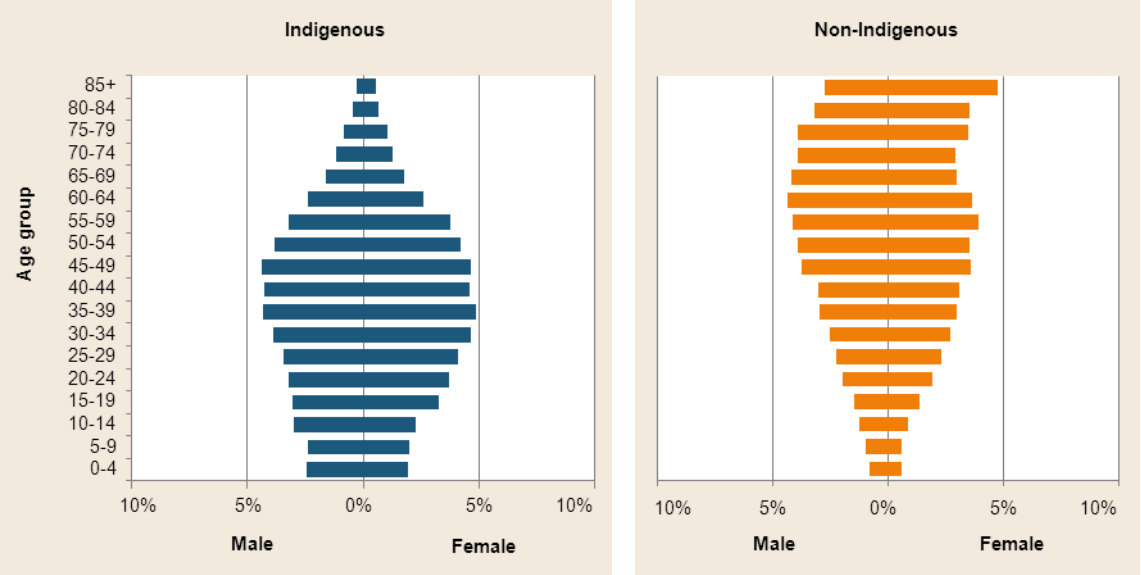
Table 4 Leading specific causes of non-fatal burden by sex

	Males			Females			Persons		
	YLD	% of total	ASR	YLD	% of total	ASR	YLD	% of total	ASR
All causes	6809	100	114.0	7770	100	124.4	14579	100	119.3
Anxiety and depression	745	10.9	9.3	1904	24.5	24.1	2649	18.2	16.8
Type 2 diabetes	716	10.5	15.7	856	11.0	17.0	1571	10.8	16.4
Asthma	369	5.4	3.0	486	6.3	4.6	855	5.9	3.8
Chronic obstructive pulmonary disease (COPD)	480	7.1	10.1	300	3.9	5.9	780	5.4	7.9
Ischaemic heart disease	262	3.8	7.2	325	4.2	8.1	587	4.0	7.7
Schizophrenia	250	3.7	2.7	167	2.2	2.2	417	2.9	2.5
Alcohol dependence and harmful use (including alcoholic cirrhosis)	218	3.2	2.7	79	1.0	0.9	298	2.0	1.7
Stroke	128	1.9	4.2	162	2.1	4.2	290	2.0	4.2
Otitis media	140	2.1	1.2	138	1.8	1.3	278	1.9	1.3
Other chronic respiratory diseases	169	2.5	4.8	95	1.2	2.8	264	1.8	3.7
Other	3333	48.9	53.1	3257	41.9	53.3	6590	45.2	53.3

Prevalent years lost to disability (YLD)

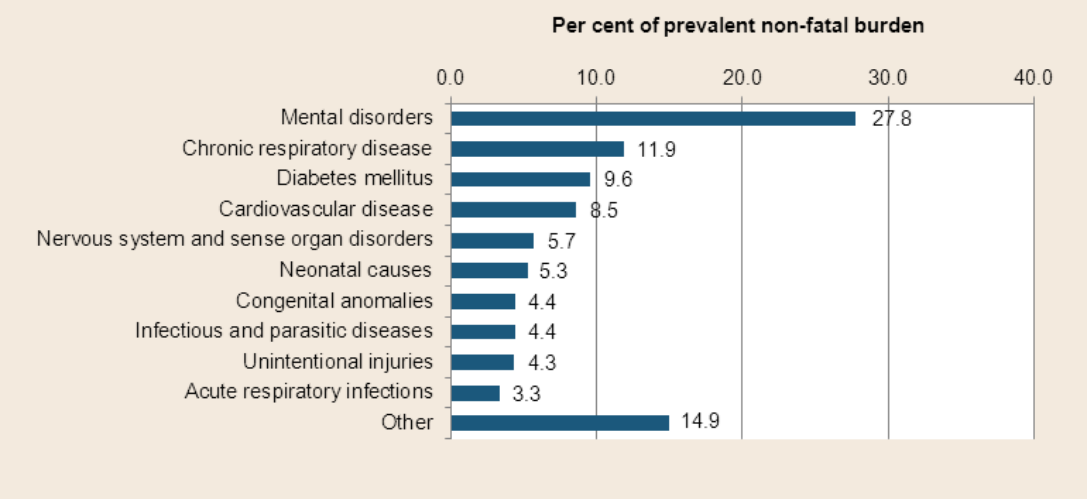
Compared to incident YLD, prevalent YLD sees a shift in the distribution of burden to the older age groups. For Queensland's Aboriginal and Torres Strait Islander population in 2007 this meant the bulk of prevalent non-fatal burden occurred from around age 30 to 49 years (Figure 19).

Figure 19 Distribution of prevalent non-fatal burden by sex and age group



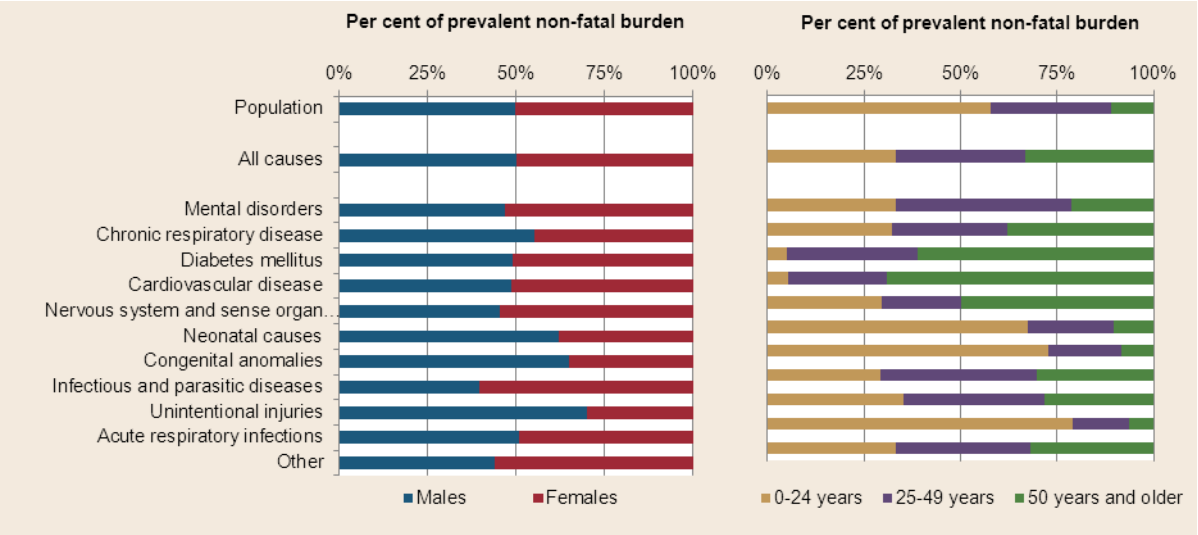
Mental disorders were the leading broad cause of prevalent non-fatal burden causing more than one-quarter of the total prevalent non-fatal burden (Figure 20). Chronic respiratory disease, diabetes and cardiovascular disease were the following three leading broad causes, together causing 30 per cent of prevalent non-fatal burden.

Figure 20 Leading broad causes of prevalent non-fatal burden in Aboriginal and Torres Strait Islander people



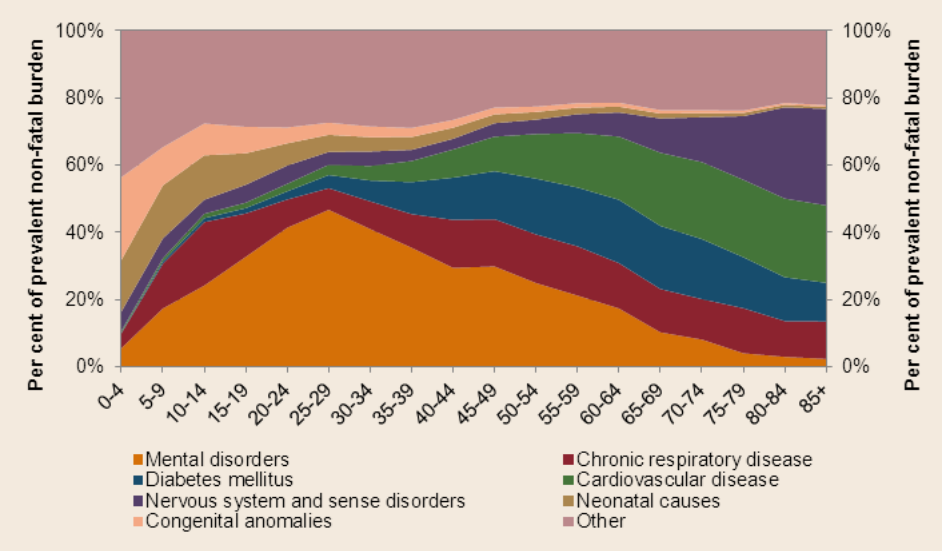
Prevalent non-fatal burden was shared equally between Queensland's Aboriginal and Torres Strait Islander males and females (Figure 21). However, more than 60 per cent of the prevalent non-fatal burden from unintentional injuries, congenital abnormalities and neonatal causes is attributed to males.

Figure 21 Leading broad causes of prevalent non-fatal burden of disease and injury in Queensland Aboriginal and Torres Strait Islander people by sex and age group



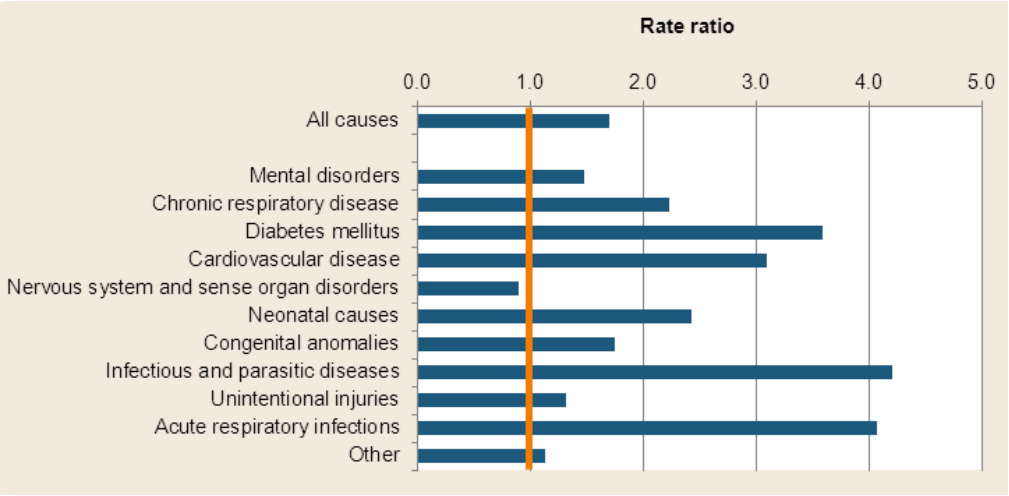
Broadly, the incident and prevalent non-fatal burden distribution by age and broad cause look similar however there are some noticeable differences. The contribution of mental disorders peaks at 46.7 per cent of non-fatal burden in the 25–29 year age group (rather than 58.4 per cent in the 20–24 year age group from incident non-fatal burden). In addition, congenital anomalies and neonatal causes contribute prevalent non-fatal burden at all ages, but only contribute incident non-fatal burden in those less than five years of age.

Figure 22 **Broad cause contribution to the prevalent non-fatal burden in Aboriginal and Torres Strait Islander people by age group**



The rate of prevalent non-fatal burden in the Queensland Aboriginal and Torres Strait Islander population is 70 per cent higher than the rate in the non-Indigenous population. Only the rate of prevalent non-fatal burden from nervous system and sense organ disorders is lower in the Indigenous population. The largest differentials were for infectious and parasitic diseases, acute respiratory infections and diabetes where the rate ratios were 4.2, 4.1 and 3.6 respectively.

Figure 23 **Queensland Aboriginal and Torres Strait Islander to non-Indigenous non-fatal burden rate ratio by broad cause group**



Anxiety and depression were the leading specific cause of prevalent non-fatal burden of disease and injury (Table 5). They alone caused 16.4 per cent of the prevalent non-fatal burden in Queensland's Aboriginal and Torres Strait Islander people. The contribution of anxiety and depression to the total prevalent non-fatal burden was considerably higher in the female population where it caused one-fifth of the burden compared to the male population where it contributed one-tenth. Despite these differences, anxiety and depression were the leading cause of non-fatal burden in both males and females. Type 2 diabetes was the second leading specific cause in males and females while asthma was the third leading cause overall and in females, and COPD was the third leading specific cause in males.

Table 5 Leading specific causes of prevalent non-fatal burden by sex

	Males			Females			Persons		
	PYLD	% of total	ASR	PYLD	% of total	ASR	PYLD	% of total	ASR
All causes	6205	100	135.6	6680	100	132.6	12885	100	133.7
Anxiety and depression	669	10.8	12.4	1447	21.7	24.3	2116	16.4	18.5
Type 2 diabetes	554	8.9	16.5	632	9.5	16.5	1186	9.2	16.5
Asthma	281	4.5	3.5	388	5.8	5.4	669	5.2	4.5
Chronic obstructive pulmonary disease (COPD)	389	6.3	11.9	248	3.7	6.4	637	4.9	8.9
Ischaemic heart disease	214	3.4	7.6	256	3.8	8.0	470	3.6	7.8
Schizophrenia	228	3.7	4.2	155	2.3	3.0	383	3.0	3.6
Alcohol dependence and harmful use (including alcoholic cirrhosis)	219	3.5	3.4	90	1.4	1.3	309	2.4	2.3
Other chromosomal disorders	198	3.2	2.6	110	1.6	1.4	309	2.4	2.0
Low birth weight	169	2.7	2.2	125	1.9	1.6	293	2.3	1.9
Otitis media	136	2.2	1.3	133	2.0	1.3	270	2.1	1.3
Other	3148	50.7	70.0	3095	46.3	63.4	6242	48.4	66.3

Health adjusted life expectancy

It was estimated that a child born in Queensland in 2007 could expect on average to live 73.5 years of healthy life (or health adjusted life expectancy, HALE). An Aboriginal and/or Torres Strait Islander child born in Queensland in 2007 had a HALE 12.3 years less at 61.2 years. Aboriginal and Torres Strait Islander male HALE was 4.4 years less than females (59.0 years males, 63.4 years females). HALE by remoteness and discussion around the HALE gap and contributors to the gap is presented later in the report.

Broad cause disease and injury categories

Mental disorders

Mental disorders caused the greatest proportion of Queensland Aboriginal and Torres Strait Islander burden of disease and injury in 2007 (17.2 per cent) (Table 6). More than 90 per cent of the burden from mental disorders was non-fatal and as such, it contributes a greater proportion to all cause non-fatal burden (28.7 per cent) than fatal burden (2.4 per cent) (Table 6). Within this broad cause group, specific conditions including anxiety and depression, alcohol dependence and harmful use, and schizophrenia caused the greatest burden, responsible for 60 per cent, 11 per cent and 9 per cent of the mental disorder burden respectively. The quantity and rate of mental disorder burden peaked in young adults and caused almost half (47 per cent) of the total burden in those aged 15–24 years. The age profile of specific mental disorders varied with anxiety and depression contributing a large proportion of mental disorder burden in the young and middle-aged. Personality disorders and alcohol dependence and harmful use contributed a larger proportion in the older age groups (Figure 25). Females experienced a greater proportion of the mental disorder burden (57.8 per cent). This is because anxiety and depression incidence was higher in females. Males carried a larger proportion of burden from other mental disorders, alcohol dependence and harmful use, schizophrenia, and heroin and poly drug use (Figure 26).

Table 6 **Mental disorders: burden by specific cause as a proportion of burden**

Cause	% of non-fatal burden	% of fatal burden	% of total burden
All mental disorders	28.7	2.4	17.2
Anxiety and depression	18.2	0.0	10.2
Alcohol dependence and harmful use	2.0	1.7	1.9
Schizophrenia	2.9	0.0	1.6
Heroin or polydrug dependence and harmful use	1.3	0.6	1.0
Personality disorders	1.3	0.0	0.8
Other mental disorders	3.0	0.1	1.8

Figure 24 **Mental disorders: burden by specific cause, and as a proportion of total burden**

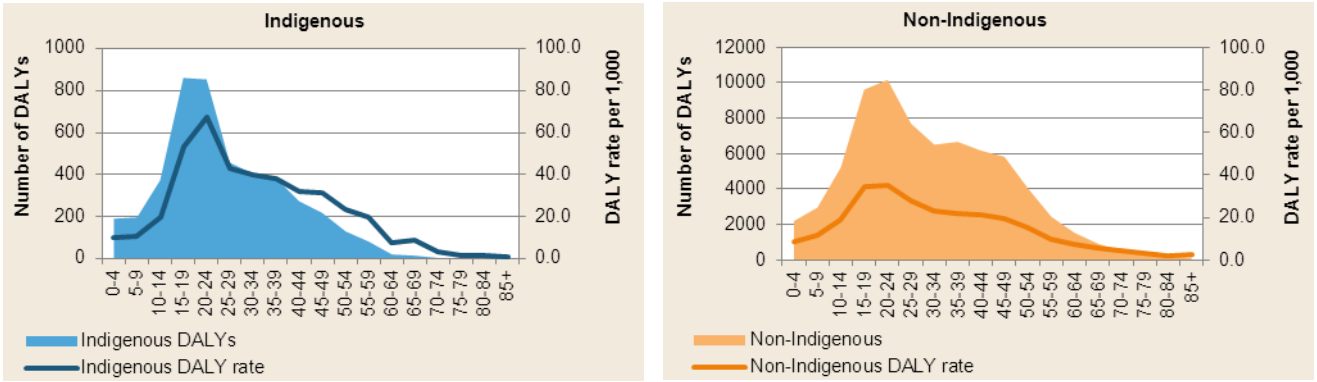


Figure 25 Mental disorders: burden by age group[1]

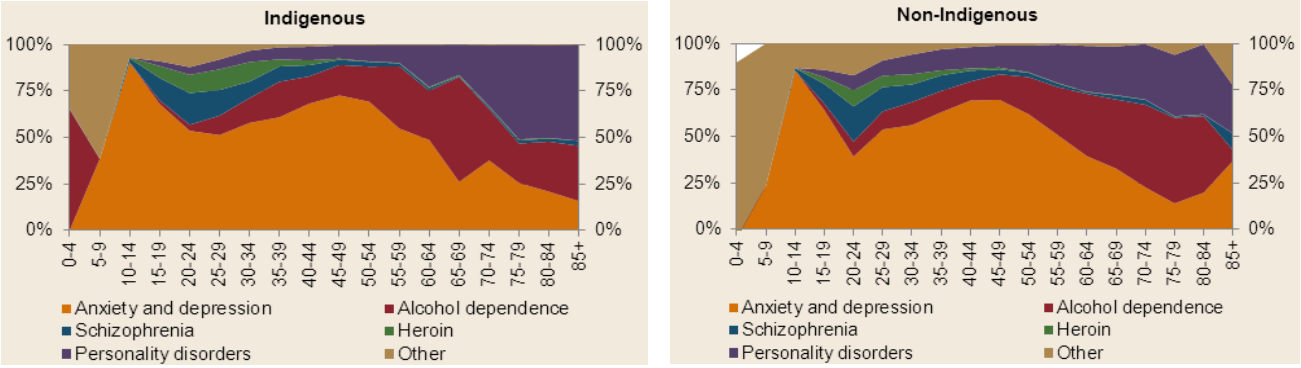
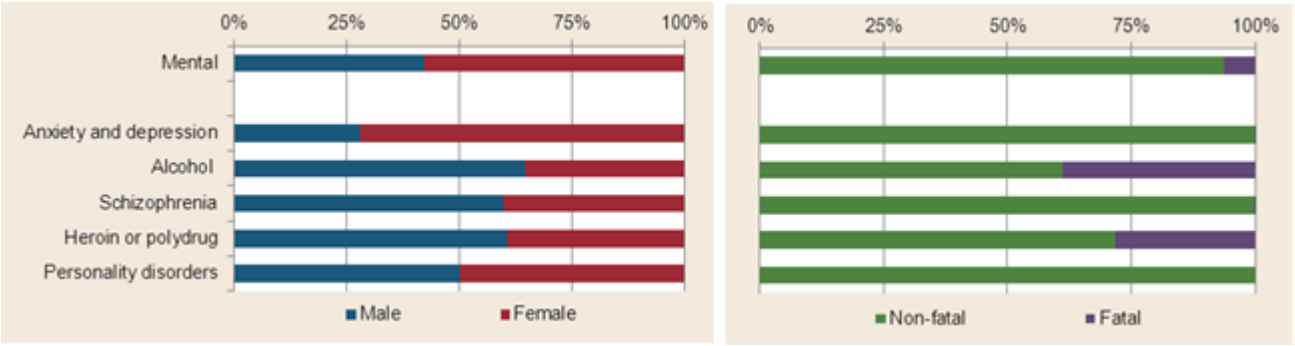


Figure 26 Mental disorders: burden by sex and outcome type



[1] Figure 25: the white section in the non-Indigenous mental disorder burden by age group graph is due to the alcohol dependence and harmful use estimate in the 0 age group being higher in the Indigenous results compared to the total Queensland, therefore non-Indigenous results return a negative value.

Cardiovascular disease

Cardiovascular diseases were responsible for 14.8 per cent of the total Queensland Aboriginal and Torres Strait Islander burden of disease and injury in 2007 (Table 7). Reflecting the fact that fatal outcomes make up the majority of cardiovascular disease burden, cardiovascular diseases caused 22.2 per cent of the fatal burden, but 9.1 per cent of the non-fatal burden. When comparing the rate of cardiovascular burden in the Aboriginal and Torres Strait Islander population against the non-Indigenous population it is clear cardiovascular diseases are of greater significance from a younger age in the Aboriginal and Torres Strait Islander population. The age distribution of the number of DALYs illustrates this younger age profile of cardiovascular disease with the peak occurring in the 45–49 year age group in the Aboriginal and Torres Strait Islander population and 85 years and older in the non-Indigenous population. In the youngest age group, inflammatory and rheumatic heart diseases contributed a large proportion to the Aboriginal and Torres Strait Islander cardiovascular disease burden (29.5 per cent and 26.9 per cent in 0–24 years olds respectively), while stroke was the dominant cause in this age group in the non-Indigenous population (47.3 per cent) with rheumatic heart disease contributing only 2.3 per cent. Ischaemic heart disease is the major cause of cardiovascular disease burden from 25 years onward (Figure 28). Overall, cardiovascular disease is fairly evenly distributed between the sexes with a slightly larger proportion of the burden being carried by males (53.7 per cent). Inflammatory and rheumatic heart diseases are the conditions with a noticeably different sex distribution (Figure 28). Females experienced 66.6 per cent of rheumatic heart disease burden and 33.3 per cent of the inflammatory heart disease burden. Cardiovascular disease burden is dominated by fatal outcomes except for peripheral vascular disease burden of which 90.7 per cent is due to non-fatal outcomes (Figure 28).

Table 7 **Cardiovascular disease: burden by specific cause as a proportion of burden**

Cause	% of non-fatal burden	% of fatal burden	% of total burden
Cardiovascular disease	9.1	22.2	14.8
Ischaemic heart disease	4.0	14.3	8.5
Stroke	2.0	3.2	2.5
Inflammatory heart disease	0.7	1.5	1.0
Peripheral vascular disease	1.3	0.2	0.8
Rheumatic heart disease	0.6	1.0	0.8
Other CVD	0.4	1.9	1.1

Figure 27 **Cardiovascular disease: burden by age group, Indigenous and non-Indigenous Queenslanders**

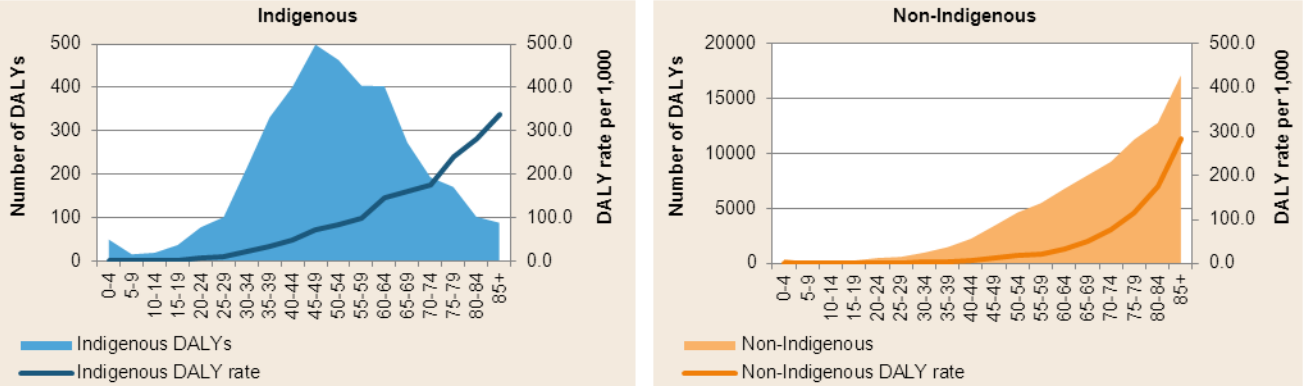


Figure 28 **Cardiovascular disease: burden in Aboriginal and Torres Strait Islander people by specific cause and age group**

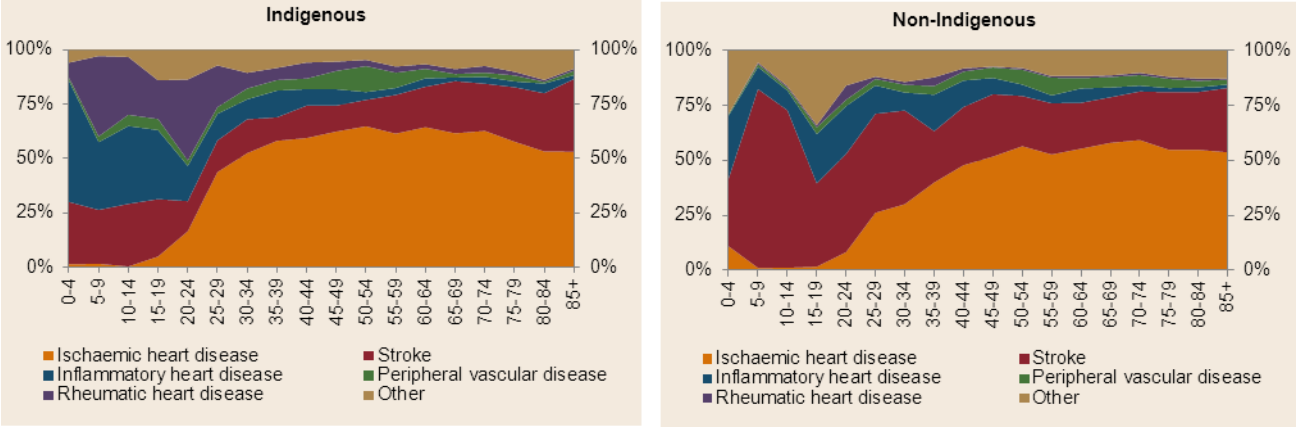
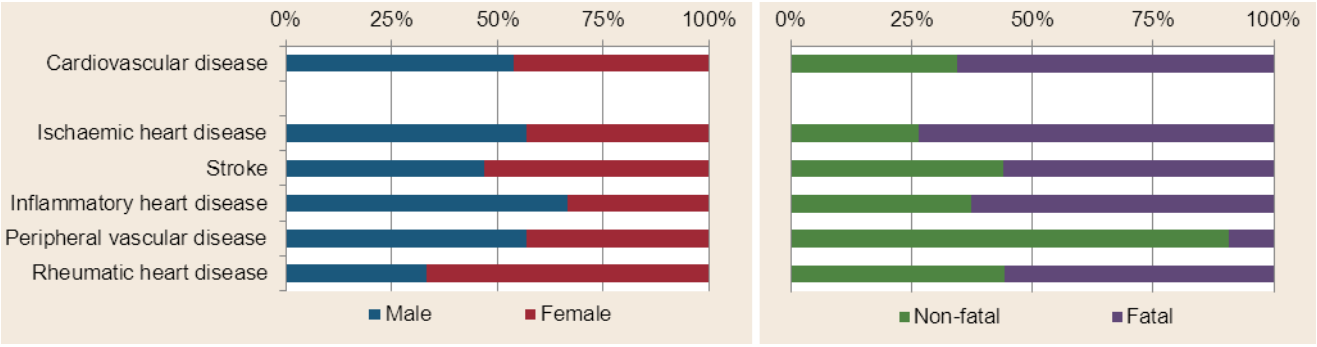


Figure 29 **Cardiovascular disease: burden in Aboriginal and Torres Strait Islander people by sex and outcome type**



Diabetes

Diabetes mellitus was the third leading broad cause of burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people in 2007. Type 2 diabetes was responsible for 9.3 per cent of the total burden of disease and injury and type 1 only 0.5 per cent (Table 8). The rate of diabetes burden in Aboriginal and Torres Strait Islander people in Queensland is considerably higher than the rate in non-Indigenous Queenslanders from a very young age with the differential becoming more obvious with age (Figure 30). The bulk of the diabetes burden sat in the 35 to 64 year age range while the peak in the non-Indigenous population occurred around 10 to 15 years later. Just over half of the diabetes burden was in females (54.9 per cent) (Figure 32). Type 2 diabetes burden was dominated by non-fatal outcomes (65.3 per cent) while a greater proportion of type 1 diabetes burden was due to fatal outcomes (65.7 per cent) (Figure 32).

Table 8 **Diabetes: burden by specific cause as a proportion of burden**

Cause	% of non-fatal burden	% of fatal burden	% of total burden
Diabetes mellitus	11.1	8.1	9.8
Type 2 diabetes	10.8	7.3	9.3
Type 1 diabetes	0.3	0.8	0.5

Figure 30 **Diabetes: burden by age group, Indigenous and non-Indigenous Queenslanders**

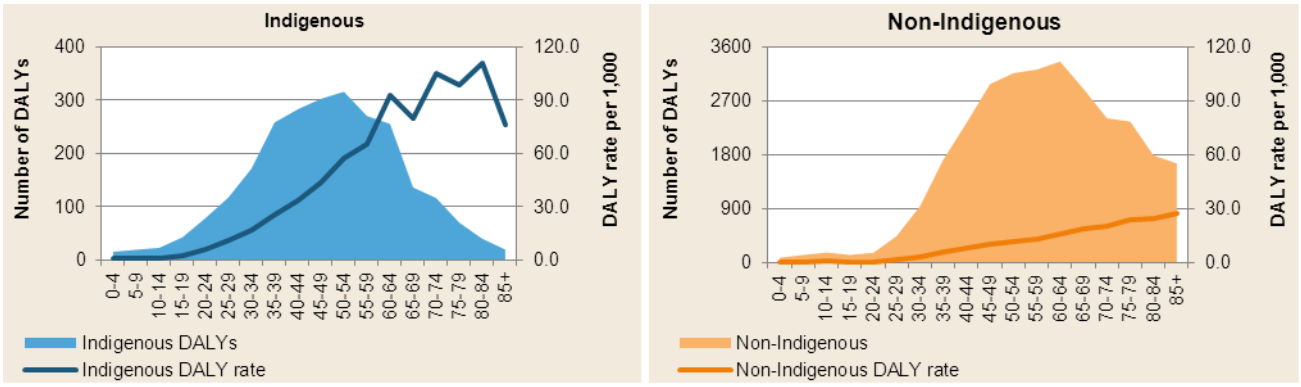


Figure 31 **Diabetes: burden in Aboriginal and Torres Strait Islander people by specific cause and age group**

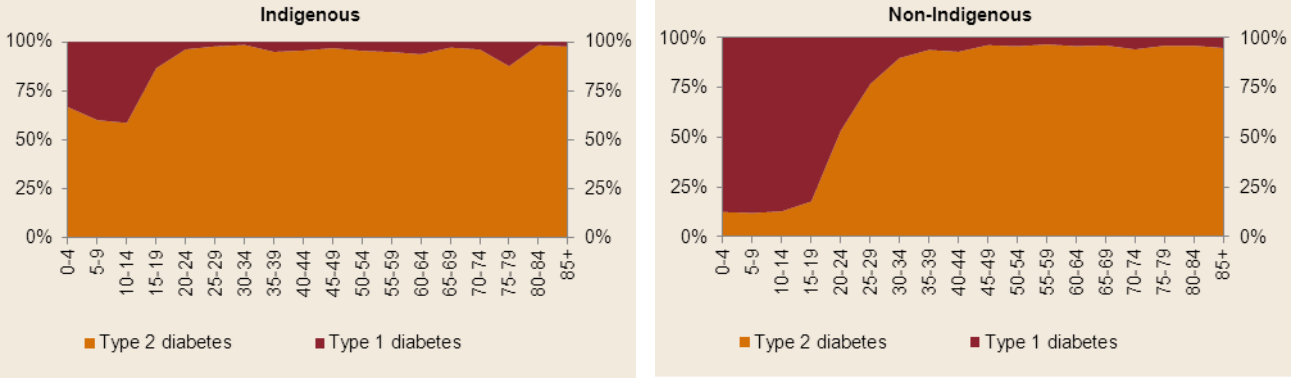
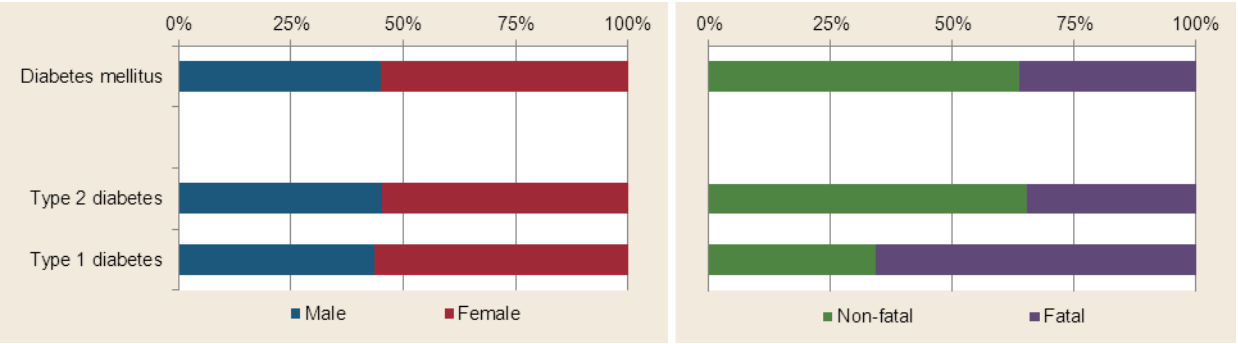


Figure 32 **Diabetes: burden in Aboriginal and Torres Strait Islander people by sex and outcome type**



Chronic respiratory diseases

Chronic respiratory disease caused 9.3 per cent of the burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people in 2007 (Table 9). Chronic obstructive pulmonary disease (COPD) and asthma cause the majority of chronic respiratory disease burden. The rate of chronic respiratory disease was higher in the Aboriginal and Torres Strait Islander population compared to the non-Indigenous population at every age except the 0–4 years age group where the rate was close to equal (Figure 33). In both populations there was a peak at 5–9 years (due to onset of asthma) followed by a subsequent peak at 35–39 years in Aboriginal and Torres Strait Islander people, and 75–79 years in non-Indigenous Queenslanders. Asthma burden predominantly affects the younger age groups and is the dominant cause of chronic respiratory disease for this age group, while from 25 years onwards COPD becomes the major cause (Figure 34). Males and females share the chronic respiratory burden almost equally with females experiencing slightly more of the asthma burden and males more of the COPD burden (Figure 35).

Table 9 **Chronic respiratory disease: burden by specific cause as a proportion of burden**

Cause	% of non-fatal burden	% of fatal burden	% of total burden
Chronic respiratory disease	13.0	4.5	9.3
COPD	5.4	2.6	4.1
Asthma	5.9	0.7	3.6
Other chronic respiratory	1.8	1.2	1.5

Figure 33 **Chronic respiratory disease: burden by age group, Indigenous and non-Indigenous Queenslanders**

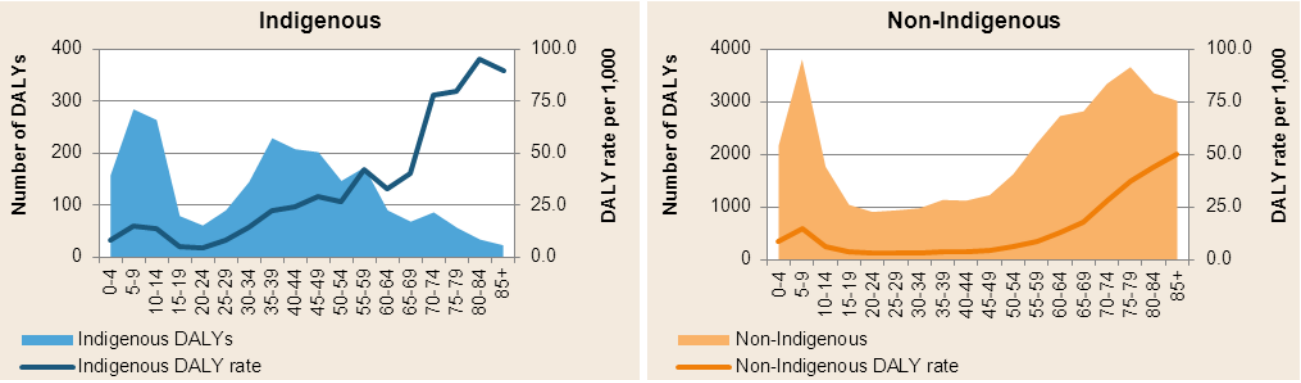


Figure 34 **Chronic respiratory disease: burden in Aboriginal and Torres Strait Islander people by specific cause and age group**

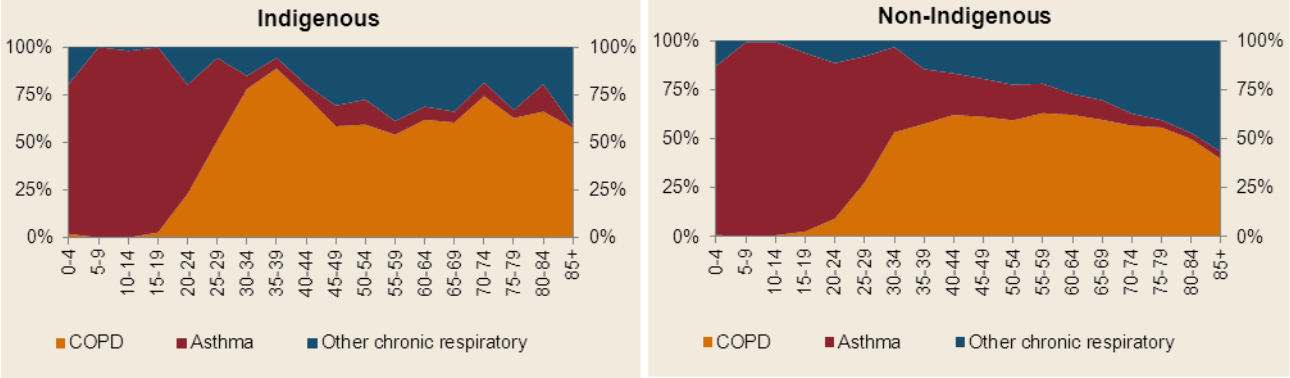
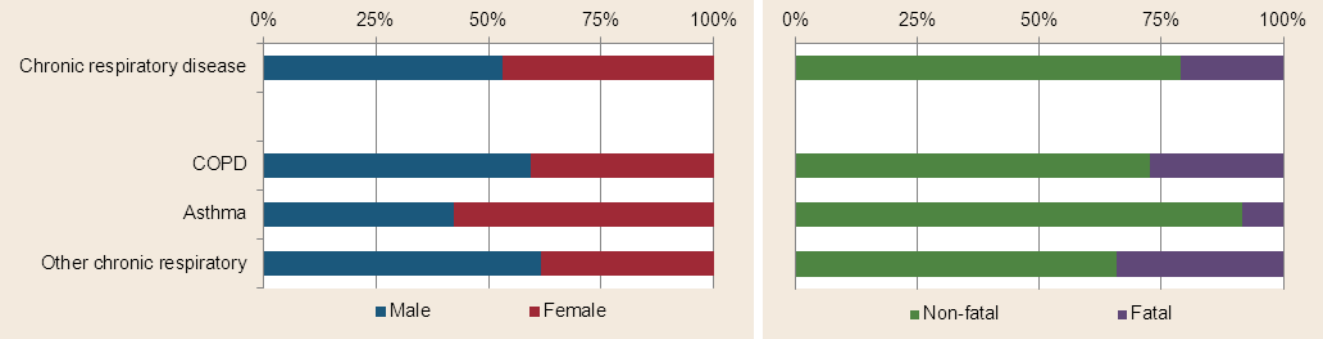


Figure 35 **Chronic respiratory disease: burden in Aboriginal and Torres Strait Islander people by sex and outcome type**



Cancers

Cancers (malignant neoplasms) were the fifth leading broad cause of burden in Queensland's Aboriginal and Torres Strait Islander people in 2007. Of the total burden of disease and injury, cancers caused 8.5 per cent (Table 10) which is considerably less than the 18.7 per cent in the non-Indigenous population. Despite this, the rate of cancer burden in the Aboriginal and Torres Strait Islander population was 1.4 times that of the non-Indigenous population. Cancers make up almost one-fifth of total fatal burden, but only 1.2 per cent of non-fatal burden. Lung cancer alone caused one-quarter of the cancer burden, while breast cancer was the second leading cancer causing almost 10 per cent of cancer burden. The rate of cancer burden peaks around 15 years earlier in Aboriginal and Torres Strait Islander people compared to non-Indigenous Queenslanders. Overall, the burden from cancers was evenly distributed between the sexes, however this varied widely between cancer types, for example males experienced 85.4 per cent of oesophageal cancer and 16.1 per cent of gall bladder cancer. The majority of cancer burden was due to fatal outcomes and this was the case across all major cancer types.

Table 10 **Cancer: burden by specific cause as a proportion of burden**

Cause	% of non-fatal burden	% of fatal burden	% of total burden
Malignant neoplasms	1.2	18.0	8.5
Lung cancer	0.1	4.7	2.1
Breast cancer	0.2	1.6	0.8
Colorectal cancer	0.1	1.3	0.6
Mouth and oropharynx cancers	0.2	1.1	0.6
Oesophagus cancer	0.0	0.9	0.4
Other cancers	0.6	8.3	4.0

Figure 36 **Cancers: burden by age group, Indigenous and non-Indigenous Queenslanders**

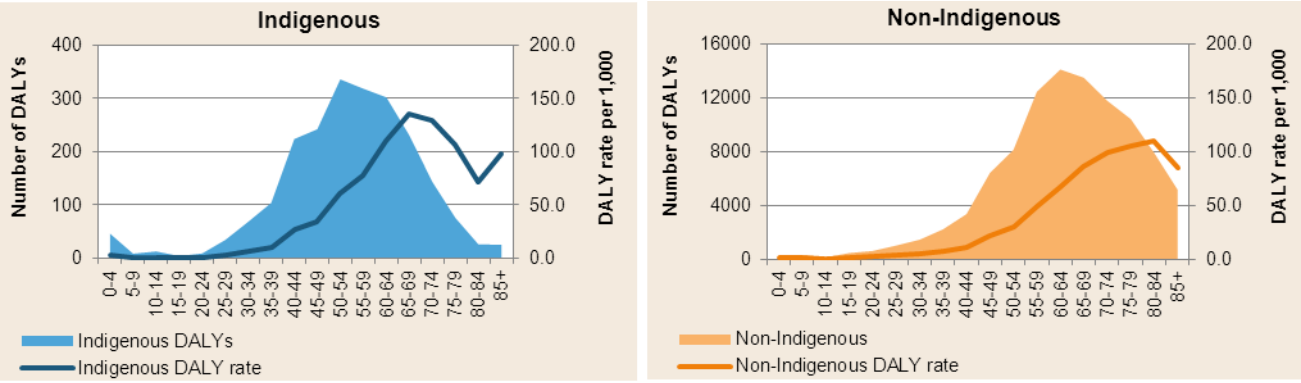


Figure 37 **Cancers: burden in Aboriginal and Torres Strait Islander people by specific cause and age group**

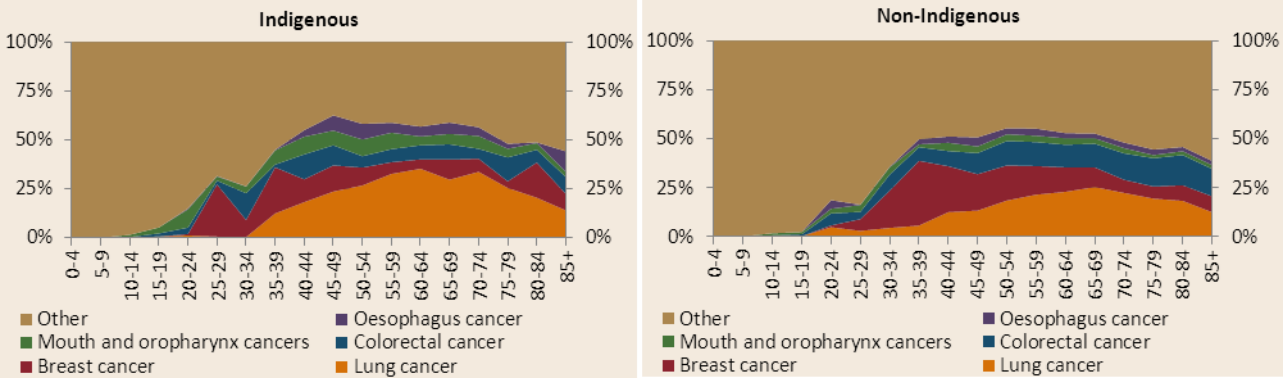
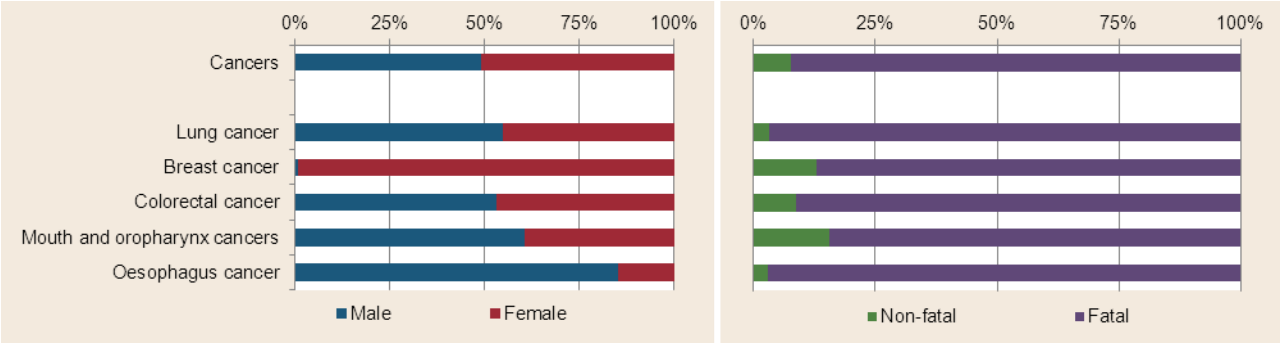


Figure 38 **Cancers: burden in Aboriginal and Torres Strait Islander people by sex and burden type**



Unintentional injuries

Unintentional injuries caused 6.2 per cent of the total Queensland Aboriginal and Torres Strait Islander burden with road traffic accidents being the largest contributor to unintentional injury (Table 11). The rate of unintentional injury peaked in the oldest age group (85 years and older) in both the Aboriginal and Torres Strait Islander and the non-Indigenous populations, with two lesser peaks at young adulthood and early childhood. In the younger age groups road traffic accidents are the dominant cause of unintentional injury with falls becoming more important at older ages. Males contribute the majority of unintentional injury and this is the case across the leading specific types of the category. Overall two-thirds of the unintentional burden was due to fatal causes. However, among the leading specific types of injury, non-fatal outcomes caused the majority of burden for falls, fires, burns and scalds, and striking and crushing injuries.

Table 11 **Unintentional injury: burden by specific cause as a proportion of burden**

Cause	% of non-fatal burden	% of fatal burden	% of total burden
Unintentional injuries	3.7	9.4	6.2
Road traffic accidents	0.5	4.7	2.3
Falls	0.8	0.5	0.7
Suffocation and foreign bodies	0.1	1.0	0.5
Fires, burns and scalds	0.5	0.4	0.4
Striking and crushing	0.6	0.1	0.4
Other unintentional injuries	1.1	2.7	1.8

Figure 39 **Unintentional injury: burden by age group, Indigenous and non-Indigenous Queenslanders**

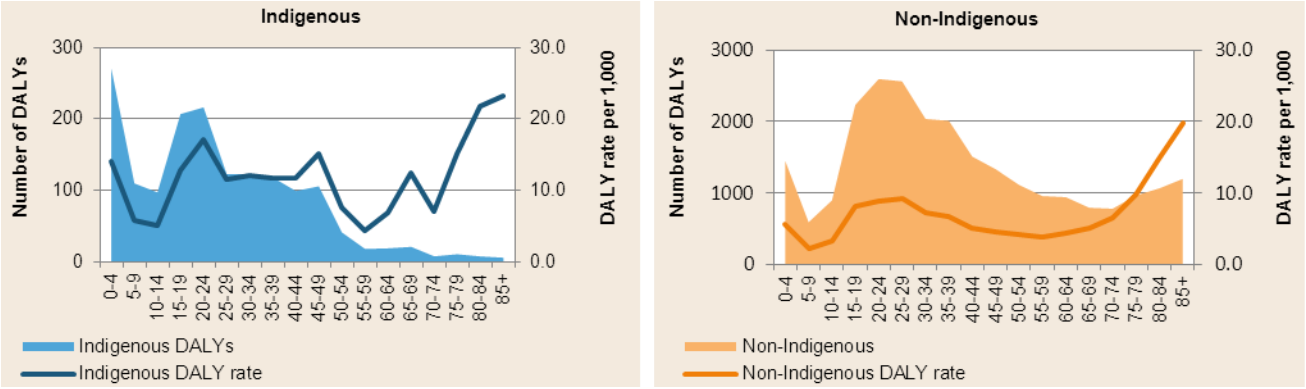


Figure 40 **Unintentional injury: burden in Aboriginal and Torres Strait Islander people by specific cause and age group**

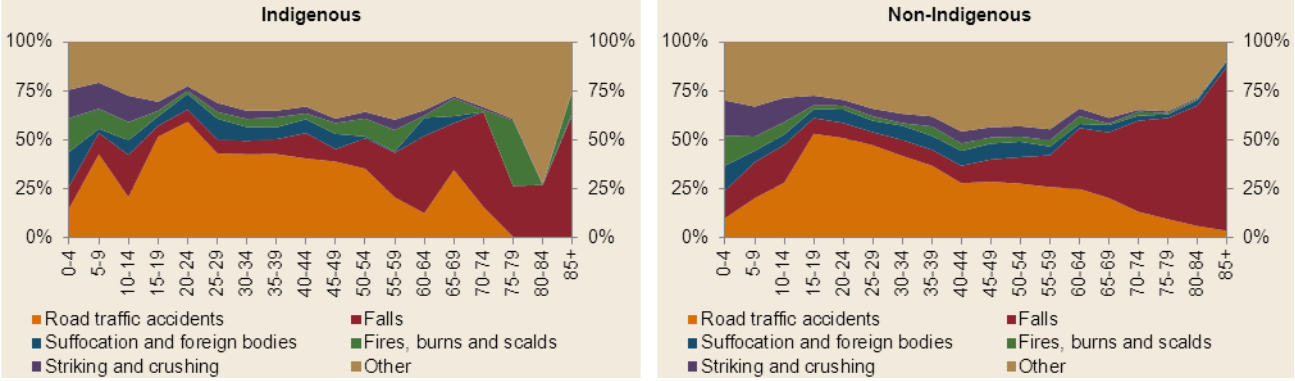
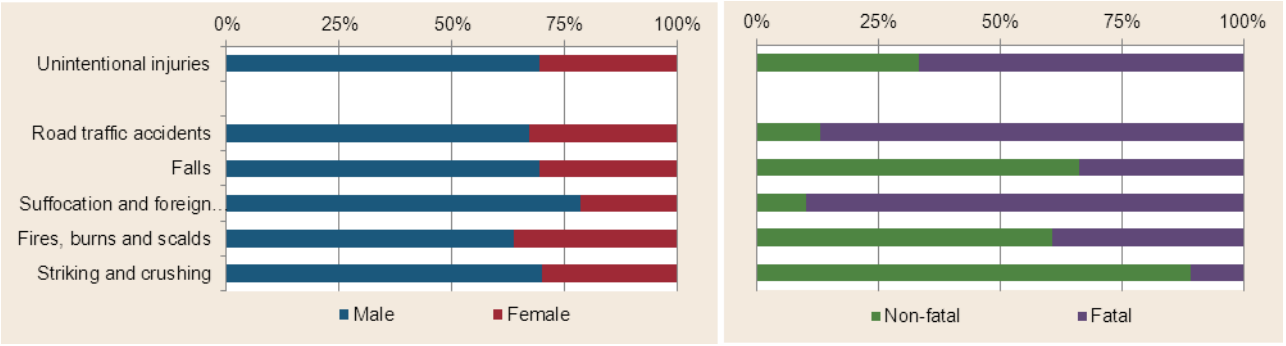


Figure 41 **Unintentional injury: burden in Aboriginal and Torres Strait Islander people by sex and outcome type**



Intentional injuries

Intentional injuries caused 5.4 per cent of the total burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander population in 2007 (Table 12). More than half of this burden was due to suicide and injury, and the remaining 42 per cent was due to homicide and violence. Intentional injury burden peaked in early adulthood with almost 50 per cent of the total intentional injury burden occurring between ages 20 and 34 years. In the non-Indigenous population, the proportion of intentional injury caused by homicide and violence reduced at each age while in the Aboriginal and Torres Strait Islander population homicide and violence generally contributed a growing proportion with age. Males carried the largest proportion of intentional injury burden. Nearly all suicide and self-inflicted injury was due to fatal outcomes (98.8 per cent) while almost one-third of homicide and violence burden was non-fatal.

Table 12 **Intentional injury: burden by specific cause as a proportion of burden**

Cause	% of non-fatal burden	% of fatal burden	% of total burden
Intentional injuries	1.3	10.8	5.4
Suicide and self-inflicted injuries	0.1	7.1	3.1
Homicide and violence	1.2	3.7	2.3

Figure 42 **Intentional injury: burden by age group, Indigenous and non-Indigenous Queenslanders**

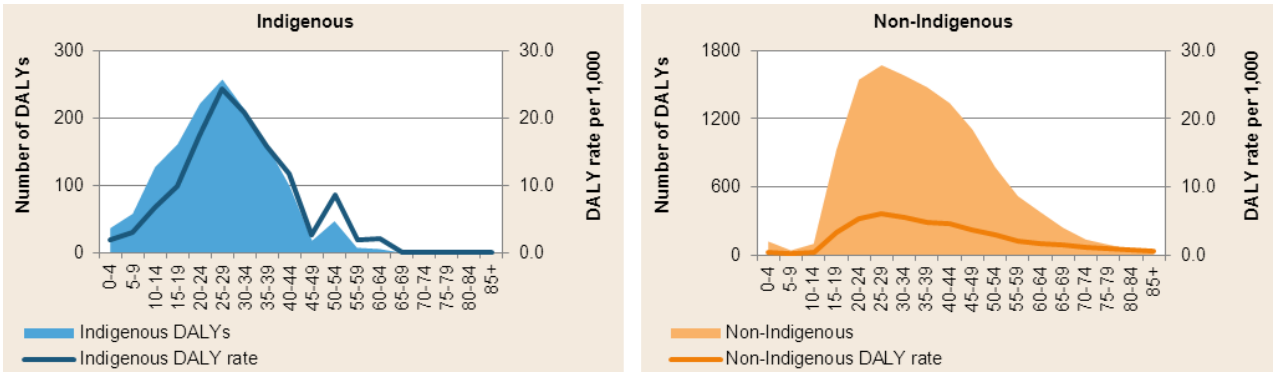
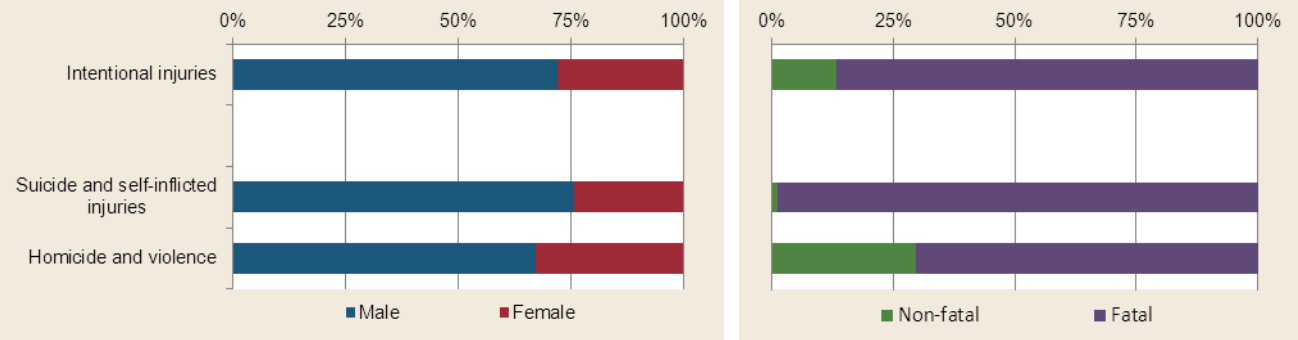


Figure 43 **Intentional injury: burden in Aboriginal and Torres Strait Islander people by specific cause and age group**

Figure 44 **Intentional injury: burden in Aboriginal and Torres Strait Islander people by sex and outcome type**



Risks to health and their contribution to burden of disease and injury

Overview

Understanding the impact of modifiable risk factors on the burden of disease and injury is essential for informing disease and injury prevention efforts. This chapter outlines the contribution of 11 modifiable risk factors to the Queensland Aboriginal and Torres Strait Islander burden of disease and injury in 2007.

The risk factors included in this analysis are obviously not exhaustive, but are based on the risk factors included in the *2003 National Indigenous burden of disease study* (Vos, et al., 2007). Exposure definitions and definitions of theoretical minimum exposure are outlined in *The Burden of Disease and Injury in Australia, 2003* (Begg, et al., 2007). For further information regarding calculation of comparative risk assessment estimates see Appendix 3 (Vos et al. 2007, and Begg et al., 2007).

Risk factor exposure definitions

Risk factor	Definition
High body mass	Body mass index measured as $kg/m^{2.}$
Tobacco	Past smoking, current daily smoking, passive smoking, maternal smoking and smoking when pregnant.
Physical inactivity	Inactive, insufficient, recommended and highly active categorisation based on average number of sessions and intensity of physical activity and metabolic equivalents (METs) per week.
High blood cholesterol	Level of usual total blood cholesterol.
Alcohol	Average number of standard drinks per day categorised as abstinent, low, hazardous or harmful.
High blood pressure	Level of usual systolic blood pressure.
Low fruit and vegetable intake	Fruit and vegetable intake per day.
Intimate partner violence	Physical or sexual violence by current or previous partner.
Illicit drugs	Use of illicit drugs, daily cannabis use.
Child sexual abuse	History of child sexual abuse among women categorised as non-contact only, contact only or intercourse.
Unsafe sex	Unprotected sex.

Combined effect

More than a third (36.1 per cent) of the burden of disease and injury in Queensland Aboriginal and Torres Strait Islander people in 2007 was attributed to the joint contribution of 11 risk factors (Table 13). Ten of these risk factors were associated with cardiovascular disease and together explained 68.7 per cent of cardiovascular disease burden. High body mass and physical activity were associated with diabetes and together caused 72.7 per cent of diabetes. Four risk factors were

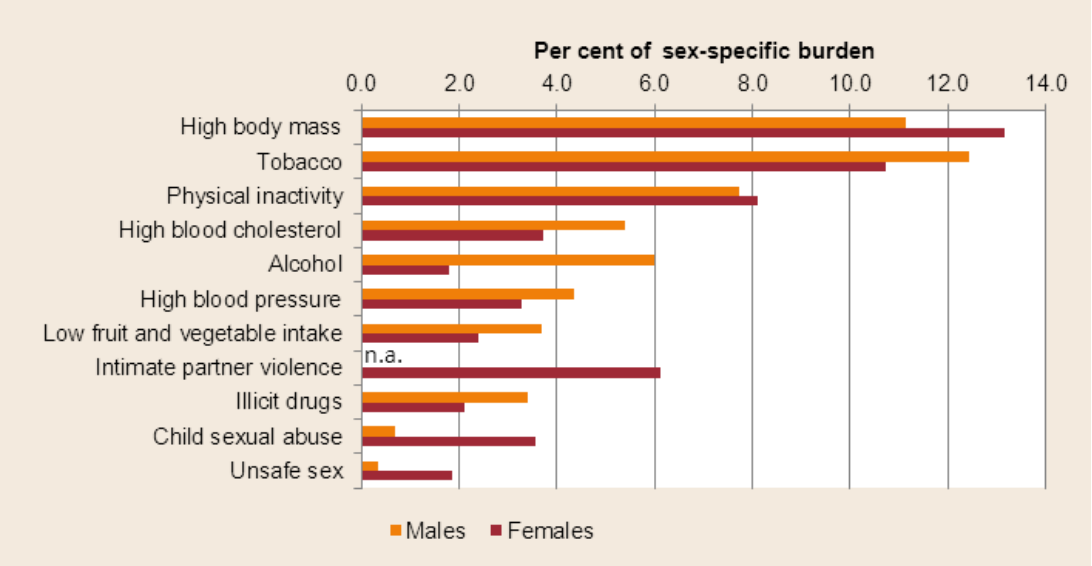
associated with mental disorders and together they explained 32.8 per cent of mental disorder burden.

Table 13 Proportion of broad cause group burden attributable to individual and joint risk factors

	Broad cause group					
Risk factor	**Mental**	**CVD**	**Diabetes**	**Cancer**	**Injury**	**All Causes**
Joint (n)	*1,464*	*2,642*	*1,848*	*1,059*	*978*	*9,366*
Joint (%)	**32.8**	**68.7**	**72.7**	**47.9**	**32.4**	**36.1**
High body mass		34.7	67.8	3.4		12.1
Tobacco		33.7		31.9	0.9	11.6
Physical inactivity		29.7	31.8	4.7		7.9
High blood cholesterol		30.9				4.6
Alcohol	8.1	-6.1		8.1	23.0	4.0
High blood pressure		25.9				3.8
Low fruit and vegetable intake		17.9		4.8		3.1
Intimate partner violence	7.6	2.5		2.3	6.8	3.0
Illicit drugs	10.1	<0.1			3.1	2.8
Child sexual abuse	10.1	<0.1		0.4	2.3	2.1
Unsafe sex				4.6		1.1

As a single contributor to the burden of disease and injury in Queensland Aboriginal and Torres Islander people, high body mass was responsible for the largest proportion with 12.1 per cent (13.2 per cent females, 11.1 per cent males) (Figure 45). In the 2003 Australian Indigenous population and total Australian population (Vos, et al., 2007) (Begg, et al., 2007), tobacco smoking was the largest single contributor to burden in the two population groups. For males in the current study, tobacco remained the leading risk factor responsible for 12.4 per cent of burden while in females tobacco was the second leading risk factor and caused 10.7 per cent of female burden.

Figure 45 Proportion of burden attributed to by the single and joint risk factors



Individual contribution to burden of disease and injury

High body mass

As a single contributing risk factor to the burden of disease and injury in 2007, high body mass caused the largest proportion of burden (12.1 per cent). More than half of the high body mass burden was due to increased risk of type 2 diabetes (55 per cent) and 67.8 per cent of diabetes burden could have been avoided if body mass of the population matched that of the theoretical minimum. A further 35 per cent of high body mass burden was due to its impact on ischaemic heart disease. Approximately 97 deaths could be attributed to high body mass, 44 of those being ischaemic heart disease deaths and 39 diabetes deaths. The risk of high body mass in this study is calculated for those aged 30 years and older. This is not to say there is no risk to those that are younger, but the proportion of burden that is attributed to high body mass remains unknown in that age group. The number of DALYs peaked in the 45–54 year age group and the rate peaked in the 60–69 year olds. Just over half of the burden of disease and injury high body mass burden was female.

Figure 46 High body mass: deaths and burden (table), and proportion by specific cause

	Deaths		DALYs	
Specific cause	**Number**	**% of total**	**Number**	**% of total**
All causes	97	14.9	3145	12.1
Type 2 diabetes	39	6.1	1722	6.6
Ischaemic heart disease	44	6.8	1093	4.2
Stroke	7	1.0	199	0.8
Hypertensive heart disease	3	0.4	41	0.2
Colorectal cancer	2	0.3	33	0.1
Breast cancer	2	0.2	29	0.1
Other	1	0.1	29	0.1

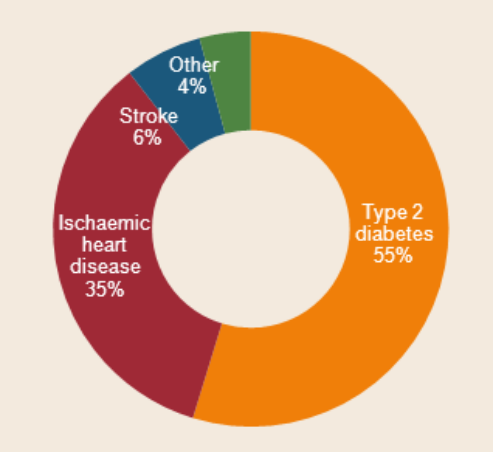
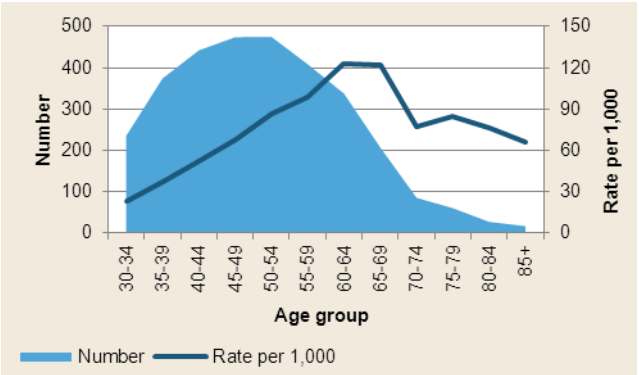
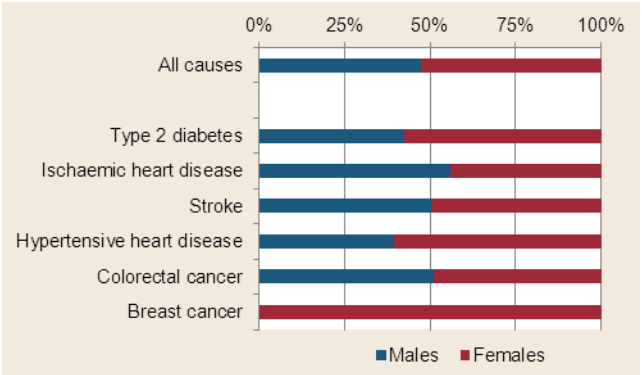


Figure 47 High body mass: burden rates and numbers by age group and proportion by sex





Tobacco

Tobacco smoking was the second leading modifiable risk factor and was responsible for 11.6 per cent of the burden of disease and injury, and almost one-fifth of total deaths. The majority of smoking related deaths were from ischaemic heart disease and lung cancer. Tobacco smoking had a larger impact on the burden of disease and injury in males where it was the leading risk factor causing a greater proportion of the burden than high body mass (12.4 per cent versus 11.1 per cent). Due to the lack of information regarding the increased risk of smoking in those aged less than 30 years only the risk from exposure to smoking in utero and exposure to maternal smoking is included in this age group.

Figure 48 Tobacco: deaths and burden (table), and proportion of tobacco burden by specific cause

	Deaths		DALYs	
Specific cause	**Number**	**% of total**	**Number**	**% of total**
All causes	125	19.3	3013	11.6
Ischaemic heart disease	49	7.6	1009	3.9
COPD	18	2.8	703	2.7
Lung cancer	30	4.7	470	1.8
Stroke	8	1.2	209	0.8
Low birth weight	3	0.5	171	0.7
Mouth and oropharynx cancers	4	0.7	85	0.3
Other	13	1.9	367	1.4

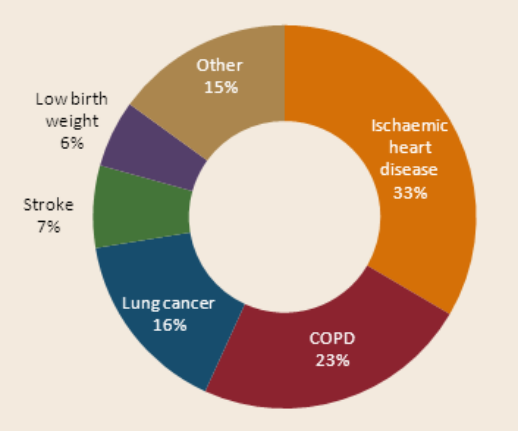
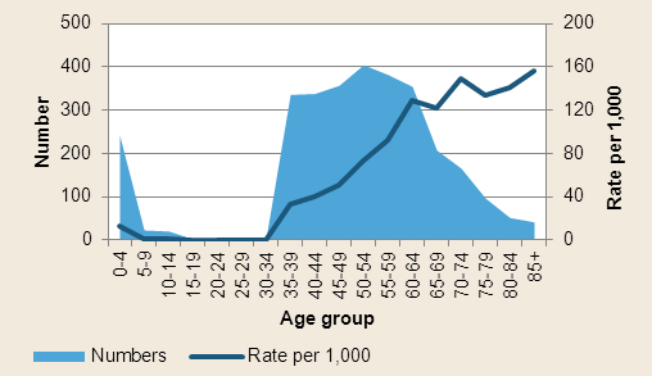
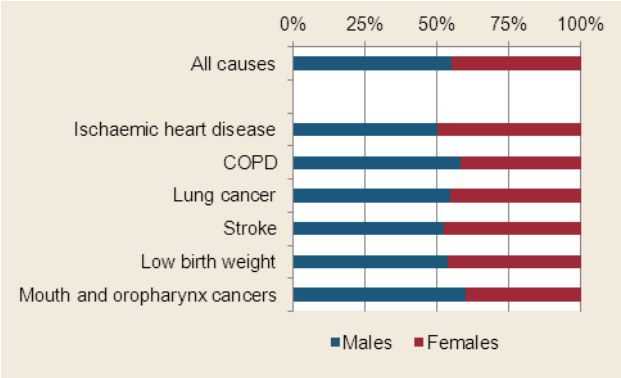


Figure 49 Tobacco: burden rates and numbers by age group and proportion by sex





Physical inactivity

Physical inactivity was responsible for the third largest proportion of disease burden with 7.9 per cent of the burden of disease and injury, and 80 deaths attributable to physical inactivity. The majority of the burden from physical inactivity was due to its impact on ischaemic heart disease and type 2 diabetes. While the rate of burden from physical inactivity continued to increase into old age the absolute burden peaked in the 45 to 64 year age groups. The overall physical inactivity burden is equally distributed between males and females, though this differs between conditions.

Figure 50 Physical inactivity: deaths and burden (table), and proportion by specific cause

	Deaths		DALYs	
Specific cause	**Number**	**% of total**	**Number**	**% of total**
All causes	80	12.3	2054	7.9
Ischaemic heart disease	47	7.2	972	3.7
Type 2 diabetes	20	3.1	807	3.1
Stroke	8	1.2	171	0.7
Colorectal cancer	3	0.5	53	0.2
Breast cancer	2	0.4	51	0.2

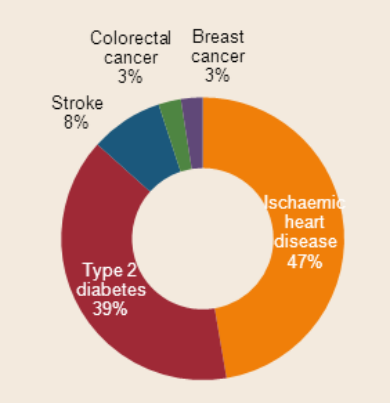
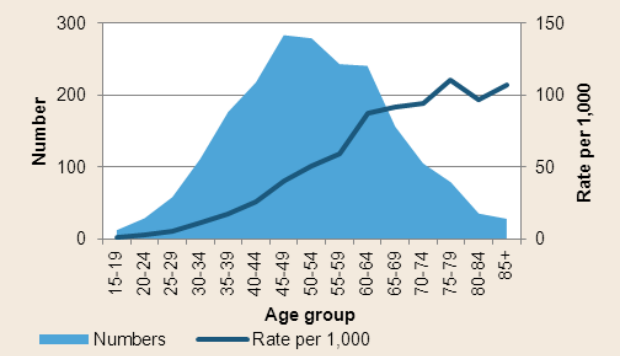
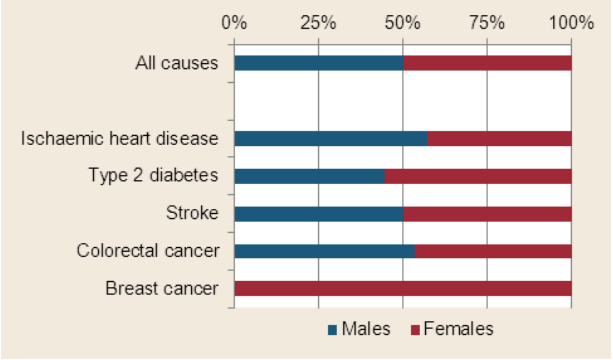


Figure 51 Physical inactivity: burden rates and numbers by age group and proportion by sex





High blood cholesterol

High blood cholesterol caused 4.6 per cent of the total burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people in 2007. Ischaemic heart disease was the largest contributor to burden from high blood cholesterol—91 per cent was due to the impact of high cholesterol on ischaemic heart disease, and the remaining nine per cent was from stroke. The high blood cholesterol risk factor model only includes the risk in those aged 30 years and older. The bulk of burden from high cholesterol occurs in the middle ages while the rate continues to increase to around age 65. Males carry 60 per cent of the overall burden from high blood cholesterol.

Figure 52 High blood cholesterol: deaths and burden (table), and proportion by specific cause

	Deaths		DALYs	
Specific cause	**Number**	**% of total**	**Number**	**% of total**
All causes	49	7.5	1188	4.6
Ischaemic heart disease	46	7.0	1086	4.2
Stroke	3	0.5	102	0.4

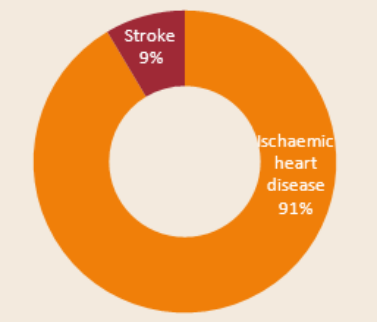
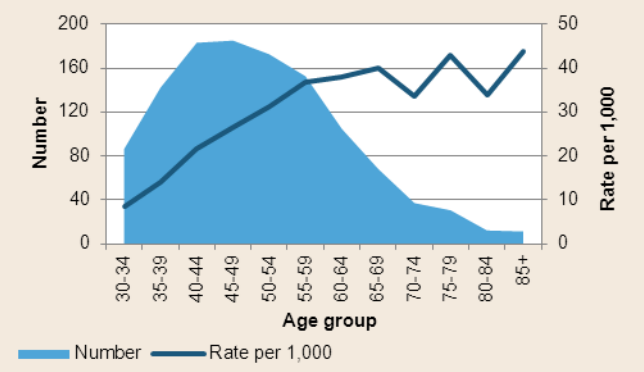
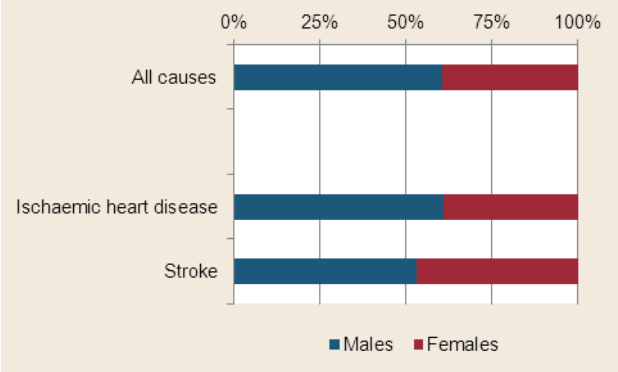


Figure 53 High blood cholesterol: burden rates and numbers by age group and proportion by sex





Alcohol

Of the risk factors analysed, alcohol caused the fifth largest proportion of burden of disease responsible for 4.0 per cent of DALYs (Figure 54). Approximately 31 deaths in 2007 were attributed to alcohol use, and 10 of those were suicide deaths. Of the alcohol burden, more than one-third was due to alcohol dependence, one-quarter suicide and self-inflicted injuries, and one-fifth homicide and violence. Alcohol caused 16 per cent of burden of disease and injury from road traffic accidents. Alcohol consumption can have a beneficial effect on cardiovascular health reducing the risk of ischaemic heart disease and cholelithiasis—a type of gall bladder and bile duct disease. However, the harm from alcohol by far exceeds the benefit (Figure 55). Alcohol burden peaked around ages 20–39 years, as did the net rate. Beyond age 70 where ischaemic heart disease is the leading specific cause of burden, the population benefit of alcohol outweighed the harm. More than three-quarters of the alcohol related burden occurred in the male population. In males, alcohol caused around 6.0 per cent of the burden of disease and was the fourth leading risk factor analysed. In females it caused just 1.8 per cent of the burden and caused the least burden of the 11 risk factors analysed.

Figure 54 Alcohol: deaths and burden (table), and proportion by specific cause

	Deaths		DALYs	
Specific cause	**Number**	**% of total**	**Number**	**% of total**
All causes	31	4.8	1026	4.0
Alcohol dependence	9	1.3	363	1.4
Suicide & self inflicted injuries	10	1.5	254	1.0
Homicide & violence	5	0.8	213	0.8
Road traffic accidents	6	0.9	166	0.6
Mouth & oropharynx cancers	3	0.4	60	0.2
Oesophagus cancer	3	0.5	52	0.2
Other	-5	-0.7	-82	-0.3

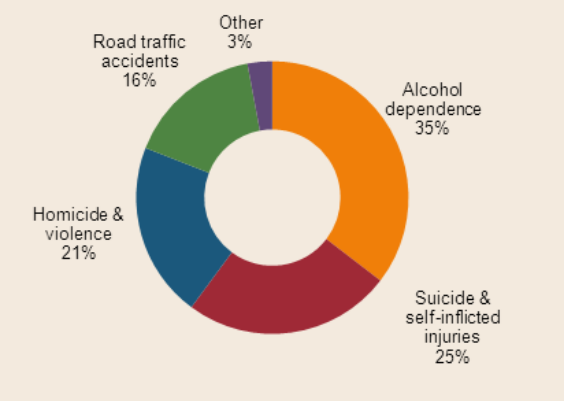
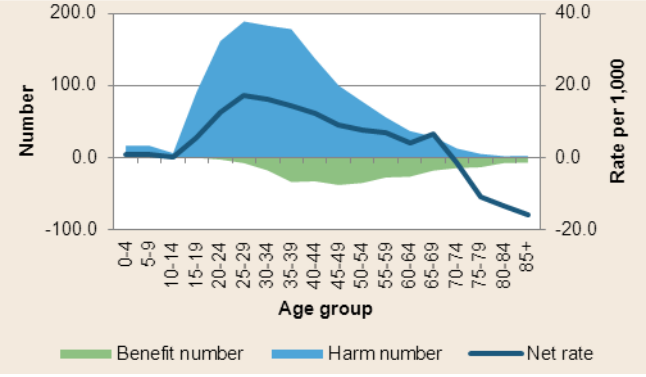
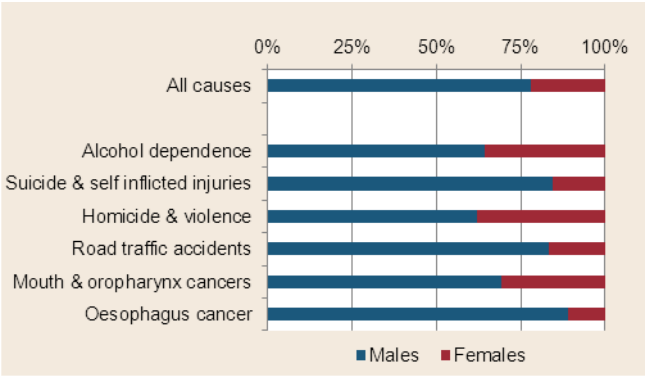


Figure 55 Alcohol: burden rates and numbers by age group and proportion by sex





High blood pressure

High blood pressure was responsible for 3.8 per cent of the total burden of disease and injury, and 8.7 per cent of deaths in Queensland's Aboriginal and Torres Strait Islander people in 2007 (Figure 56). Ischaemic heart disease was the largest contributor to this risk factor causing 67 per cent of high blood pressure burden. Stroke caused an additional 25 per cent. High blood pressure burden is calculated for ages 30 and older. Burden from high blood pressure peaked in the 60–64 year age group while the rate of high blood pressure burden continued to increase into old age. High blood pressure was a bigger burden in the male than female population, and almost 60 per cent of the total high blood pressure burden was in males.

Figure 56 High blood pressure: deaths and burden (table), and proportion by specific cause

	Deaths		DALYs	
Specific cause	**Number**	**% of total**	**Number**	**% of total**
All causes	57	8.7	995	3.8
Ischaemic heart disease	39	5.9	671	2.6
Stroke	13	2.0	250	1.0
Hypertensive heart disease	4	0.6	56	0.2
Other cardiovascular disease	1	0.1	19	0.1

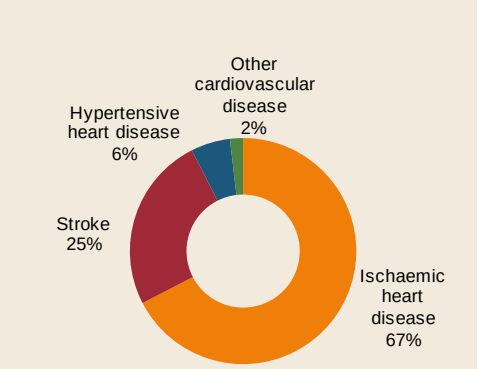
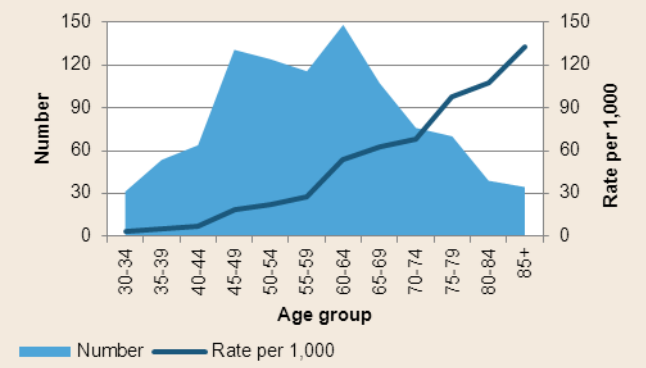
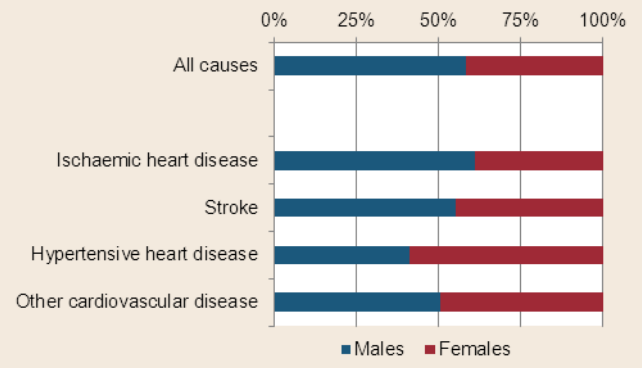


Figure 57 High blood pressure: burden rates and numbers by age group and proportion by sex





Low fruit and vegetable intake

Insufficient fruit and vegetable intake was responsible for 3.1 per cent of the burden of disease and injury, and 5.7 per cent of deaths in Queensland's Aboriginal and Torres Strait Islander people in 2007. Ischaemic heart disease was responsible for more than three-quarters of low fruit and vegetable burden. Low fruit and vegetable burden peaked in the 45–49 year age group while the rate of burden peaked in the 65–69 year age group and then plateaued to the oldest age groups. Just over half of the burden from low fruit and vegetable intake occurred in males (56 per cent).

Figure 58 **Low fruit and vegetable intake: deaths and burden (table), and proportion by specific cause**

Specific cause	Deaths		DALYs	
	Number	% of total	Number	% of total
All causes	37	5.7	793	3.1
Ischaemic heart disease	28	4.3	618	2.4
Stroke	3	0.4	70	0.3
Lung cancer	4	0.6	67	0.3
Oesophagus cancer	1	0.2	20	0.1
Stomach cancer	1	0.1	12	0.0
Colorectal cancer	0	0.1	7	0.0

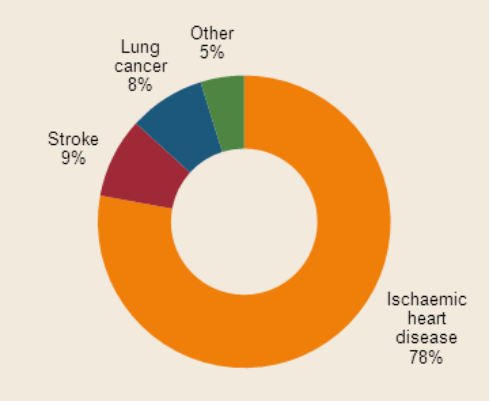
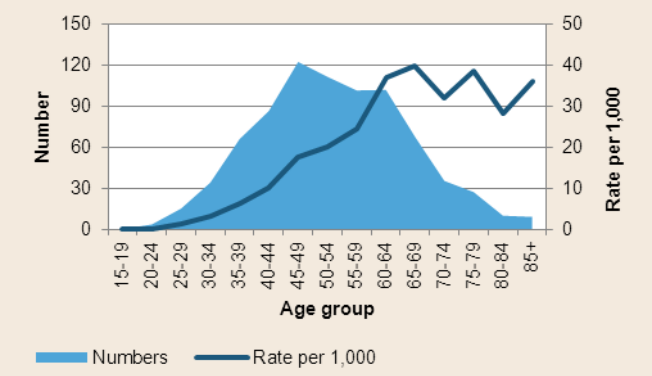
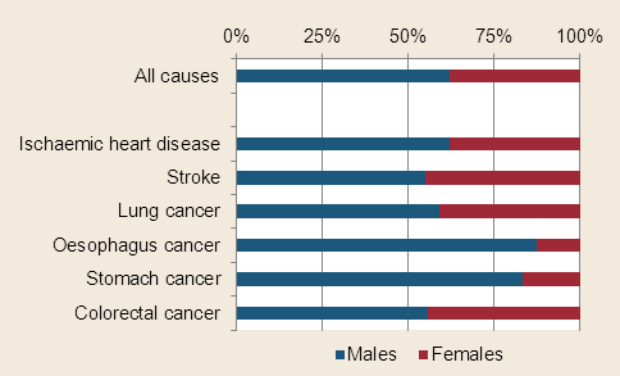


Figure 59 **Low fruit and vegetable intake: burden rates and numbers by age group and proportion by sex**





Intimate partner violence

Due to a lack of data regarding the health risks and the prevalence of intimate partner violence in males, only quantification of the burden attributable to intimate partner violence for females is attempted. Intimate partner violence was responsible for 3.0 per cent of the total burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people in 2007. In females, intimate partner violence caused 6.1 per cent of the burden of disease, 12 deaths, and was the fourth leading risk factor. The largest proportion of intimate partner violence was from anxiety and depression, with homicide and violence also causing a considerable proportion of the burden. Rate of burden from intimate partner violence peaked in the 30–34 year age group and the number of DALYs peaked in the 20–24 year age group.

Figure 60 Intimate partner violence: deaths and burden (table), and proportion by specific cause

	Deaths		DALYs	
Specific cause	**Number**	**% of total**	**Number**	**% of total**
All causes	12	1.9	775	3.0
Anxiety and depression	0	0.0	324	1.3
Homicide and violence	3	0.5	138	0.5
Ischaemic heart disease	2	0.4	73	0.3
Suicide and self-inflicted injuries	2	0.3	60	0.2
COPD	1	0.1	59	0.2
Lung cancer	1	0.2	24	0.1
Other	2	0.3	95	0.4

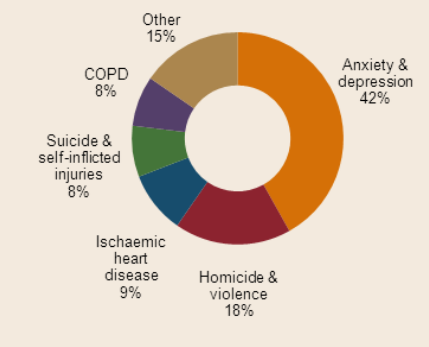
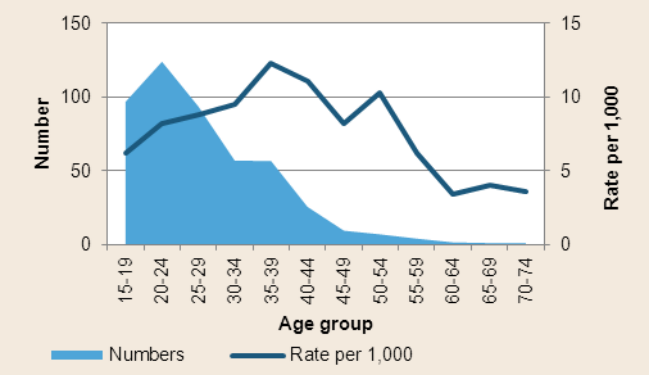
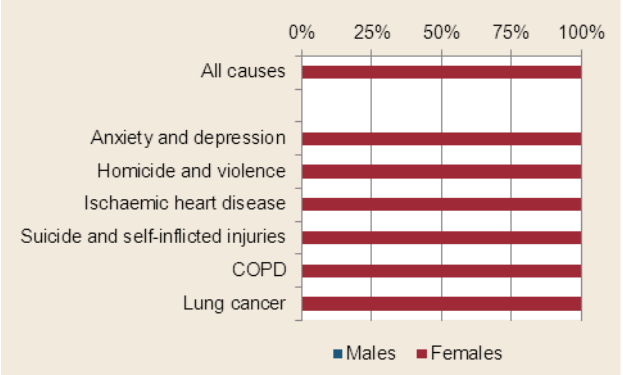


Figure 61 Intimate partner violence: burden rates and numbers by age group and proportion by sex





Illicit drug use

Illicit drug use was responsible for 2.8 per cent of the total burden of disease and injury, and 12 deaths in Queensland's Aboriginal and Torres Strait Islander population in 2007. Heroin or polydrug dependence and harmful use caused more than one-third of illicit drug burden. The rate of illicit drug burden and number of DALYs caused by illicit drug use peaked in the 20–24 year age group. More than half of the illicit drug burden is in males.

Figure 62 Illicit drug use: deaths and burden (table), and proportion by specific cause

	Deaths		DALYs	
Specific cause	**Number**	**% of total**	**Number**	**% of total**
All causes	15	2.3	720	2.8
Heroin or polydrug dependence	3	0.4	256	1.0
Hepatitis C	6	1.0	108	0.4
Cannabis dependence	0	0.0	97	0.4
Suicide & self-inflicted injuries	3	0.4	66	0.3
Schizophrenia	0	0.0	54	0.2
Hepatitis B	2	0.3	33	0.1
Other	2	0.3	105	0.4

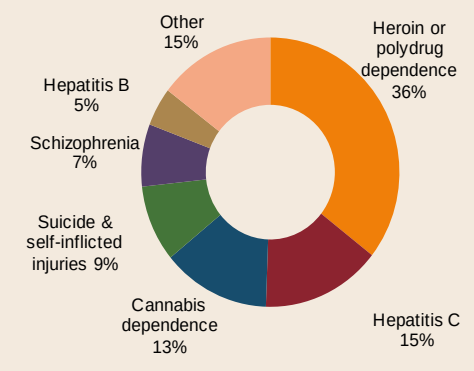
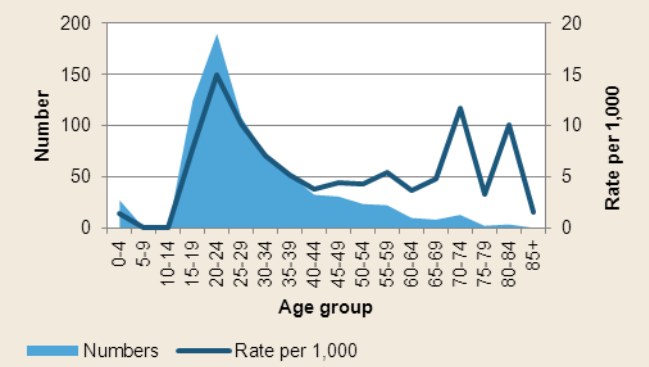
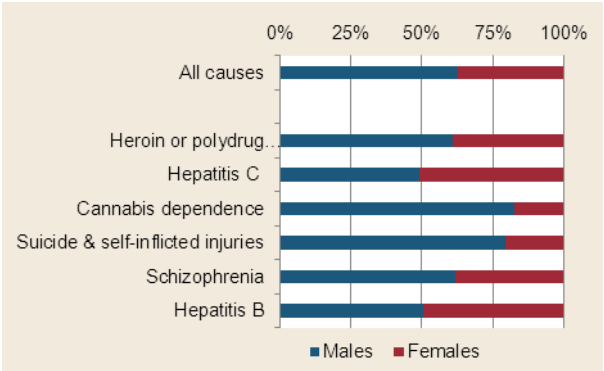


Figure 63 Illicit drug use: burden rates and numbers by age group and proportion by sex





Child sexual abuse

Child sexual abuse was responsible for 2.1 per cent of the total burden of disease and injury in 2007. Anxiety and depression was the major contributor causing 79 per cent of the child sexual abuse burden. The impact of child sexual abuse peaks in the 15–19 year age group and rate of burden in the 20–24 year age group. Females carried the majority of child sexual abuse burden (83.2 per cent).

Figure 64 Child sexual abuse: deaths and burden (table), and proportion by specific cause

Specific cause	Deaths		DALYs	
	Number	% of total	Number	% of total
All causes	4	0.6	539	2.1
Anxiety and depression	0	0.0	429	1.7
Suicide and self-inflicted injuries	2	0.3	58	0.2
Alcohol dependence and harmful use	0	0.1	12	0.0
Hepatitis C	0	0.1	8	0.0
Heroin or polydrug dependence and harmful use	0	0.0	6	0.0
Homicide and violence	0	0.0	5	0.0
Other	1	0.1	22	0.1

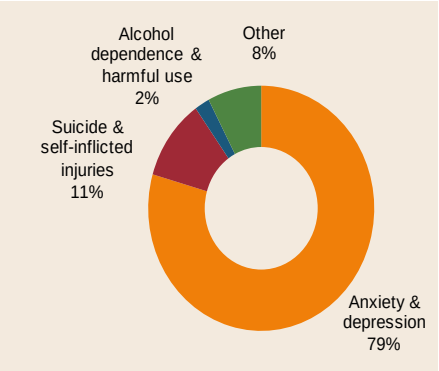
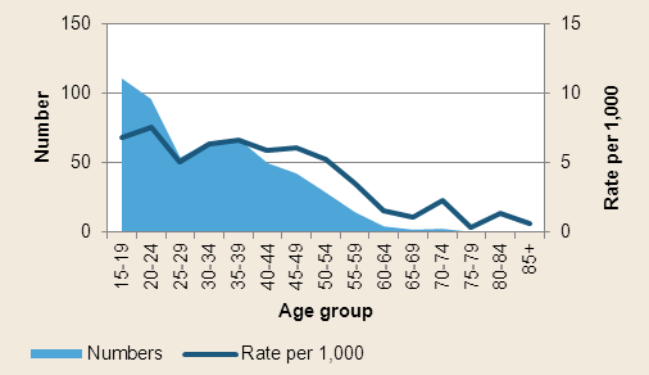
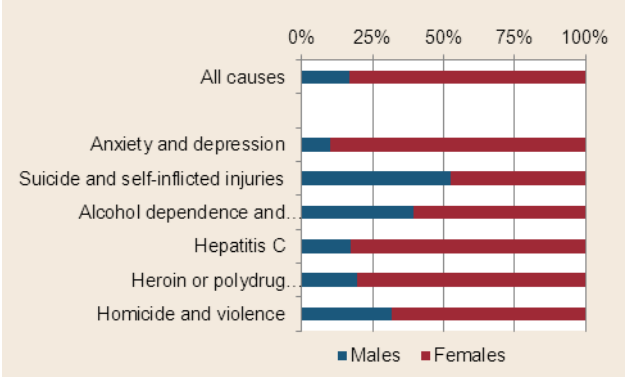


Figure 65 Child sexual abuse: burden rates and numbers by age group and proportion by sex





Unsafe sex

Of the 11 risk factors included in this study, unsafe sex caused the smallest proportion of total burden of disease and injury (1.1 per cent). Cervical cancer, chlamydia and HIV/AIDS accounted for just over three-quarters of the burden from unsafe sex. The largest amount of burden from unsafe sex occurred in the 30–44 year age groups. There is a secondary peak in the rate of unsafe sex burden in the 65–74 year age groups due primarily to the impact on cervical cancer at these ages. Unsafe sex burden is primarily experienced by females (83.7 per cent), however almost 80 per cent of the HIV/AIDs burden attributable to unsafe sex is experienced by males.

Figure 66 Unsafe sex: deaths and burden (table), and proportion burden by specific cause

Specific cause	Deaths		DALYs	
	Number	% of total	Number	% of total
All causes	6	0.9	280	1.1
Cervix cancer	4	0.7	102	0.4
Chlamydia	0	0.0	69	0.3
HIV/AIDS	0	0.0	42	0.2
Other STDs	0	0.0	40	0.2
Hepatitis B	1	0.1	15	0.1
Gonorrhoea	0	0.0	5	0.0
Other	0	0.0	6	0.0

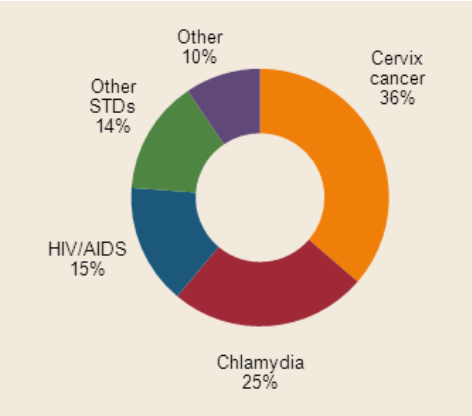
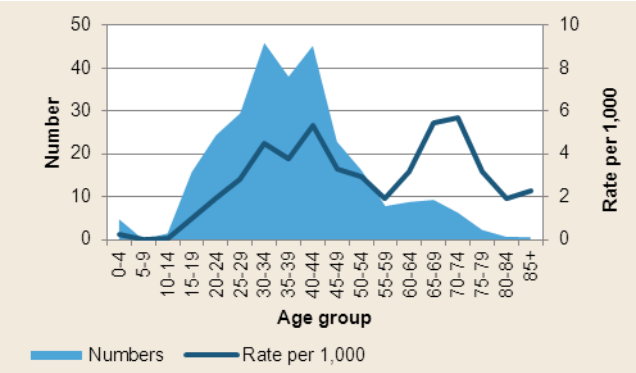
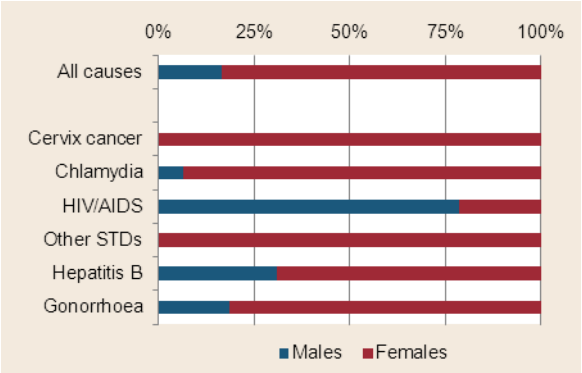


Figure 67 Unsafe sex: burden rates and numbers by age group and proportion by sex





Aboriginal and Torres Strait Islander health differentials by remoteness

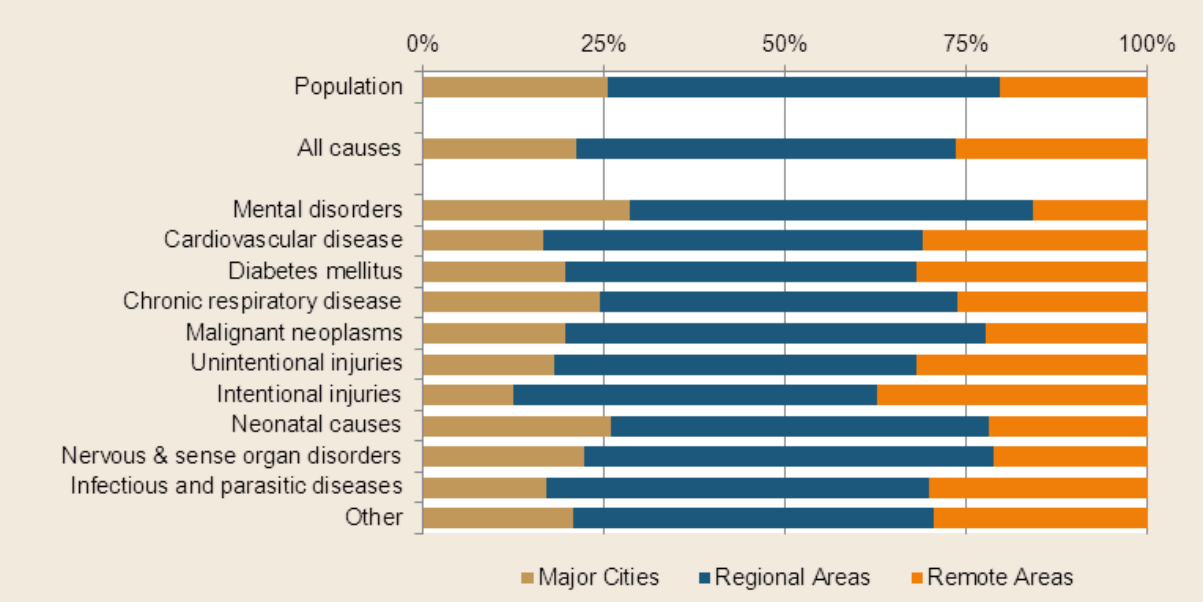
Overview

This section focuses on the burden of disease and injury, HALE and risk factor assessment by remoteness. Health outcomes, including mortality differ by remoteness. To construct a clearer and more accurate picture of the disease burden experience of Queensland's Aboriginal and Torres Strait Islander population, burden of disease and injury estimates have been produced by three remoteness categories: major cities, regional areas and remote areas.

Disease and injury burden differentials by remoteness

In 2007 more than half of Queensland's Aboriginal and Torres Strait Islander people lived in regional areas of Queensland (55 per cent) and experienced slightly less than the expected proportion of burden (52.3 per cent) (Figure 68). Just over one fifth of the burden was in major city areas (21.2 per cent) where one quarter of the population resided, and the remaining quarter (26.5 per cent) of the Aboriginal and Torres Strait Islander burden was in remote areas where one-fifth of the population resided. In remote areas, half of the burden was due to fatal outcomes while this proportion was 45 per cent in regional areas and a much lower 33 per cent in major cities.

Figure 68 Distribution of Burden of disease and injury by remoteness area



With increasing remoteness the rate of burden increased. Regional areas experienced a rate 1.26 times that of major cities and in remote areas it was 1.47 times the major city rate (Table 14). These ratios differed by broad cause with the largest major city to remoteness differential being for intentional injuries and unintentional injuries, and largest differential between major cities and regional areas for intentional injuries, and infectious and parasitic diseases. Mental disorders, however countered this trend with the rate of burden in remote areas 28 per cent lower than major cities.

Table 14 Burden of disease and injury by broad cause group and remoteness area, number rate and rate ratio

	Major Cities		Regional Areas		Remote Areas			
	N	ASR	N	ASR	N	ASR	Reg:MC RR	Rem:MC RR
All causes	5514	214.3	13563	269.0	6871	314.9	1.26	1.47
Mental disorders	1274	30.2	2489	29.4	699	21.7	0.98	0.72
Cardiovascular disease	640	42.7	2018	61.8	1186	69.8	1.45	1.63
Diabetes mellitus	502	24.2	1232	30.4	806	49.2	1.26	2.03
Chronic respiratory disease	591	25.4	1188	23.4	629	29.3	0.92	1.15
Malignant neoplasms	435	24.9	1286	38.5	491	31.7	1.55	1.27
Unintentional injuries	291	7.2	802	10.2	510	17.3	1.42	2.38
Intentional injuries	179	4.1	707	8.3	528	17.2	2.00	4.16
Neonatal causes	326	4.2	655	4.0	272	4.1	0.96	0.99
Nervous & sense organ disorders	242	14.2	610	15.8	230	13.5	1.12	0.95
Infectious and parasitic diseases	153	5.6	472	8.5	268	12.2	1.53	2.19
Other	880	31.6	2105	38.5	1252	48.9	1.22	1.55

The leading contributors to burden of disease and injury varied between remoteness areas (Figure 69). In major cities, mental disorders followed by cardiovascular diseases and chronic respiratory diseases caused the three largest proportions of burden respectively. Similar to major cities, in regional areas mental disorders and cardiovascular disease were the first and second largest broad cause groups, while cancer was third. In remote areas, cardiovascular diseases caused the largest proportion of burden followed by diabetes and mental disorders.

Figure 69 Burden of disease and injury by broad cause group and remoteness area

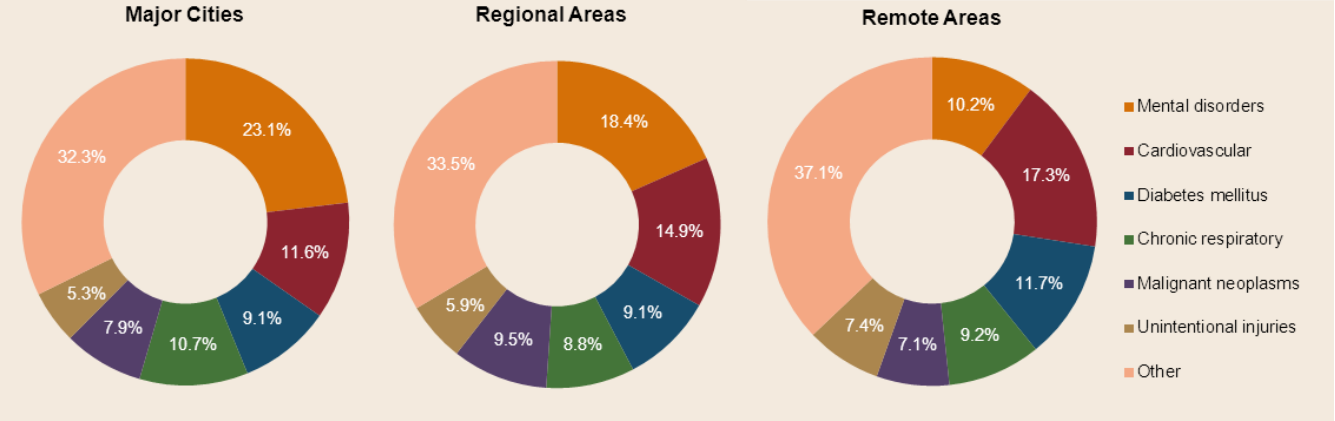


Figure 70 Ranking of specific causes of burden of disease and injury by Indigenous status and remoteness area

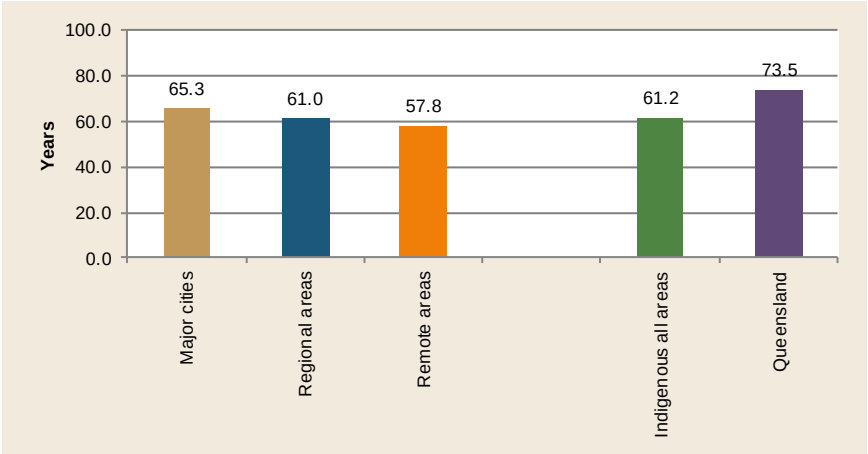
Specific cause	Indigenous				Non-Indigenous
	All areas	Major cities	Regional areas	Remote areas	
Anxiety and depression	1	1	1	3	2
Type 2 diabetes	2	2	3	1	3
Ischaemic heart disease	3	3	2	2	1
Chronic obstructive pulmonary disease (COPD)	4	5	5	4	8
Asthma	5	4	4	11	9
Suicide and self-inflicted injuries	6	8	6	5	12
Stroke	7	10	7	8	4
Road traffic accidents	8	11	12	7	14
Homicide and violence	9	22	9	6	63
Low birth weight	10	6	10	12	37
Lung cancer	11	13	8	14	6
Alcohol dependence and harmful use (including alcoholic cirrhosis)	12	9	11	19	17
Schizophrenia	13	7	13	22	22
Other chronic respiratory diseases	14	18	14	10	13
Birth trauma and asphyxia	15	14	16	21	66
Otitis media	16	34	41	9	104
Inflammatory heart disease	17	36	27	13	38
Other endocrine and metabolic disorders	18	16	20	23	30
Lower respiratory tract infections	19	40	19	17	21
Other chromosomal disorders	20	17	21	24	70

Rank 1-10
Rank 11-20
Rank 21-30
Rank 31-40
Rank 41-50
Rank >50

Health adjusted life expectancy differentials by remoteness

Aboriginal and Torres Strait Islander people living in major city areas of Queensland had the longest health adjusted life expectancy at birth. On average, Aboriginal and Torres Strait Islander babies born in major city areas of Queensland in 2007 could expect to live 65.3 years free of disability. This is 7.6 years longer than those in remote areas and 4.3 years longer than those in regional areas.

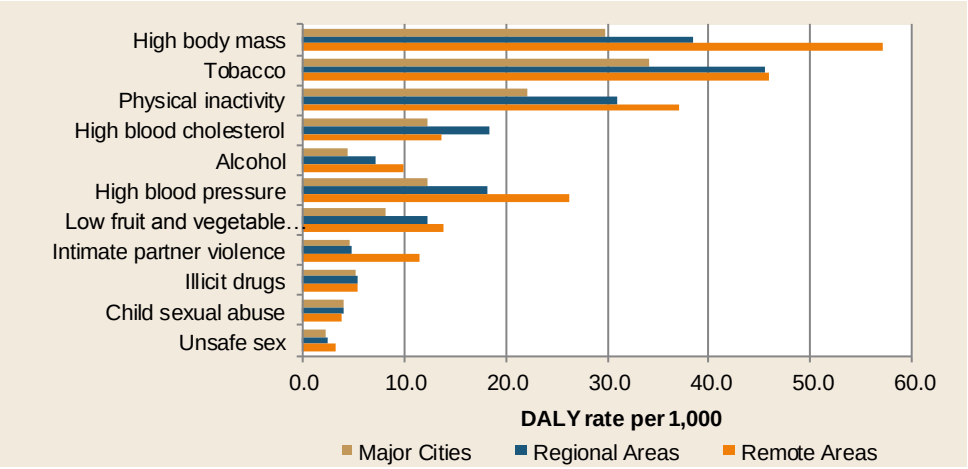
Figure 71 Health adjusted life expectancy by remoteness area



Risk factor differentials by remoteness

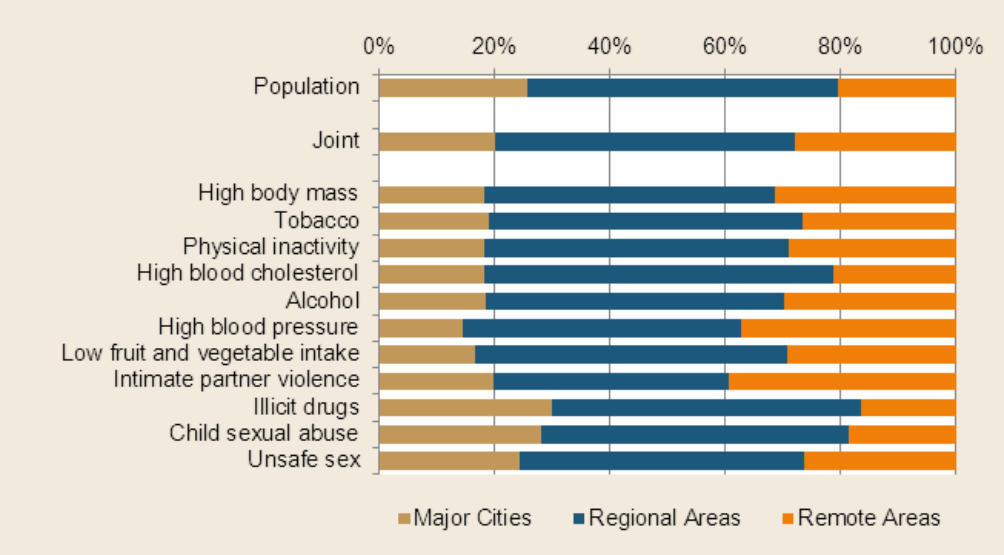
For most risk factors included in the burden of disease and injury comparative risk factor analysis, the rate of burden attributable to each was highest in remote areas except for high blood cholesterol where the rate in regional areas was higher than both major cities and remote areas (Figure 72). The rate of burden of disease and injury attributable to the joint effect of the 11 modifiable risk factors was 22.3 per cent higher in regional compared to major city areas, and 58.9 per cent in remote compared to major city areas.

Figure 72 Risk factor burden rate by remoteness area



Just over one-quarter of Queensland's Aboriginal and Torres Strait Islander population reside in major city areas (25.7 per cent) yet 29.9 per cent of burden attributable to illicit drugs occurred in this area (Figure 73). A higher proportion of burden attributable to tobacco, high blood cholesterol, and low fruit and vegetable intake occurred in regional areas than would be expected based on the population distribution. A disproportionately small amount of burden from illicit drugs occurred in remote areas, whereas for all other risk factors the proportion of burden that occurred in remote areas was higher than would have occurred had the burden been distributed as per the population.

Figure 73 Distribution of risk factor burden by remoteness area



Aboriginal and Torres Strait Islander health gap

Overview

This section reports on the Aboriginal and Torres Strait Islander health gap in Queensland. The health gap is measured as the difference in the burden of disease and injury estimated to have occurred in Queensland's Aboriginal and Torres Strait Islander people in 2007, and that which would have occurred had the Indigenous population experienced the same age, sex and cause specific burden rates as the non-Indigenous population. The importance of examining this gap is that it highlights the areas where there is the greatest potential for health gain as the rate of burden in the non-Indigenous population represents an 'achievable' scenario.

Aboriginal and Torres Strait Islander health gap

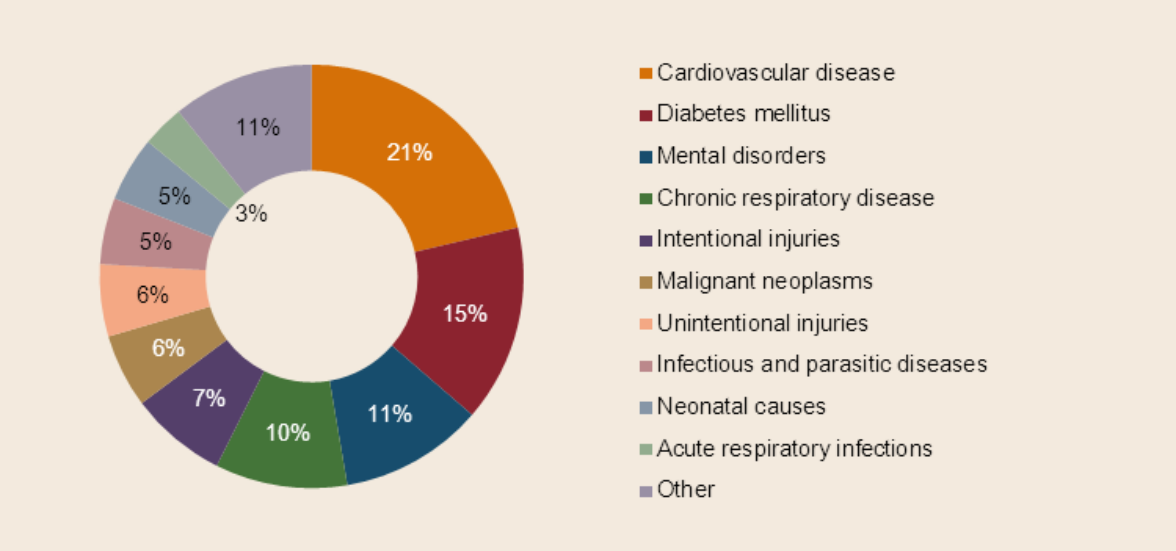
In 2007, the burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people would have been half the size had the Indigenous population experienced the same rate of burden of disease and injury as non-Indigenous Queenslanders (Table 15). If cardiovascular disease rates in the Aboriginal and Torres Strait Islander population matched the non-Indigenous rates, the cardiovascular disease burden would have been 72 per cent lower.

Table 15 Observed burden and gap by broad cause group

Broad cause groups	Observed DALYs	Gap (DALYs)	% of burden that is aviodable
All causes	25949	13040	50
Cardiovascular disease	3844	2777	72
Diabetes mellitus	2541	1961	77
Mental disorders	4462	1429	32
Chronic respiratory disease	2407	1317	55
Intentional injuries	1413	964	68
Malignant neoplasms	2211	733	33
Unintentional injuries	1603	719	45
Infectious and parasitic diseases	893	662	74
Neonatal causes	1254	647	52
Acute respiratory infections	620	421	68
Other	4699	1408	30

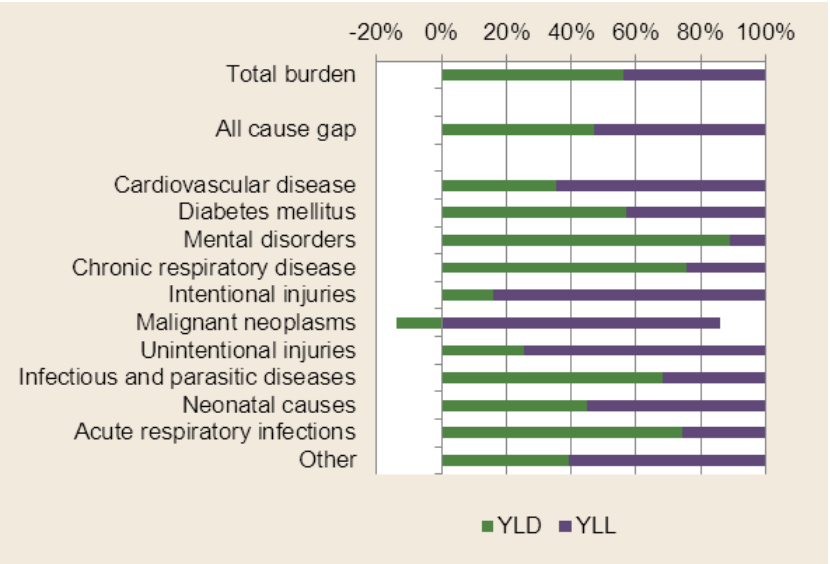
Almost half of the health gap was due to differences in rates of cardiovascular disease, diabetes and mental disorder burden which together caused 47 per cent of the gap. The largest contributor was cardiovascular disease which caused just over one-fifth of the gap. Diabetes, mental disorders and chronic respiratory disease together caused a further 36 per cent of the gap (Figure 74).

Figure 74 Contributors to the health gap by broad cause group



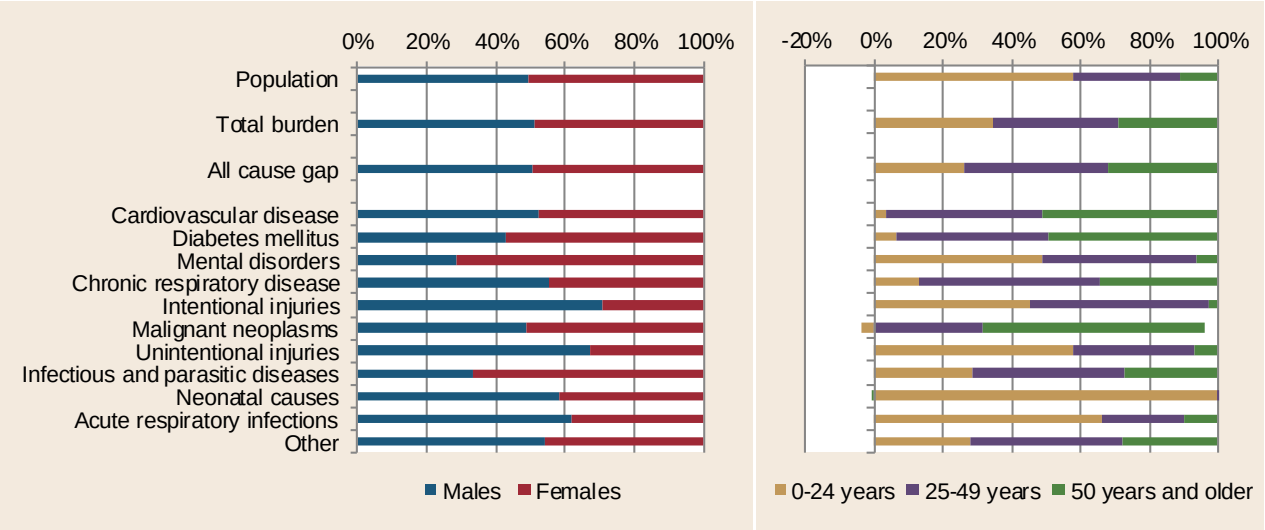
While fatal outcomes caused 43.8 per cent of the total burden of disease and injury in Queensland's Aboriginal and Torres Strait Islander people in 2007 more than half of the health gap was due to fatal outcomes (Figure 75). This demonstrates that the case fatality rate is higher for Aboriginal and Torres Strait Islander people compared to non-Indigenous Queenslanders. The total fatal burden in Aboriginal and Torres Strait Islander people would be reduced by 60.4 per cent and the non-fatal burden by 42.3 per cent if the rate of burden were the same between the two populations.

Figure 75 Leading broad causes of the health gap by outcome type



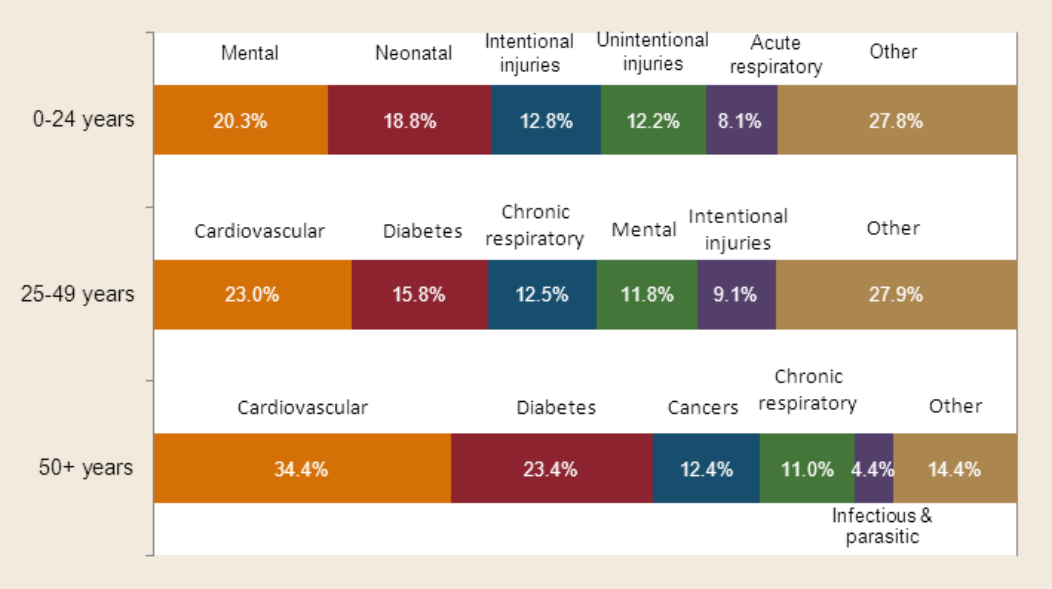
The health gap is shared equally by males and females. This is in line with the population distribution (Figure 76). The burden among those aged 25–49 years would be 58.8 per cent lower if Queensland's Aboriginal and Torres Strait Islander population had the same rate of burden as the non-Indigenous population. In the 50 years and older age group the burden would be 54.4 per cent lower, and in the 0–24 year age group it would have been 38.0 per cent lower. For malignant neoplasms (cancers), the gap in the 0–24 year age group is negative. This is because on balance across all of the specific types of cancers the rate of burden, particularly non-fatal burden, is lower in the Aboriginal and Torres Strait Islander population than the non-Indigenous population.

Figure 76 Leading broad causes of the health gap by sex and age group



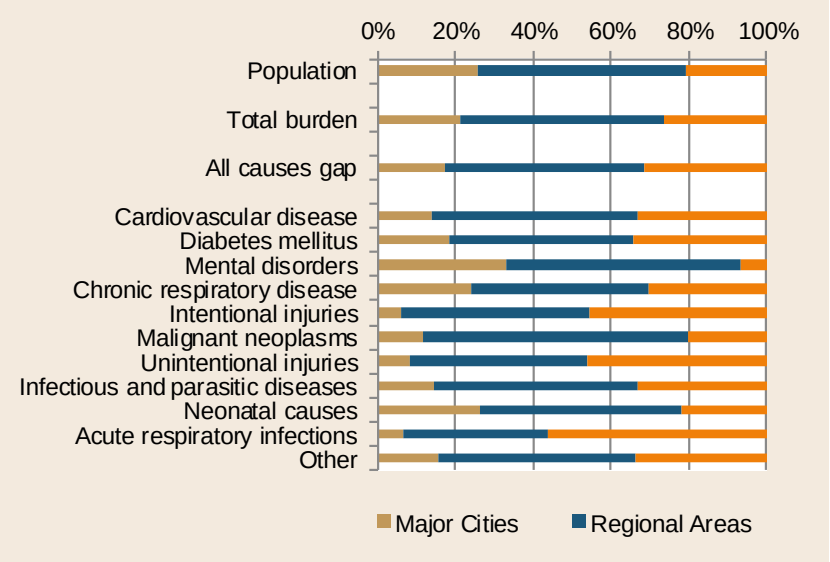
For those aged 0–24 years, mental disorders and neonatal conditions were the main contributors to the health gap (20.3 per cent and 18.8 per cent respectively) (Figure 77). In the 25–49 and 50 years and older age groups, cardiovascular disease and diabetes were the leading contributors.

Figure 77 Leading broad causes of the health gap by sex and age group



The majority of the Queensland Aboriginal and Torres Strait Islander population reside in regional areas and this is where the majority of the burden and health gap occurs (Figure 78). While around one-fifth of the Queensland Aboriginal and Torres Strait Islander population live in remote areas, more than one-quarter of the overall burden and almost one-third of the total health gap occurs in this population. The distribution of the health gap between regions differs by cause.

Figure 78 Population, burden and gap distribution by remoteness



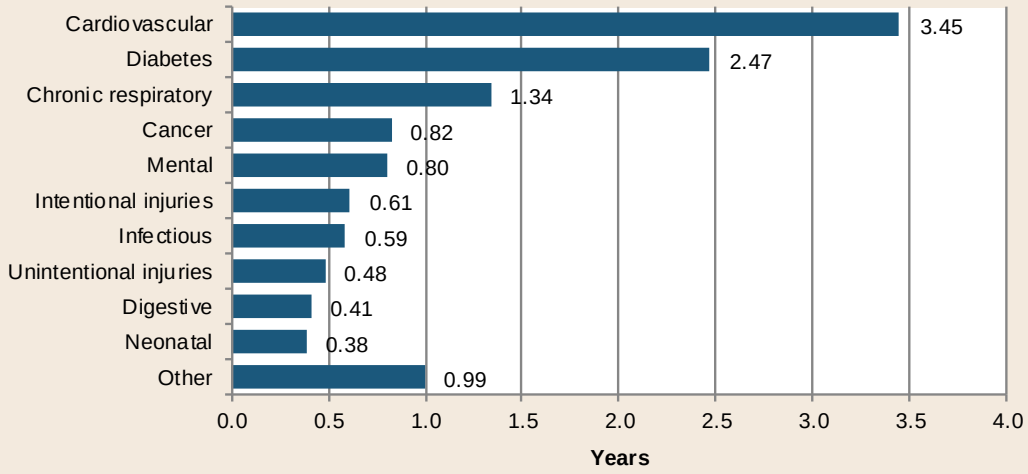
Health adjusted life expectancy gap

Health adjusted life expectancy was 12.3 years lower in Queensland's Aboriginal and Torres Strait Islander people than the total Queensland population. This is referred to as the HALE gap. The HALE gap can be decomposed by cause, thereby giving an indication of where there is greatest potential for gain in HALE. More than one-quarter of the HALE gap is due to differences in the cardiovascular prevalent non-fatal burden (PYLD) rate between the Indigenous and total Queensland population. Potentially 3.45 years of healthy life could have been gained had the Indigenous population experienced the same rates of cardiovascular burden as the total Queensland population. Another major contributor to the HALE gap was type 2 diabetes, where 19.2 per cent of the HALE gap was due to differences in the PYLD rate of type 2 diabetes. Had the type 2 diabetes PYLD rates been the same as that of the non-Indigenous population of Queensland, Aboriginal and Torres Strait Islander Queenslanders could have expected an average 2.37 years more of healthy life.

Table 16 Health adjusted life expectancy (HALE) and contributors to the HALE gap by cause

	Years	Percent
Indigenous HALE	61.2	
Non-Indigenous HALE	73.5	
HALE gap	12.3	100.0
Decomposition of HALE gap by cause		
Broad cause		
Specific cause		
Cardiovascular	*3.45*	*28.0*
Coronary heart disease	2.06	16.7
Stroke	0.70	5.7
Diabetes	*2.47*	*20.0*
Type 2 diabetes	2.37	19.2
Chronic respiratory	1.34	10.8
Chronic obstructive pulmonary disease	0.98	8.0
Cancer	*0.82*	*6.7*
Lung cancer	0.39	3.2
Mental	*0.80*	*6.5*
Alcohol dependence and harmful use	0.18	1.4
Intentional injuries	*0.61*	*5.0*
Suicide and self-inflicted injuries	0.28	2.3
Infectious	*0.59*	*4.7*
Unintentional injuries	*0.48*	*3.9*
Road traffic accidents	0.16	1.3

Figure 79 Contributors to the HALE gap by broad cause



Discussion and conclusions

This study is an important contribution to the quantification of the health problems experienced by Queensland's Aboriginal and Torres Strait Islander people. It demonstrates the leading causes of fatal and non-fatal burden by age, sex and remoteness, and quantifies the amount of burden attributable to 11 modifiable risk factors. This provides an understanding of the areas that have potential for the greatest health gain and those where the largest disparity between the Aboriginal and Torres Strait Islander and non-Indigenous populations exist.

Areas of concern

The leading causes of disease and injury burden in the Aboriginal and Torres Strait Islander population were largely the same as in the non-Indigenous population: mental disorders, cardiovascular disease, diabetes, chronic respiratory disease and cancers. However, highlighted in this study is the difference in rate and age distribution of the burden between the two populations.

Mental disorders and cardiovascular disease were the leading contributors to the disease and injury burden in Aboriginal and Torres Strait Islander Queenslanders in 2007. These two broad cause groups together accounted for almost one-third of the Aboriginal and Torres Strait Islander disease burden. Diabetes, chronic respiratory disease and cancers were the next three leading causes of burden accounting for 27.6 per cent of the total burden of disease and injury.

Despite having a younger age profile than the non-Indigenous population, Aboriginal and Torres Strait Islander people carried a disproportionate share of Queensland's burden of disease and injury. In 2007, the Aboriginal and Torres Strait Islander population of Queensland made up 3.6 per cent of the total Queensland population, but carried 4.6 per cent of the total Queensland disease burden. While all cause Aboriginal and Torres Strait Islander burden occurred at a rate just over double the non-Indigenous rate, the differentials between the two populations varied by broad cause. The largest differential was for diabetes which was 4.7 times the non-Indigenous rate. Infectious and parasitic diseases were 4.2 times the non-Indigenous rate, and intentional injuries were 3.0 times.

The majority of the absolute burden (number of DALYs) for Aboriginal and Torres Strait Islander people in Queensland occurred in the middle-aged population, with a significant peak also occurring in the very young. In contrast, the bulk of burden occurred at older age in the non-Indigenous population. The rate of burden also increased at a much younger age in the Aboriginal and Torres Strait Islander population in Queensland than for the non-Indigenous population. The rate of the burden also occurred at a considerably higher rate at each age for Indigenous Australians compared with the total Australian population. Burden of disease from conditions where age is a risk factor tended to have a considerably younger age distribution in the Aboriginal and Torres Strait Islander population. This is particularly evident in the strikingly different age patterns of cardiovascular disease and diabetes.

With increasing remoteness, the rate of burden increased. Regional areas experienced a rate 1.26 times that of major cities and in remote areas it was 1.47 times the major city rate. These ratios differed by broad cause with the largest major city to remoteness differential being for intentional injuries and unintentional injuries, and the largest differential between major cities and regional areas for intentional injuries, and infectious and parasitic diseases. While the rates of burden are higher in remote areas, the greatest amount of burden is in regional areas where the greatest proportion of the population resides.

This study also quantified and characterised the excess burden of disease and injury experienced by Aboriginal and Torres Strait Islander people—the gap. This gap identifies those areas with the greatest potential for health gain. Almost half of the health gap was due to differences in rates of

cardiovascular disease, diabetes, and mental disorder burden—together these caused 47 per cent of the gap.

More than one-third of burden of disease and injury was caused by the joint contribution of 11 modifiable risk factors. On its own, high body mass caused the greatest burden followed by tobacco smoking. These are also leading risk factors in the non-Indigenous population, although the prevalence of overweight and obesity, and smoking are considerably higher in the Aboriginal and Torres Strait Islander population.

This study demonstrates the rate of burden goes up with increasing remoteness and subsequently the HALE goes down. Aboriginal and Torres Strait Islander people who live in remote areas experienced a rate of burden 47 per cent higher than in major cities, and those in regional areas 26 per cent higher. However, due to the population distribution the bulk of the burden occurred in regional areas. While substantial effort is needed to reduce those differentials for remote areas, there is room for major gains to be made in major cities and regional areas as well.

The gap in the burden between the Aboriginal and Torres Strait Islander population and the non-Indigenous population shows the burden of disease and injury experienced by Aboriginal and Torres Strait Islander people could be halved if the rate of burden were reduced to those levels seen in the non-Indigenous population.

This study highlights the lack of data on epidemiology of many conditions even those that cause the greatest burden in the Aboriginal and Torres Strait Islander population of Queensland. The 2012–13 Australian Aboriginal and Torres Strait Islander Health survey should go some way to improve future burden of disease and injury estimates, particularly for risk factor analysis, however these results will only be progressively released from late 2013 to late 2014. Even then, the suitability of this data for jurisdictional small population analysis is questionable. While available data has been used effectively, the use of relative hospitalisation or mortality rates as a proxy for differences in incidence or prevalence has obvious limitation. The availability of representative epidemiological studies and population surveys will greatly improve the certainty of the results for future burden of disease studies.

It is estimated there were 148,674 Aboriginal and Torres Strait Islander people residing in Queensland in 2007—this is a relatively small number of people. Examining cases of ill-health and death for 176 conditions, by sex, across 19 age groups and three remoteness categories it is clear that some of these stratifications will contain very small numbers, or indeed no cases at all. These small numbers can lead to instability of the estimates.

Changes in methodology and assumptions mean direct comparisons of the results of this study with other jurisdictional, national or global burden of disease and injury estimates are not possible. Any observed differences should be undertaken with caution and clear understanding they may not represent change over time or a true differential between population groups.

To assist planning and decision-making at the local level, small area estimates of Aboriginal and Torres Strait Islander burden of disease and injury derived from this study will be available by late 2014.

Additionally all estimates and parameters reported in this report for the 2007 reference year will be updated using 2010 as the reference year. The production of ongoing burden of disease estimates will assist understanding of changes in the burden of disease over time and help appropriately guide future effort and investment to improve health outcomes for Aboriginal and Torres Strait Islander people.

Appendix 1

Differences in Aboriginal and Torres Strait Islander people burden of disease and injury and risk factors: Australia 2003 and Queensland 2007

Overview

While this is the third in a series of Queensland Indigenous burden of disease and injury estimates, it is the most comprehensive to date and includes more Queensland specific data than previous efforts. The 2007 Burden of Disease study has improved the specificity of the results for Queensland, but in doing so, it has reduced the comparability of results with previous estimates.

The 2003 Burden of Disease and Injury in Aboriginal and Torres Strait Islander people report (Vos et al 2007) had very little Queensland specific data underpinning the study, as did the 2003 and 2006 Queensland updates. However, this 2007 update is significantly different in that it includes:

- Queensland life tables by remoteness categories
- revised cause of death structure for Queensland
- refresh of a limited number of disease models for the non-fatal contribution to the burden
- use of Queensland specific risk factor exposure data in a number of the risk factor models.

While these adjustments have improved the accuracy and specificity of the results, the comparability with previous estimates is reduced. Given these changes in the underlying parameters, a time series analysis of the burden over time is not possible. It is important to note in the following two tables that in identifying differences, the impact of different inputs in the national 2003 model and the Queensland specific update of 2007 are identified, rather than changes to the burden of disease over time.

Burden of disease and injury

Table 17 **Comparison of leading specific causes of burden of disease and injury in Aboriginal and Torres Strait Islander people, Australia 2003 and Queensland 2007**

	Rank		DALYs		% of total DALY	
	Australia	Queensland	Australia	Queensland	Australia	Queensland
Specific cause	2003	2007	2003	2007	2003	2007
Anxiety and depression	3	1	7446	2650	7.8%	10.2%
Type 2 diabetes	2	2	7881	2405	8.2%	9.3%
Ischaemic heart disease	1	3	9973	2215	10.4%	8.5%
COPD	4	4	3619	1073	3.8%	4.1%
Asthma	6	5	3303	933	3.4%	3.6%
Suicide and self-inflicted injuries	5	6	3439	816	3.6%	3.1%
Stroke	9	7	2706	659	2.8%	2.5%
Road traffic accidents	7	8	3030	610	3.2%	2.3%
Homicide and violence	10	9	1956	597	2.0%	2.3%
Low birth weight	12	10	1809	557	1.9%	2.1%

Risk factors

Table 18 **Comparison of burden of disease and injury in Aboriginal and Torres Strait Islander people attributable to 11 risk factors, Australia 2003 and Queensland 2007**

	Rank		DALYs		% of total DALY	
	Australia	Queensland	Australia	Queensland	Australia	Queensland
Specific cause	2003	2007	2003	2007	2003	2007
Joint			*35895*	*9366*	*37.4%*	*36.1%*
High body mass	2	1	10919	3145	11.4%	12.1%
Tobacco	1	2	11633	3013	12.1%	11.6%
Physical inactivity	3	3	8032	2054	8.4%	7.9%
High blood cholesterol	4	4	5262	1188	5.5%	4.6%
Alcohol	5	5	5171	1026	5.4%	4.0%
High blood pressure	6	6	4417	995	4.6%	3.8%
Low fruit and vegetable intake	7	7	3344	793	3.5%	3.1%
Intimate partner violence	9	8	2469	775	2.6%	3.0%
Illicit drugs	8	9	3264	720	3.4%	2.8%
Child sexual abuse	10	10	1390	539	1.4%	2.1%
Unsafe sex	11	11	1174	280	1.2%	1.1%

Appendix 2

Methods used to update selected epidemiological models

The following describes the methods used to update specific disease models. Unless otherwise stated, all other assumptions and rates were unchanged from the 2003 Burden of Disease and Injury in Aboriginal and Torres Strait Islander Peoples report (Vos et al 2007).

Mental disorders

Anxiety and depression

Indigenous rate ratios were applied to the 2007 Queensland burden of disease prevalence rates to estimate the Indigenous prevalence at the three remoteness levels. Using data from the NATSIHS 2004–05 (Australian Bureau of Statistics, 2004–05) and the NHS 2004–05 (Australian Bureau of Statistics, 2004–05), Indigenous prevalence rates were estimated by remoteness level. With remission and case fatality rates, DISMOD was used to arrive at outputs for incidence, prevalence, remission, case fatality, duration, mortality and age of onset.

Rate ratios applied to the 2007 Queensland prevalence rates by age group and remoteness:

- 0–4 years: no adjustment
- 4–11 years: 1.6 for both females and males and all areas (Zubrick, et al., 2005)
- 12–17 years: 1.3 for both females and males and all areas (2006 National Survey of Youth Mental Health Literacy)
- 18+ years: from NATSIHS 2004–05 (Australian Bureau of Statistics, 2004–05).

Table 19 Rate ratios of prevalence of anxiety and depression between Aboriginal and Torres Strait Islanders by remoteness category and Queensland

Remoteness	Males	Females
Major cities	1.31	2.46
Regional (inner and outer)	1.99	2.24
Remote (remote and very remote)	1.05	2.00

The average rates for the following anxiety measures were calculated for Queensland Aboriginal and Torres Strait Islander people and non-Indigenous Queenslanders for responses of ‘all of the time or most of the time’:

- How often felt nervous in last four weeks
- How often felt without hope in last four weeks
- How often felt restless or jumpy in last four weeks
- How often felt everything was an effort in last four weeks
- How often felt so sad that nothing could cheer you up in last four weeks.

This methodology is different from that used to estimate the prevalence rates for anxiety in the 2007 Queensland model. The latter used an additional four measures:

- How often felt calm and peaceful in last four weeks
- How often felt happy in last four weeks
- How often felt full of life in last four weeks
- How often had a lot of energy in last four weeks.

These are measures of wellbeing and it was felt that they should be omitted.

Cardiovascular diseases

Ischaemic heart disease

Incidence of angina pectoris and acute myocardial infarction was estimated by applying the national hospitalisation Indigenous to non-Indigenous rate ratios by condition, age and sex from the 2003 Burden of Disease and Injury in Aboriginal and Torres Strait Islander Peoples report (Vos et al 2007) to the Queensland Burden of Disease 2007 estimated incidence.

Peripheral vascular disease

Peripheral vascular disease (PVD) incidence was based on the estimated incidence from the Queensland burden of disease 2007 data (unpublished), adjusted by the rate ratios of hospitalisation for PVD by age and sex from the 2003 Burden of Disease and Injury in Aboriginal and Torres Strait Islander Peoples report (Vos et al 2007).

Chronic respiratory disease

Asthma

Indigenous remoteness relativities were derived from the NATSIHS 2004–05 (Australian Bureau of Statistics, 2004–05) and NHS 2004–05 (Australian Bureau of Statistics, 2004-05) and applied to the 2007 Queensland prevalence rates. The same rates were applied to all age groups.

Table 20 Rate ratios of prevalence of asthma between Aboriginal and Torres Strait Islanders by remoteness category and Queensland

Remoteness	Males	Females
Major cities	1.52	1.50
Regional (inner and outer)	1.16	1.48
Remote (remote and very remote)	0.84	1.00

The same methodology as the 2007 Queensland model was implemented.

Chronic obstructive pulmonary disease (COPD)

For 2006–07 admitted patient episodes of care, ICD–AM codes J40–44 and J46–47, the ratio of Indigenous age and region specific rates to the total Queensland population rate was calculated. This rate was applied to the 2007 Queensland prevalence rates to arrive at the Indigenous remoteness prevalence rates. Data was extracted by Health Statistics Centre (Queensland Health, 2010).

Appendix 3

Methods used for updating selected risk factor models

The following describes the methods used to update the risk factor models. Unless otherwise stated, all other assumptions and rates were unchanged from the 2003 Burden of Disease and Injury in Aboriginal and Torres Strait Islander Peoples report (Vos et al 2007).

Alcohol

Prevalence of alcohol consumption was derived from the NATSIHS 2004–05 (Australian Bureau of Statistics, 2004–05). The NATSIHS 2004-05 asked:

- whether the participant drank alcohol in the week prior to interview and on how many days they drank; and
- more detailed questions regarding type, size and where possible, brand name of drinks consumed on the most recent drinking three days within the previous week.

This information was used to estimate average level of alcohol consumption per day over the week. Given that people tend to be more likely to drink, and also drink at higher levels on the weekend the average alcohol consumption recorded may be dependent on the day of the week of interview (i.e. a person interviewed on a Friday may be less likely to include reporting on weekend drinking than a person interviewed on a Monday). In addition, fewer interviews were conducted on Fridays, Saturdays and Sundays than other days of the week. In an attempt to adjust for this, consumption levels were equally weighted by day of week of interview (i.e. average of prevalence by consumption level over the (up to) seven days). Due to small numbers, the oldest age groups were collapsed to 50 years and older. Since alcohol consumption was not established for those aged 15–17 years, these participants were classed as abstainers.

Participants who reported drinking in the previous week were categorised into one of four drinking levels based on the average quantity of alcohol consumed per day in that week: abstinent, low, hazardous and harmful. Participants who drank between one week and 12 months ago were distributed as per those that drank in the previous week. Participants who drank more than 12 months ago or never were classed as abstinent. This is a considerable change from the Australian studies where those who drank between one week and 12 months ago were classified as abstinent. The new method of distribution considerably reduces the number of participants classified as abstainers, however it seems to have a little effect on the overall alcohol results.

High body mass

Mean BMI and standard deviation was derived from self-report data from the NATSIHS 2004–05 (Australian Bureau of Statistics, 2004–05). The BMI variable available on the confidentialised unit record file (CURF) is censored such that those with a BMI below 16 kg/m2 are recorded as 16 kg/m2, and those that have a BMI of 40 kg/m2 or higher are recorded as 40 kg/m2. This equates to 72 participants with censored BMI. Height and weight data was also available on the CURF with censoring being an issue in 30 cases. BMI was calculated using the height and weight data available on the CURF with those cases with censored height and/or weight data having the applicable measurement being recorded as the minimum or maximum known value. Height, weight, recorded and calculated BMI for those 30 cases were inspected and where recorded BMI was not censored, calculated BMI was replaced with the more accurate recorded BMI (12 cases). Among

the remaining censored cases, there were two where the BMI may be lower than calculated, and 10 where BMI may be higher than calculated, this will have had very little if any impact on the results.

BMI relative risks are for age groups 30–44 years, 45–59 years, 60–69 years, 70–79 years, 80 years and older. The oldest age group available on the NATSIHS CURF is 70 years and older. For the 80 years and older age group, the same mean BMI and standard deviation (SD) as the 70 years and older age group was assumed.

Due to the small number of participants in major cities, major cities and regional areas were combined to create a non-remote estimate.

Fruit and vegetable consumption

Fruit and vegetable consumption was estimated from the NATSIHS 2004–05 (Australian Bureau of Statistics, 2004-05). For Queensland's Aboriginal and Torres Strait Islanders in non-remote areas, reported serves of fruit was converted to grams at 150 grams per serve, vegetables at 75 grams per serve, and the grams of fruit and vegetables were summed. For remote areas whether usually consumes fruit and or vegetables was asked, but average serves per day was not. To estimate the distribution of grams of fruit and vegetable intake for remote areas, those that answered that they do not usually eat fruit and do not usually eat vegetables were allocated to the 0–37.4 gram category, the remaining were distributed according to the age, sex, grams distribution of non-remote areas.

Since the maximum serves of vegetables on the CURF is 'six or more serves', all of these participants are assumed to consume 450 grams of vegetables (6x75 grams). If these participants also consumed no fruit they are placed in the 450 grams category. Around two per cent of the 450 grams category was those that only consumed vegetables. The burden may therefore be slightly overestimated if these participants in fact consumed eight or more serves of vegetables (600 grams).

Illicit drug use

There were minor changes to the illicit drug use risk factor model. Proportion of HIV/AIDS and hepatitis B and C attributable to illicit drug use were updated, however there was insufficient evidence or time to update other aspects of this model.

The proportion of newly diagnosed HIV attributable to illicit drug use only was from Queensland Health's *HIV/AIDS Annual Report 2007: Epidemiology Report* (Queensland Health, 2009) for years 2002–2007.

Exposure category of AIDS diagnoses in Indigenous Queenslanders was not available, therefore the national data for AIDS in Indigenous people (National Centre in HIV Epidemiology and Clinical Research, 2008) was used. Due to the small number of AIDS diagnoses years 2003–2007 were combined. Total number of cases by sex was available, but exposure category was only published with males and females combined. Exposure category distribution by sex was based on the total number of cases with 100 per cent of the men who have sex with men cases being classified as male, and the remaining cases are distributed proportionately.

For deaths following AIDS, HIV exposure categories for cases of AIDS in Indigenous Australians for the years 1998–2007 are used (National Centre in HIV Epidemiology and Clinical Research, 2008) as a proxy, with exposure category by sex derived as described in AIDS above.

Exposure category of new Hepatitis B and C cases was not available by Indigenous status. It was therefore assumed the exposure category distribution was the same as the total Australian population for 2007 (National Centre in HIV Epidemiology and Clinical Research, 2008).

Physical activity

Physical activity prevalence estimates are derived from the NATSIHS 2004–05 (Australian Bureau of Statistics, 2004-05). For non-remote participants, variables on the CURF relating to type of exercise, number of sessions and time spent exercising were used to categorise participants into one of four physical activity categories. All variables required to calculate activity level were not available for remote areas, however the proportion of the remote population that are inactive can be estimated. The remaining active population are distributed as per the physical activity levels of the active non-remote population.

Tobacco

The lag time between exposure to tobacco smoke, and occurrence of cancers and COPD means that current smoking prevalence is not useful in determining the burden attributable to tobacco smoking. For these conditions the smoking impact ratio (SIR) is used to derive a population attributable fraction (PAF). Calculation of the SIR required lung cancer mortality rates for the study population.

The prevalence of current daily smoking was from the NATSIHS 2004–05 (Australian Bureau of Statistics, 2004-05) by sex and age group to 50+ years. Due to the small numbers in major city areas regional and major cities were collapsed to create a non-remote category. Smoking status related questions were asked of participants aged 18 years and older. Although not realistic, it was assumed that those aged under 18 years did not smoke.

The proportion of Indigenous babies born to mothers that smoked during pregnancy is required to attribute low birth weight to smoking. Smoking during pregnancy among mothers delivering in 2007 is available by Indigenous status of the mother in *Perinatal Statistics Queensland 2007* (Queensland Health, 2009). Indigenous status of father is unknown in this dataset. According to births data, 29.6 per cent of Indigenous babies born in Queensland in 2007 had a non-Indigenous mother (Australian Bureau of Statitics, 2008). For these births, the smoking during pregnancy rate of non-Indigenous mothers by remoteness was applied. For the remaining 70.3 per cent of Indigenous births, the Indigenous smoking rate by remoteness was applied. Due to lack of data this method assumes the distribution of Indigenous births by Indigenous status of the parents is the same by remoteness across Queensland.

Maternal tobacco smoke has been linked to lower respiratory tract infections, Sudden Infant Death Syndrome (SIDS), otitis media and asthma. To estimate lower respiratory tract infection, SIDS and otitis media attributable to maternal smoking the same prevalence of exposure as that described above for smoking during pregnancy is assumed. For asthma where the condition has been linked to a higher level of maternal smoking we estimate prevalence of exposure based on the proportion of Indigenous babies born in 2007 whose mother smoked 10+ cigarettes per day at 20+ weeks pregnant (Australian Bureau of Statitics, 2008) (Queensland Health, 2009).

Unsafe sex

For HIV, AIDS, AIDS deaths, and hepatitis B and C, the proportion of burden attributed to unsafe sex used the same data and methods described in illicit drug use (above). As per the *Australian burden of disease study*, all sexually transmissible infection, abortion and cervical cancer is attributed to unsafe sex.

References

Australian Bureau of Statistics, 2004-05. *National Aboriginal and Torres Strait Islander Health Survey Expanded State/Territory by ASGC Remoteness 2004-05, Expanded CURF, RADL. Finding based on use of ABS CURF data,* Canberra: Australian Bureau of Statistics.

Australian Bureau of Statistics, 2004-05. *National Aboriginal and Torres Strait Islander Health Survey Expanded State/Territory by ASGC Remoteness 2004-05, Expanded CURF, RADL. Findings based on use of ABS CURF data.,* Canberra: s.n.

Australian Bureau of Statistics, 2004-05. *National Health Survey Expanded 2004-05, Expanded CURF, RADL. Findings based on use of ABS CURF data.,* Canberra: s.n.

Australian Bureau of Statitics, 2008. *Births Australia 2007, 'Table 01. Birthsm Summary Australia, states and territories, data cube, cat. no. 33010DO002_2007.* [Online]
Available at:
http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3301.02007?OpenDocument
[Accessed 10 June 2014]

Australian Institute of Health and Welfare (AIHW), *An Enhanced Mortality Database for Estimating Indigenous Life Expectancy, Queensland, AIHW 2010*, unpublished paper, November 2010.

Begg, S. et al., 2007. *The Burden of Disease and Injury in Australia 2003,* Canberra: AIHW.

Institute for Health Metrics and Evaluation, 2013. *GBD Profile: Australia.* [Online]
Available at: http://www.healthmetricsandevaluation.org/sites/default/files/country-profiles/GBD%20Country%20Report%20-%20Australia.pdf
[Accessed 10 June 2014].

Murray, C. J. L. e. a., 2012. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990—2010: a systematic analysis for the Global Burden of Disease Study 2010. *The Lancet,* 380(9859), pp. 2197-2223.

National Centre in HIV Epidemiology and Clinical Research, 2008. *HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2008,* Sydney: National Centre in HIV Epidemiology and Clinical Research, The University of Sydney.

Queensland Government, 2008. *Close the Gap: Indigenous Health Equality Summit Statement of Intent.* [Online]
Available at: http://www.health.qld.gov.au/atsihealth/documents/statement_intent_qld.pdf
[Accessed 10 June 2014]

Queensland Health: Begg, S., Bright, M. & Harper, C., 2008. *Differentials in burden of disease and injury in Queensland, 2006,* Brisbane: Queensland Health.

Queensland Health: Begg, S. et al., 2008. *Differentials in the burden of disease and injury in Queensland, 2003,* Brisbane: Queensland Health.

Queensland Health: Begg, S. et al., 2008. *Overview of the burden of disease and injury in Queensland, 2003.,* Brisbane: Queensland Health.

Queensland Health, 2009. *HIV/AIDS Annual Report 2007: Epidemiology Report,* Brisbane: Queensland Health.

Queensland Health, 2009. *Perinatal statistics, Queensland 2007,* Brisbane: Queensland Health.

Queensland Health, 2010. *Queensland hospital admitted patient data collection.* Brisbane: Queensland Health.

Queensland Health, 2012. *Experimental Life Tables by Remoteness, Queensland, 2002-04 and 2005-07.* Brisbane: Queensland Health.

The Lancet, 2012. *The Global Burden of Disease Study 2010.* The Lancet*,* 380(9859), pp. 2053-2260.

University of Melbourne, 2006. *The 2006 National Survey of Youth Mental Health Literacy,* Orygen Youth Health Research Centre, Melbourne School of Psychological Sciences.

Vos, T., Barker, B., Stanley, L. & Lopez, A., 2007. *The burden of disease and injury in Aboriginal and Torres Strait Islander peoples 2003,* Brisbane: School of Population Health, The University of Queensland.

Zubrick, S. R. et al., 2005. *The Western Australian Aboriginal Child Health Survey: The social and emotional wellbeing of Aboriginal children and young people (vol. 2).,* Perth: Curtin University of Technology and Telethon Institute for Child Health Research.

Notes

Notes