



Australian Government

**Australian Institute of
Health and Welfare**

*Better information and statistics
for better health and wellbeing*

Contribution of chronic disease to the gap in adult mortality between Aboriginal and Torres Strait Islander and other Australians

May 2011

Australian Institute of Health and Welfare
Canberra

Cat. no. IHW 48

The Australian Institute of Health and Welfare is Australia's national health and welfare statistics and information agency. The Institute's mission is *better information and statistics for better health and wellbeing.*

© Australian Institute of Health and Welfare 2011

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced without prior written permission from the Australian Institute of Health and Welfare. Requests and enquiries concerning reproduction and rights should be directed to the Head, Media and Communications Unit, Australian Institute of Health and Welfare, GPO Box 570, Canberra ACT 2601.

A complete list of the Institute's publications is available from the Institute's website <www.aihw.gov.au>.

ISBN 978-1-74249-144-8

Suggested citation

Australian Institute of Health and Welfare 2010. Contribution of chronic disease to the gap in adult mortality between Aboriginal and Torres Strait Islander and other Australians. Cat. No. IHW 48. Canberra: AIHW.

Australian Institute of Health and Welfare

Board Chair

Hon. Peter Collins, AM, QC

Director

David Kalisch

Any enquiries about or comments on this publication should be directed to:

Communications, Media and Marketing Unit

Australian Institute of Health and Welfare

GPO Box 570

Canberra ACT 2601

Phone: (02) 6244 1032

Email: info@aihw.gov.au

Published by the Australian Institute of Health and Welfare

Please note that there is the potential for minor revisions of data in this report. Please check the online version at <www.aihw.gov.au> for any amendments.

Contents

- Contentsiii**
- Acknowledgments..... iv**
- Summary v**
- 1 Introduction.....1**
- 2 Methods2**
 - 2.1 Mortality and population data.....2
 - 2.2 The mortality gap.....2
 - 2.3 Chronic diseases.....3
 - 2.4 The structure of the analysis.....4
- 3 Results5**
 - 3.1 Estimating the mortality gap.....5
 - 3.2 The contribution of chronic diseases.....7
 - 3.3 The contribution of major disease groups8
 - 3.4 The contribution of specific disease groups and some alternative disease groups.....9
- 4 Discussion.....18**
 - 4.1 Overview18
 - 4.2 Specific diseases18
 - 4.3 Closing the gap.....19
- Appendix 1: Assumptions and terminology21**
- Appendix 2: Classification of chronic diseases24**
- Appendix 3: Deaths, PYLL and PYLL rates for tables 4 to 13.....30**
- References40**

Acknowledgments

Stan Bennett, Anne Broadbent, Anna Reynolds and Lynelle Moon of the National Centre for Monitoring Cardiovascular Disease at the Australian Institute of Health and Welfare (AIHW) wrote this report.

It was prepared as part of the AIHW's Indigenous Biennial Report and as one of the major pieces of analysis for the Aboriginal and Torres Strait Islander Health and Welfare Observatory, a web-based observatory to be launched in 2011.

Members of the Cardiovascular Disease Monitoring Advisory Committee (CVDMAC), the National Diabetes Data Working Group (NDDWG) and the Chronic Kidney Disease Monitoring Advisory Committee (CKDMAC) refereed the report. Their valuable comments are gratefully acknowledged.

Many staff of the AIHW provided helpful comments including Kuldeep Bhatia, Adrian Webster, Mark Cooper-Stanbury, Karen Bishop, Frances Green, Susana Senes, Amber Jefferson, Lyle Baker, Indrani Pieris-Caldwell, Helen Johnstone, Barbara Gray and Fadwa Al-Yaman. We also thank Lany Trinh for her assistance with data checking, and staff of the AIHW Information Services and Publishing, and Media and Communications units who helped with publishing and releasing this report.

The Steering Committee for the Indigenous Biennial Report provided overall guidance for the project.

Summary

There is a substantial gap in life expectancy between Aboriginal and Torres Strait Islander people and other Australians – currently estimated by the Australian Bureau of Statistics (ABS) at 12 years for males and 10 years for females.

Chronic disease is known to be a major contributor to this gap for adults. This report quantifies that contribution in terms of potential years of life lost – a measure that takes into account both the number of deaths and the age at which death occurs.

About 80% of the mortality gap between Indigenous and other Australians aged 35–74 years is due to chronic diseases. Of the gap due to chronic disease, the main contributors are:

- ischaemic heart diseases (22%)
- diabetes mellitus (12%)
- diseases of liver (mainly from alcoholic liver disease) (11%)
- other forms of heart disease (such as heart failure and cardiomyopathy) (6%)
- chronic lower respiratory diseases (mainly chronic obstructive pulmonary disease) (6%)
- cerebrovascular diseases (5%).

Cancer is also an important contributor, the most prominent being cancer of the respiratory and intrathoracic organs (4%), cancer of the digestive organs (4%) and cancer of the lip, oral cavity and pharynx (2%).

There are important differences across age and sex groups:

- Alcoholic liver disease is an important contributor to the mortality gap for both males and females aged 35–54 years.
- Lung cancer and chronic obstructive pulmonary disease are important contributors for both males and females aged 55–74 years.
- Chronic kidney disease is an important contributor for females aged 35–54 years and both males and females aged 55–74 years.

Many of these diseases are associated with inter-related factors that are common to more than one disease, such as risk behaviours and issues related to service provision and access, and disease treatment and management among Indigenous Australians. These factors are often also associated with social and economic disadvantage in areas such as housing, education and employment.

1 Introduction

Aboriginal and Torres Strait Islander people generally have significantly more ill health than other Australians and typically die at much younger ages. One reason is their socioeconomic disadvantage compared with other Australians. On average, Indigenous Australians have lower incomes, higher rates of unemployment, lower educational attainment and more overcrowded households (AIHW 2009). This socioeconomic disadvantage places them at greater risk of unhealthy risk factors, in particular smoking, alcohol misuse and being overweight or obese (AIHW 2010).

In this context, the Council of Australian Governments has agreed to six specific targets and timelines to reduce disadvantage among Indigenous Australians. These targets acknowledge the importance of reducing the gap in health levels and of improving the social determinants of health. The first of the six targets relates to closing the gap in life expectancy between Indigenous and other Australians (AIHW 2010).

The lower life expectancy of Indigenous Australians compared with that of other Australians has been well documented. The ABS recently revised their method of estimating the life expectancy of Indigenous Australians and the new method suggests a markedly higher Indigenous life expectancy than previous estimates. For the period 2005–2007, the life expectancy at birth was estimated to be 67 years for Indigenous males and 73 years for Indigenous females (ABS 2009). Equivalent estimates for other Australians were 79 years for males and 83 years for females. This is a gap in life expectancy of 12 years for males and 10 years for females. While these latest estimates of Indigenous life expectancy are much higher than previous estimates, the life expectancy gap remains substantial although now more on a par with gap estimates for Indigenous people of New Zealand and Canada (McDermott 2009).

In Australia, Indigenous peoples' life expectancy is shorter because of higher mortality rates for many diseases but also because death from these diseases occurs earlier in life. This phenomenon is best revealed by a measure – potential years of life lost or PYLL – which takes into account the age at which death occurs. This report examines which diseases have contributed most to the life expectancy gap by defining the mortality gap in terms of the number of potential years of life lost.

Chronic diseases are the focus of the analysis because they are known to place a significant burden on Indigenous Australians in terms of mortality and disability (Vos et al. 2009). Chronic diseases occur more often among Indigenous Australians and at a much younger age (AIHW: Mathur et al. 2006).

The purpose of the analysis in this report is to:

- estimate the overall contribution of chronic diseases to the mortality gap between Indigenous and other Australians
- identify which particular chronic diseases contribute most to this gap
- examine whether the causes of the mortality gap differ by age and sex.

The chronic diseases that contribute most to the mortality gap represent the diseases with the greatest potential for health gain in terms of reducing the gap in life expectancy.

2 Methods

2.1 Mortality and population data

Mortality data have been extracted from the AIHW's National Mortality Database, which contains information collected on death registrations by the state and territory registrars (Box 2.1).

Box 2.1: National Mortality Database

The AIHW's National Mortality Database contains information about all deaths registered in Australia. Deaths are certified by a medical practitioner or the coroner and registered by the Registrar of Births, Deaths and Marriages in each state or territory. The ABS codes the cause of death using the International Statistical Classification of Diseases and Related Health Problems and passes the data to the AIHW for inclusion in the National Mortality Database. Although the database includes multiple causes of death, only the underlying cause is used in this analysis.

In order to counteract small numbers and year-to-year variability in some cause of death data for Indigenous Australians, the analysis is conducted on combined deaths for the 3-year period 2005 to 2007 rather than 2006 death data alone. Population estimates for 2006 are multiplied by 3 and used as the denominator to calculate average annual rates per 10,000 population, centred around the year 2006.

The analysis is performed on the combination of mortality records for New South Wales, Queensland, Western Australia, South Australia and the Northern Territory as these are the jurisdictions where the level of identification of Indigenous people in the data is considered to be adequate for analysis.

The mortality analysis is based on the underlying cause of death, which is the disease or injury that initiated the train of events leading directly to death – in other words, the condition believed to be the primary cause of death. This is discussed in more detail in Appendix 1.

2.2 The mortality gap

The mortality gap between Indigenous and other Australians is defined in terms of potential years of life lost (PYLL) which gives greater weight to deaths at younger ages compared to death rates (Box 2.2). The potential years of life lost from a disease or injury is an indicator of premature or untimely death.

Box 2.2: The mortality gap

The potential years of life lost for an individual is determined by age at death and takes into account only deaths that occur before a particular age. In this report, dying before the age of 75 is defined as premature. Thus, a person dying at age 45 has potentially lost 30 years of life, while a person dying at age 80 is deemed to have lost no years of life.

Individual PYLL are summed to provide a total PYLL for population groups. The PYLL rate is calculated by dividing the total PYLL by the number of people in the population group.

The mortality gap is calculated as the difference between Indigenous and other Australians in potential years of life lost due to premature mortality, that is:

The mortality gap = the annual PYLL rate for Indigenous Australians - the annual PYLL rate for other Australians.

The mortality gap is calculated using deaths that occurred in Australians who were aged 35 or older and younger than age 75.

The reasons for choosing these age limits are discussed in Appendix 1.

Taking age at death into account acknowledges that Indigenous Australians tend to die at a younger age than other Australians and, as a consequence, the analysis is better able to identify those diseases which are contributing most to the gap in life expectancy.

2.3 Chronic diseases

Most chronic diseases are rarely cured and do not usually resolve spontaneously. They persist over time, and can become immediately life threatening (for example, heart attacks associated with chronic circulatory diseases). Chronic diseases can be intensive in terms of management (for example, end-stage kidney disease) and most persist throughout an individual's life, but are not always the cause of death (for example, arthritis).

Some characteristics of chronic disease are:

- complex causality, often associated with multiple risk factors
- gradual onset during which there may be no symptoms
- long lasting with persistent effects that progress over an individual's life
- sometimes associated with the development of other chronic diseases
- functional impairment or disability.

People can live for many years with chronic conditions; however, quality of life can be significantly compromised through activity limitation and impairment and a need for prolonged assistance.

For the purposes of this analysis, the underlying cause of death is used to categorise deaths as being due to chronic disease, or otherwise, using the World Health Organization's (WHO) International Classification of Diseases (ICD-10). Since there is no standard definition of 'chronic disease', it is defined in terms of major disease groups using ICD-10 chapter headings. Broadly, the chapter headings that are classified as 'chronic' are diseases of the circulatory system; cancers; endocrine and metabolic diseases; diseases of the respiratory, digestive, genitourinary and nervous systems; and mental and behavioural disorders. A list of disease chapters and their ICD-10 codes that are classified as 'chronic' for the purpose of

this analysis is given in Table 3 and Appendix 2. Although some acute diseases are included among these broad headings, most deaths that occur are due to chronic diseases.

2.4 The structure of the analysis

The size of the mortality gap between Indigenous and other Australians is calculated in terms of PYLL, and the overall contribution of chronic diseases to this mortality gap is estimated.

The relative contribution of different diseases to the mortality gap due to chronic diseases is conducted at three different levels of disease classification:

- **Major disease groups**

The contribution of major chronic disease groups to the mortality gap is estimated using ICD-10 disease chapters. This is a broad-level analysis as each ICD-10 chapter is comprised of a wide range of diseases (albeit related). An example of a chronic disease chapter is diseases of the respiratory system (ICD-10 codes J00–J99).

- **Specific disease groups**

The relative contribution of specific chronic diseases to the mortality gap is estimated using ICD-10 disease blocks, which are narrower groups of codes within chapters. An example of a disease block is chronic lower respiratory diseases (ICD-10 codes J40–J47).

- **Alternative disease groups**

As well as disease blocks, the contribution of some alternative disease groups of particular interest is also examined. These diseases comprise only part of a disease block or comprise codes from different disease blocks. Examples are chronic obstructive pulmonary disease (ICD codes J40–J44) and chronic kidney disease (see Appendix 2). These disease groups provide an additional level of analysis and help in the interpretation of the leading causes of the mortality gap between Indigenous and other Australians.

Although some chapters and blocks contain acute diseases, the approach used in this report enables diseases to be compared at a similar level of classification (that is, chapter to chapter) and to compare the relative contributions of diseases (percentages add to 100). This approach is also consistent with that taken in the Burden of Disease study (Vos et al. 2007).

The analysis is conducted for people aged 35–74 years, and repeated for males and females aged 35–54 and 55–74 years in order to examine whether the relative contribution of diseases to the mortality gap varied by sex and age.

Data quality issues and limitations associated with this analysis are discussed in Appendix 1.

3 Results

3.1 Estimating the mortality gap

Among Indigenous Australians aged 35–74 years there were 4,060 deaths during 2005–2007 which is an annual crude death rate of 105.2 deaths per 10,000 population (Table 1). These premature deaths amount to 81,286 potential years of life lost over this 3-year period, an average annual PYLL rate of 2,106 per 10,000 population.

Table 1: The mortality gap between Indigenous and other Australians, age and sex, 2006^(a)

	Males		Females		Persons
	35–54	55–74	35–54	55–74	35–74
Indigenous Australians					
Population 2006	46,942	14,236	50,857	16,608	128,643
Deaths 2005–2007	1,209	1,139	762	950	4,060
Annual death rate (per 10,000 population)	85.9	266.7	49.9	190.7	105.2
PYLL 2005–2007	36,363	12,407	22,587	9,929	81,286
Annual PYLL rate (per 10,000 population)	2,582	2,905	1,480	1,993	2,106
Other Australians					
Population 2006	2,046,072	1,289,853	2,063,797	1,297,382	6,697,104
Deaths 2005–2007	12,735	43,352	7,362	25,598	89,047
Annual death rate (per 10,000 population)	20.7	112.0	11.9	65.8	44.3
PYLL 2005–2007	360,879	383,416	206,315	221,502	1,172,112
Annual PYLL rate (per 10,000 population)	588	991	333	569	583
Rate differences					
Absolute difference in death rates (per 10,000 population) ^(b)	65.1	154.7	38.1	124.9	60.9
Absolute difference in PYLL rates (per 10,000 population)^(c)	1,994	1,914	1,147	1,424	1,523

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

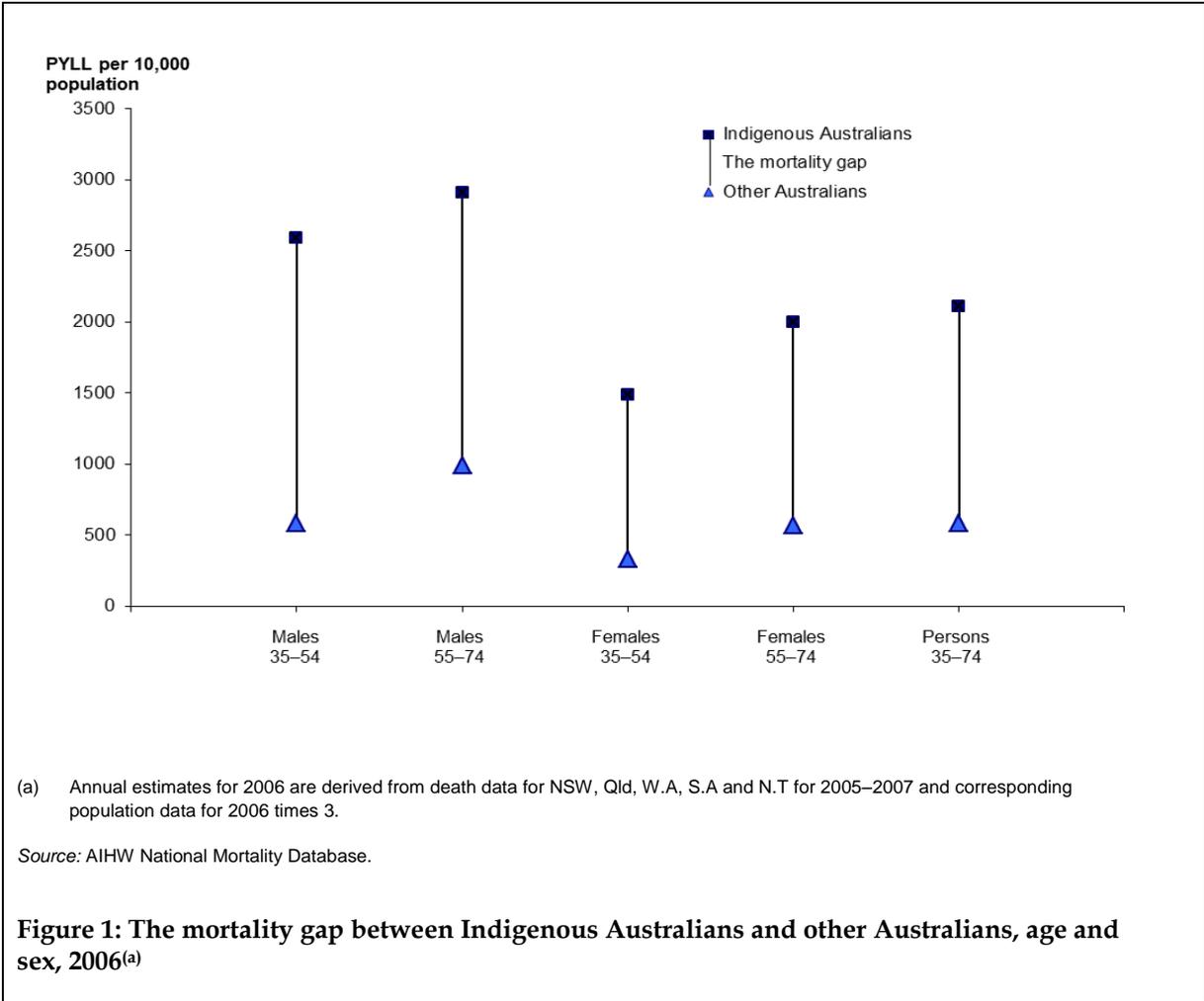
(b) Annual death rate for Indigenous Australians – annual death rate for other Australians (per 10,000 population).

(c) The PYLL gap, calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

The annual death rate and PYLL rate are both markedly higher among Indigenous Australians than other Australians. The difference in crude death rates is 60.9 deaths per 10,000 population which, when age at death is taken into account, equates to 1,523 PYLL per 10,000 population. This absolute difference in PYLL rates between Indigenous Australians and other Australians (1,523 per 10,000 population) is referred to as the mortality gap in this report.

Figure 1 shows that the size of the mortality gap in terms of potential years of life lost is greater among males than females. It also illustrates that the size of the PYLL mortality gap is not markedly different between ages 35–54 and 55–74 years, even though there is a marked increase in death rates between these two ages (Table 1). The PYLL approach gives a greater weight to a death at a younger age than a death at an older age; that is, a younger person loses more potential years of life than an older person.



3.2 The contribution of chronic diseases

About 80% of the mortality gap between Indigenous and other Australians can be attributed to chronic diseases (Table 2). Among males aged 35–54 years, almost 75% of the mortality gap is due to chronic diseases, and almost 95% among males aged 55–74 years. Equivalent figures are 79% and 95% for females¹.

Table 2: The mortality gap by broad disease groups, age and sex, 2006^(a)

Broad disease groups (ICD-10 codes)	Males		Females		Persons
	35–54	55–74	35–54	55–74	35–74
PYLL gap^(b)					
Chronic diseases (C00–N99) ^(c)	1,494	1809	903	1,345	1,213
Communicable, maternal, neonatal and congenital conditions (A00–B99, O00–Q99)	58	31	55	34	51
Symptoms, signs and abnormal clinical and laboratory findings, nec. (R00–R99)	70	35	46	25	51
External causes (V01–Y98)	373	40	144	20	208
Total PYLL gap (all causes)	1,994	1,914	1,147	1,424	1,523
Percentage distribution					
Chronic diseases (C00–N99) ^(c)	74.9	94.5	78.7	94.5	79.7
Communicable, maternal, neonatal and congenital conditions (A00–B99, O00–Q99)	2.9	1.6	4.8	2.4	3.3
Symptoms, signs and abnormal clinical and laboratory findings, nec. (R00–R99)	3.5	1.8	4.0	1.8	3.4
External causes (V01–Y98)	18.7	2.1	12.5	1.4	13.7
Total	100.0	100.0	100.0	100.0	100.0

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(c) This broad definition of chronic diseases, based on ICD-10 chapters, includes some acute diseases but most deaths are due to chronic diseases.

Source: AIHW National Mortality Database.

The next two sections examine which particular chronic diseases are contributing most to the mortality gap due to chronic diseases, first in terms of major disease groups (chronic disease chapters) and then in terms of a specific chronic diseases (chronic disease blocks) and some alternative disease groups.

¹ Although the focus of this analysis is on the contribution of chronic diseases to the mortality gap, the important contribution made by external causes among Indigenous Australians aged 35–54 is noteworthy (Table 2).

3.3 The contribution of major disease groups

The greatest contribution to the mortality gap between Indigenous and other Australians due to chronic diseases is made by diseases of the circulatory system followed by endocrine, nutritional and metabolic diseases (Table 3). Diseases of the digestive system are more important for explaining the gap among those aged 35–54 years, whereas diseases of the respiratory system are more important among those aged 55–74 years. Overall, neoplasms make the fourth biggest contribution to the mortality gap. These five chronic disease chapters explain almost 90% of the mortality gap caused by chronic diseases.

Table 3: The mortality gap by major disease groups, age by sex, 2006^(a)

Chronic disease chapter (ICD-10 codes) ^(b)	Males		Females		Persons
	35–54	55–74	35–54	55–74	35–74
	PYLL gap^(b)				
Diseases of the circulatory system (I00–I99)	610	633	316	433	457
Endocrine, nutritional and metabolic diseases (E00–E90)	154	271	122	280	168
Diseases of the digestive system (K00–K93)	211	120	168	78	165
Neoplasms (C00–D48)	189	366	121	246	155
Diseases of the respiratory system (J00–J99)	144	223	76	152	122
Diseases of the genitourinary system (N00–N99)	55	85	46	86	58
Mental and behavioural disorders(F00–F99)	49	43	29	16	35
Diseases of the nervous system (G00–G99)	67	36	6	23	33
Other chronic disease chapters ^(d)	15	33	20	31	20
Total PYLL gap (chronic diseases)	1,494	1,809	903	1,345	1,213
	Percentage distribution				
Diseases of the circulatory system (I00–I99)	40.8	35.0	35.0	32.2	37.7
Endocrine, nutritional and metabolic diseases (E00–E90)	10.3	15.0	13.5	20.8	13.9
Diseases of the digestive system (K00–K93)	14.1	6.6	18.6	5.8	13.6
Neoplasms (C00–D48)	12.7	20.2	13.4	18.3	12.8
Diseases of the respiratory system (J00–J99)	9.7	12.3	8.5	11.3	10.1
Diseases of the genitourinary system (N00–N99)	3.7	4.7	5.0	6.4	4.8
Mental and behavioural disorders(F00–F99)	3.3	2.4	3.2	1.2	2.9
Diseases of the nervous system (G00–G99)	4.5	2.0	0.6	1.7	2.7
Other chronic disease chapters ^(d)	1.0	1.8	2.2	2.3	1.7
Total	100.0	100.0	100.0	100.0	100.0

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(c) Some chronic disease chapters include acute diseases but most deaths are due to chronic diseases.

(d) Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50–D89); Diseases of the eye, adnexa, ear and mastoid process (H00–H95); Diseases of the skin and subcutaneous tissue (L00–L99); Diseases of the musculoskeletal system and connective tissue (M00–M99).

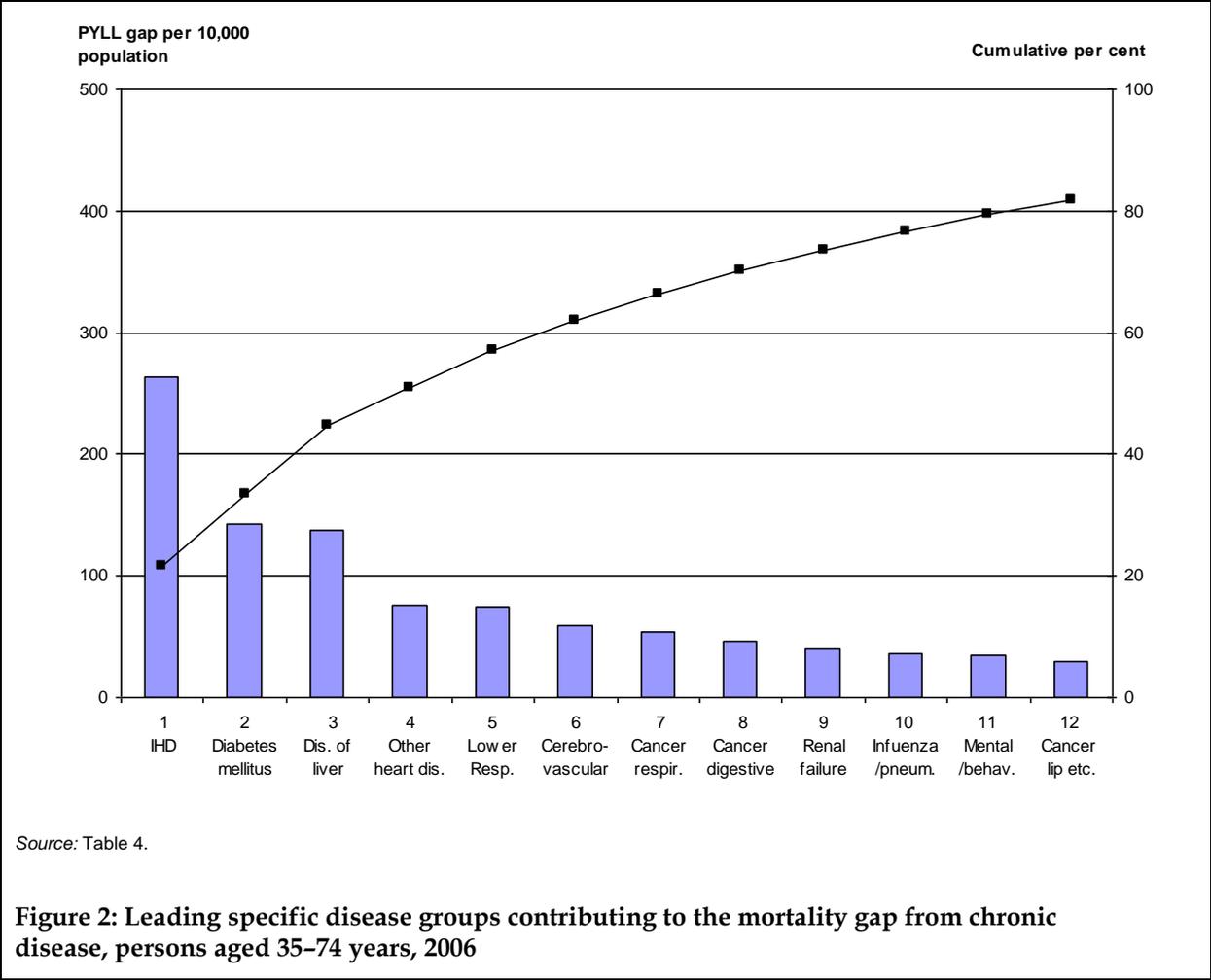
Source: AIHW National Mortality Database.

3.4 The contribution of specific disease groups and some alternative disease groups

The following figure and tables show the leading causes of the mortality gap due to specific chronic diseases, based on disease blocks and some alternative disease groups that are known to have particular relevance to Indigenous Australians (see Appendix 2 for a full list of ICD-10 codes). The number of deaths, PYLL and PYLL rates on which these tables are based are provided as Appendix tables A4 to A13.

Persons aged 35–74 years

Over 60% of the mortality gap due to chronic disease results from six specific diseases, and over 80% from twelve specific diseases (Figure 2).



Overall, the top three specific diseases contributing to the mortality gap between Indigenous and other Australians are ischaemic heart disease (22%), diabetes mellitus (12%) and diseases of the liver (11%) (Table 4). These are followed by other forms of heart disease (6%), which include cardiomyopathy and heart failure. Chronic lower respiratory disease contributes 6% to the mortality gap and cerebrovascular diseases account for 5%. Cancer of the respiratory

and intrathoracic organs, cancer of the digestive organs and cancer of the lip, oral cavity and pharynx are also prominent.

Table 4: Leading causes of the mortality gap by specific chronic diseases, persons aged 35–74 years, 2006^(a)

Rank	Cause of death (ICD-10 block codes) ^(b)	PYLL gap ^(c)	Per cent
1	Ischaemic heart diseases (I20–I25)	263	21.7
2	Diabetes mellitus (E10–E14)	143	11.8
3	Diseases of liver (K70–K77)	138	11.3
4	Other forms of heart disease (I30–I52)	75	6.2
5	Chronic lower respiratory diseases (J40–J47)	74	6.1
6	Cerebrovascular diseases (I60–I69)	59	4.8
7	Respiratory and intrathoracic organs (cancer) (C30–C39)	54	4.4
8	Digestive organs (cancer) (C15–C26)	47	3.8
9	Renal failure (N17–N19)	40	3.3
10	Influenza and pneumonia (J09–J18)	36	3.0
11	Mental and behavioural disorders due to psychoactive substance use (F10–F19)	35	2.9
12	Lip, oral cavity and pharynx (cancer) (C00–C14)	29	2.4
	Other chronic diseases	221	18.2
	Total PYLL gap (chronic diseases)	1,213	100.0

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Some chronic disease blocks include acute diseases but most deaths are due to chronic conditions.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

Analysis by particular alternative disease groups (Table 5) shows that the contribution of diseases of the liver to the mortality gap is mainly from alcoholic liver disease (8%), and the contribution of chronic lower respiratory disease is mainly as chronic obstructive pulmonary disease (4%). Cancer of the respiratory and intrathoracic organs is mainly lung cancer (4%). Chronic kidney disease contributes 6% to the mortality gap while stroke and transient ischaemic attack together contribute 4%.

Table 5: Leading causes of the mortality gap by alternative disease groups, persons aged 35–74 years, 2006^(a)

Alternative cause of death groups (ICD-10 codes) ^(b)	PYLL gap ^(c)	Per cent
Alcoholic liver disease (K70)	91	7.5
Chronic kidney disease ^(d)	75	6.1
Stroke and transient ischaemic attack (I60–I64; G45)	52	4.3
Chronic obstructive pulmonary disease (J40–J44)	47	3.9
Lung cancer (C33–C44)	44	3.7
Mental and behavioural disorders due to use of alcohol (F10)	32	2.6

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Diseases known to have specific relevance to Indigenous Australians that comprise only part of an ICD-10 block or several codes from different blocks. Epilepsy (G40–G41) and Fibrosis and cirrhosis of liver (K74) were also examined but not listed here because they each explained less than 2% of the PYLL chronic disease gap.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(d) Includes codes from cardiovascular disease, diabetes and other disease chapter/blocks (see Appendix 2 for list of codes).

Source: AIHW National Mortality Database.

Males aged 35–54 years

For males aged 35–54 years, ischaemic heart diseases contribute most (27%) to the mortality gap between Indigenous and other Australians caused by chronic diseases (Table 6). The second largest contributor is diseases of the liver (12%), mainly in the form of alcoholic liver disease (9%) (tables 6 and 7). Diabetes mellitus, the third leading specific cause of the PYLL gap, contributes 8%. Other forms of heart disease explain 7%. Cancer of the digestive organs explains 5% and chronic lower respiratory diseases 5%.

Of the alternative disease groups, chronic kidney disease explains 4% of the mortality gap as do stroke and transient ischaemic attack combined (Table 7). The contribution of lung cancer (3%) represents over half of the contribution of cancer of the respiratory and intrathoracic organs. The contribution of chronic obstructive pulmonary disease represents about half of the contribution from chronic lower respiratory diseases (tables 6 and 7).

Table 6: Leading causes of the mortality gap by specific chronic diseases, males aged 35–54 years, 2006^(a)

Rank	Cause of death (ICD-10 block codes) ^(b)	PYLL gap ^(c)	Per cent
1	Ischaemic heart diseases (I20–I25)	397	26.6
2	Diseases of liver (K70–K77)	184	12.3
3	Diabetes mellitus (E10–E14)	115	7.7
4	Other forms of heart disease (I30–I52)	108	7.2
5	Digestive organs (cancer) (C15–C26)	81	5.4
6	Chronic lower respiratory diseases (J40–J47)	72	4.9
7	Cerebrovascular diseases (I60–I69)	59	3.9
8	Influenza and pneumonia (J09–J18)	53	3.6
9	Respiratory and intrathoracic organs (cancer) (C30–C39)	51	3.4
10	Mental and behavioural disorders due to psychoactive substance use (F10–F19)	49	3.3
11	Lip, oral cavity and pharynx (cancer) (C00–C14)	41	2.7
12	Renal failure (N17–N19)	39	2.6
	Other chronic diseases	243	16.3
	Total PYLL gap (chronic diseases)	1,494	100.0

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Some chronic disease blocks include acute diseases but most deaths are due to chronic conditions.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

Table 7: Leading causes of the mortality gap by alternative disease groups, males aged 35–54 years, 2006^(a)

Alternative cause of death groups (ICD-10 codes) ^(b)	PYLL gap ^(c)	Per cent
Alcoholic liver disease (K70)	131	8.8
Chronic kidney disease ^(d)	60	4.0
Stroke and transient ischaemic attack (I60–I64; G45)	59	4.0
Mental and behavioural disorders due to use of alcohol (F10)	45	3.0
Lung cancer (C33–C34)	41	2.8
Chronic obstructive pulmonary disease (J40–J44)	36	2.4
Epilepsy (G40–G41)	36	2.4

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Diseases known to have specific relevance to Indigenous Australians that comprise only part of an ICD-10 block or several codes from different blocks. Fibrosis and cirrhosis of liver (K74) was also examined but not listed as it explained less than 2% of the PYLL chronic disease gap.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(d) Includes codes from cardiovascular disease, diabetes and other disease chapter/blocks (see Appendix 2 for list of codes).

Source: AIHW National Mortality Database.

Males aged 55–74 years

Ischaemic heart disease contributes 22% to the chronic disease mortality gap between Indigenous and other Australians among men aged 55–74 years (Table 8). The next biggest contributor to the gap is diabetes mellitus (15%). Cancer of the respiratory and intrathoracic organs explains 9%, almost all of which is due to lung cancer (8%) (tables 8 and 9). Chronic lower respiratory diseases explain 8% of the gap, mainly in the form of chronic obstructive pulmonary disease (7%). Cancer of the digestive organs contributes 8%. Diseases contributing 4–5% of the mortality gap are cerebrovascular disease, other forms of heart disease, diseases of the liver (mainly alcoholic liver disease), and renal failure.

Table 8: Leading causes of the mortality gap by specific chronic diseases, males aged 55–74 years, 2006^(a)

Rank	Cause of death (ICD-10 block codes) ^(b)	PYLL gap ^(c)	Per cent
1	Ischaemic heart diseases (I20–I25)	397	21.9
2	Diabetes mellitus (E10–E14)	264	14.6
3	Respiratory and intrathoracic organs (cancer) (C30–C39)	168	9.3
4	Chronic lower respiratory diseases (J40–J47)	152	8.4
5	Digestive organs (cancer) (C15–C26)	136	7.5
6	Cerebrovascular diseases (I60–I69)	87	4.8
7	Other forms of heart disease (I30–I52)	78	4.3
8	Diseases of liver (K70–K77)	74	4.1
9	Renal failure (N17–N19)	70	3.8
10	Lip, oral cavity and pharynx (cancer) (C00–C14)	42	2.3
11	Influenza and pneumonia (J09–J18)	41	2.2
12	Mental and behavioural disorders due to psychoactive substance use (F10–F19)	37	2.0
	Other chronic diseases	261	14.5
	Total PYLL gap (chronic diseases)	1,809	100.0

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Some chronic disease blocks include acute diseases but most deaths are due to chronic conditions.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

Of the alternative disease groups not already mentioned, chronic kidney disease explains 7% of the mortality gap between Indigenous and other Australians, and stroke and transient ischaemic attack together contribute 4% (Table 9).

Table 9: Leading causes of the mortality gap by alternative disease groups, males aged 55–74 years, 2006^(a)

Alternative cause of death groups (ICD-10 codes) ^(b)	PYLL gap ^(c)	Per cent
Lung cancer (C33–C34)	142	7.8
Chronic obstructive pulmonary disease (J40–J44)	124	6.9
Chronic kidney disease ^(d)	123	6.8
Stroke and transient ischaemic attack (I60–I64; G45)	70	3.9
Alcoholic liver disease (K70)	47	2.6

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Diseases known to have specific relevance to Indigenous Australians that comprise only part of an ICD-10 block or several codes from different blocks. Mental and behavioural disorders due to use of alcohol (F10), Epilepsy (G40–G41) and Fibrosis and cirrhosis of liver (K74) were also examined but not listed as they each explained less than 2% of the PYLL chronic disease gap.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(d) Includes codes from cardiovascular disease, diabetes and other disease chapter/blocks (see Appendix 2 for list of codes).

Source: AIHW National Mortality Database.

Females aged 35–54 years

Diseases of liver contribute most (16%) to the mortality gap caused by chronic diseases among women aged 35–44 years, primarily as a result of alcoholic liver disease (10%) (tables 10 and 11). A close second is ischaemic heart disease (15%) and third is diabetes mellitus (11%) (Table 10). Other forms of heart disease and cerebrovascular disease each contribute 6% to the mortality gap – stroke and transient ischaemic attack together contribute 5% (tables 10 and 11). Chronic lower respiratory diseases contribute 5% with about half due to chronic obstructive pulmonary disease. Cancer of the female genital organs explains 4% of the mortality gap as do cancer of the respiratory and intrathoracic organs (primarily as lung cancer). Chronic kidney disease explains 7% of the mortality gap (Table 11).

Table 10: Leading causes of the mortality gap by specific chronic diseases, females aged 35–54 years, 2006^(a)

Rank	Cause of death (ICD-10 block codes) ^(b)	PYLL gap ^(c)	Per cent
1	Diseases of liver (K70–K77)	141	15.6
2	Ischaemic heart diseases (I20–I25)	136	15.1
3	Diabetes mellitus (E10–E14)	102	11.3
4	Other forms of heart disease (I30–I52)	58	6.5
5	Cerebrovascular diseases (I60–I69)	54	6.0
6	Chronic lower respiratory diseases (J40–J47)	44	4.8
7	Female genital organs (cancer) (C51–C58)	38	4.2
8	Respiratory and intrathoracic organs (cancer) (C30–C39)	37	4.1
9	Rheumatic heart diseases (I00–I09)	33	3.7
10	Renal failure (N17–N19)	31	3.5
11	Mental and behavioural disorders due to psychoactive substance use (F10–F19)	29	3.3
12	Influenza and pneumonia (J09–J18)	29	3.2
	Other chronic diseases	170	18.9
	Total PYLL gap (chronic diseases)	903	100.0

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Some chronic disease blocks include acute diseases but most deaths are due to chronic conditions.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

Table 11: Leading causes of the mortality gap by alternative disease groups, females aged 35–54 years, 2006^(a)

Alternative cause of death groups (ICD-10 codes) ^(b)	PYLL gap ^(c)	Per cent
Alcoholic liver disease (K70)	88	9.8
Chronic kidney disease ^(d)	63	7.0
Stroke and transient ischaemic attack (I60–I64; G45)	46	5.1
Lung cancer (C33–C34)	30	3.3
Mental and behavioural disorders due to use of alcohol (F10)	28	3.1
Fibrosis and cirrhosis of liver (K74)	26	2.8
Chronic obstructive pulmonary disease (J40–J44)	23	2.6

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Diseases known to have specific relevance to Indigenous Australians that comprise only part of an ICD-10 block or several codes from different blocks. Epilepsy (G40–G41) was also examined but not listed as it explained less than 2% of the PYLL chronic disease gap.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(d) Includes codes from cardiovascular disease, diabetes and other disease chapter/blocks (see Appendix 2 for list of codes).

Source: AIHW National Mortality Database.

Females aged 55–74 years

Among women aged 55–74 years, diabetes mellitus explains 19% of the mortality gap caused by chronic diseases (Table 12). Ischaemic heart disease explains 18% and chronic lower respiratory disease 10% (of which chronic obstructive pulmonary disease contributes 8%) (tables 12 and 13). The 7% contribution by cancer of the respiratory and intrathoracic organs is almost all in the form of lung cancer. Cerebrovascular diseases contribute 5% – the combination of stroke and transient ischaemic attack contributing 4%. Diseases of the liver contribute 4%, more than half in the form of alcoholic liver disease. Chronic kidney disease contributes 8% (Table 13).

Table 12: Leading causes of the mortality gap by specific chronic diseases, females aged 55–74 years, 2006^(a)

Rank	Cause of death (ICD-10 block codes) ^(b)	PYLL gap ^(c)	Per cent
1	Diabetes mellitus (E10–E14)	258	19.2
2	Ischaemic heart diseases (I20–I25)	240	17.9
3	Chronic lower respiratory diseases (J40–J47)	134	10.0
4	Respiratory and intrathoracic organs (cancer) (C30–C39)	92	6.9
5	Cerebrovascular diseases (I60–I69)	68	5.0
6	Diseases of liver (K70–K77)	54	4.0
7	Renal failure (N17–N19)	51	3.8
8	Digestive organs (cancer) (C15–C26)	47	3.5
9	Other forms of heart disease (I30–I52)	44	3.3
10	Female genital organs (cancer) (C51–C58)	30	2.2
11	Rheumatic heart diseases (I00–I09)	27	2.0
12	Breast (cancer) (C50)	24	1.8
	Other chronic diseases	274	20.4
	Total PYLL gap (chronic diseases)	1,345	100.0

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Some chronic disease blocks include acute diseases but most deaths are due to chronic conditions.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

Table 13: Leading causes of the mortality gap by alternative disease groups, females aged 55–74 years, 2006^(a)

Alternative cause of death groups (ICD-10 codes)^(b)	PYLL gap^(c)	Per cent
Chronic kidney disease ^(d)	114	8.4
Chronic obstructive pulmonary disease (J40–J44)	111	8.3
Lung cancer (C33–C34)	89	6.6
Stroke and transient ischaemic attack (I60–I64; G45)	54	4.0
Alcoholic liver disease (K70)	31	2.3

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Diseases known to have specific relevance to Indigenous Australians that comprise only part of an ICD-10 block or several codes from different blocks. Epilepsy (G40–G41); Mental and behavioural disorders due to use of alcohol (F10); and Fibrosis and cirrhosis of liver (K74) were also examined but not listed as they each explained less than 2% of the PYLL chronic disease gap.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(d) Includes codes from cardiovascular disease, diabetes and other disease chapter/blocks (see Appendix 2 for list of codes).

Source: AIHW National Mortality Database.

4 Discussion

4.1 Overview

This analysis quantifies the contribution of chronic diseases to the mortality gap between Indigenous and other Australians. Examining the mortality gap in terms of potential years of life lost, rather than the number of deaths alone, takes account of the fact that death occurs at a younger age among Indigenous Australians. This makes the findings more relevant to the aim of reducing the gap in life expectancy between Indigenous and other Australians.

The analysis shows that chronic diseases are the cause of about 80% of the mortality gap between Indigenous and other Australians aged 35–74. Overall, ischaemic heart disease, diabetes mellitus and diseases of the liver are the largest contributors, together explaining about 45% of the chronic disease mortality gap in this age range. While these are the largest contributors, there are many other chronic diseases that make smaller but important contributions to the gap with some important differences by age and sex.

For Indigenous Australians aged 35–54, chronic diseases are the cause of over 75% of the mortality gap, the main contributors being ischaemic heart disease, diseases of the liver (mainly in the form of alcoholic liver disease), diabetes mellitus and other forms of heart disease (mainly cardiomyopathy and heart failure).

Chronic diseases are the cause of about 95% of the mortality gap for Indigenous Australians aged 55–74, mainly from ischaemic heart disease, diabetes, chronic lower respiratory diseases (mainly chronic obstructive pulmonary disease) and cancer of the respiratory and intrathoracic organs (mainly lung cancer).

4.2 Specific diseases

It is well known that ischaemic heart disease is a serious health problem for Indigenous Australians, partly because of the higher prevalence of tobacco smoking, being overweight or obese, poor nutrition and diabetes. As well as being a major cause of death among Indigenous as it is among other Australians, this analysis shows that ischaemic heart disease is also a major contributor to the mortality gap in terms of potential years of life lost.

The results show that diabetes is a major contributor to the mortality gap between Indigenous and other Australians. This is true for each of the four population groups considered but especially marked for the age group 55–74. It is known that Type 1 diabetes is rare in the Indigenous population, but that there is a very high prevalence of Type 2 diabetes (AIHW 2010). Also, Indigenous Australians tend to develop Type 2 diabetes earlier than other Australians and tend to die from it at younger ages. If left undiagnosed or poorly controlled, diabetes can lead to a range of complications including ischaemic heart disease, stroke and chronic kidney disease. These diseases often occur together in the same individual (AIHW: Tong & Stevenson 2007).

The importance of diseases of the liver to explaining the additional years of life lost among Indigenous Australians aged 35–54 years is not so well documented. For males in this age group, diseases of the liver are the second largest contributor (12%) to the mortality gap

caused by chronic diseases and the number one contributor among females (16%). Most of the additional years of life lost are attributed to alcoholic liver disease (9% in males and 10% in females). While some studies report a higher level of abstinence among Indigenous Australians than other Australians, it appears that the prevalence of harmful alcohol use among Indigenous Australians is still about twice as high as that of other Australians (Wilson et al. 2010).

Cancer is known to be the second leading cause of death among Indigenous Australians, with higher death rates than other Australians for lung cancer and cervical cancer. This present analysis shows that cancers also contribute to the gap between Indigenous and other Australians in potential years of life lost due to premature mortality. Important contributors to the mortality gap for Indigenous males are cancer of the digestive organs, cancer of the respiratory and intrathoracic organs (mainly lung cancer) and cancer of the lip, oral cavity and pharynx. For Indigenous females, cancer of the genital organs, and cancer of the respiratory and intrathoracic organs (mainly lung cancer) are important for both age groups, and cancer of the digestive organs and breast cancer for ages 55–74 years.

Other forms of heart disease are prominent contributors to the mortality gap, particularly among the 35–54 age group, mainly as cardiomyopathy or heart failure. Causes of cardiomyopathy include viral infections and severe alcohol abuse. Heart failure results from a variety of diseases and conditions that impair or overload the heart, notably heart attack, high blood pressure, diabetes and various forms of cardiomyopathy. Heart failure is known to occur frequently as an associated cause when the underlying cause of death is kidney failure, ischaemic heart disease, diabetes or chronic lower respiratory disease (AIHW 2010).

Chronic kidney disease is an important contributor to the mortality gap, especially among females and older males. It is known that Indigenous Australians have high levels of chronic kidney disease, partly due to their high prevalence of diabetes. Diabetic nephropathy – a condition where consistently high blood sugar levels damage blood-filtering capillaries in the kidneys – is the leading cause of new cases of end-stage kidney disease in Australia. Indigenous Australians have a much higher incidence rate of treated end-stage kidney disease than non-Indigenous Australians and a much higher death rate (AIHW 2010).

Chronic lower respiratory disease also contributes to the mortality gap, particularly among older males and females, mainly in the form of chronic obstructive pulmonary disease. This, together with the important contributions to the mortality gap made by lung cancer and ischaemic heart disease, clearly implicates smoking as a major causal factor. Smoking rates among Indigenous adults are more than twice those among other Australians and smoking is a major risk factor for each of these diseases.

Indigenous Australians in the Northern Territory have some of the highest rates of rheumatic heart disease in the world and death rates from rheumatic heart disease for Indigenous Australian males and females are much higher than for other Australians. In the context of explaining the gap in mortality from chronic diseases, rheumatic heart disease explains less than 1% for males but makes a greater contribution for females (4% for females aged 35–54 years and 2% for females aged 55–74 years).

4.3 Closing the gap

Many of the diseases that contribute substantially to the gap in potential years of life lost between Indigenous and other Australians are caused, in part, by adverse levels of risk factors – risk factors that are relatively more common among Indigenous Australians than

other Australians. Some of the risk factors shared by several chronic diseases include tobacco use, high body mass, physical inactivity, high blood cholesterol, alcohol abuse, high blood pressure and low fruit and vegetable intake (AIHW: Penm 2008, AIHW 2010). That each of these risk factors is modifiable and preventable suggests an important role for prevention in the reduction of the mortality gap between Indigenous and other Australians and closing the gap in life expectancy.

However, risk factors such as these are known to be strongly associated with the social and economic disadvantage that Indigenous Australians commonly experience. Indigenous Australians report having lower incomes, higher rates of unemployment, lower educational attainment, and more overcrowded households than other Australians (AIHW 2010). It is widely acknowledged that closing the gap in life expectancy will require major improvements in the social determinants of health for Indigenous Australians, such as their education, employment and housing (Oxfam Australia 2007). Policies and programs are needed that focus on the risk factors in their own right, as well as tackling the social and economic conditions that promote them and cause ill health and premature death.

While there is great potential to reduce the mortality gap by addressing risk factors that are common to multiple chronic diseases, there are also differences between Indigenous and other Australians with respect to service provision and access, disease treatment, management and follow-up (AIHW: Mathur et al. 2006, McDermott 2009). Reducing the gap in life expectancy between Indigenous and other Australians will require improvements in the prevention, treatment and management of the diseases highlighted by this analysis as well as addressing the relative socioeconomic disadvantage of Indigenous Australians.

Appendix 1: Assumptions and terminology

Underlying cause of death

The analysis has been based on the underlying cause of death, which is the condition, disease or injury initiating the sequence of events leading to death, that is, the primary, chief, main or principal cause.

Analyses based on a single underlying cause of death can underestimate the importance of other causes that contributed to the death. For example, diabetes mellitus, which is prevalent among Indigenous Australians, is a frequent contributor to subsequent death from diseases of the circulatory system or renal failure. For chronic diseases especially, the underlying cause of death may be the end result of a long disease process involving other diseases. The potential impacts of such associated causes should be considered when interpreting the results of analyses that are based on the underlying cause of death only.

Potential years of life lost

Potential years of life lost (PYLL) is a measure of premature mortality that gives greater weight to deaths at younger ages, compared with other summary indices of mortality, which are dominated by deaths of the elderly. Premature deaths were defined as those occurring before age 75. Thus, a person dying at 45 years of age was considered to have died prematurely and potentially to have lost 30 years of life.

$PYLL = \sum (75 - \text{age at death})$ where age at death is less than 75 years.

The summation was performed for deaths that occurred for age groups 35–74 years, 35–54 years and 55–74 years, for males and females separately and for various causes of death.

PYLL is an indicator of mortality that places more 'weight' on deaths of young people. It may be argued that the loss of an elder (which contributes less to PYLL) is of equal importance, in that it represents shrinkage of a community's cultural repository. However, the value of PYLL is that it highlights the causes of premature, and therefore often preventable, deaths, whereas deaths among the elderly are a normal part of the life course.

PYLL is a more appropriate indicator for identifying which diseases contribute most to the gap in life expectancy as it is a measure based on the number of years of life lost through premature death rather than the number of deaths only.

Choosing the age limits of 35 and 75 years

The mortality gap was calculated as the difference between Indigenous and other Australians in potential years of life lost due to premature mortality. It was based on deaths that occurred from the age of 35 to less than age 75. Using this approach, deaths which occurred outside this age range did not contribute to estimates of the mortality gap.

An upper age limit of 75 was chosen because:

- it is often used as the limit for premature death in Australia
- it is between the existing life expectancies for Indigenous and other Australians

- deaths before 75 are less likely than those at older ages to have more than one contributing cause.

A lower age limit of 35 was chosen for the analysis because:

- deaths among Indigenous Australians before that age are much less likely to have been from chronic disease (and much more likely to have been from external causes)
- deaths from chronic disease among Indigenous Australians before that age (192 males, 160 females) are too small for reliable estimates of the mortality gap for some specific chronic diseases.

The data supporting these statements is given in Box A1.1.

Box A1.1: Death counts for Indigenous Australians								
Deaths among Indigenous Australians by broad disease groups, age and sex, 2005–2007								
Broad disease groups (ICD-10 codes)	Males				Females			
	<35	35–54	55–74	75+	<35	35–54	55–74	75+
Chronic diseases (C00–N99)	192	904	1,069	423	160	612	896	616
Communicable, maternal, neonatal and congenital conditions (A00–B99, O00–Q99)	144	36	20	14	108	31	22	13
Symptoms, signs and abnormal clinical and laboratory findings, nec (R00–R99)	67	42	18	2	37	29	12	6
External causes (V01–Y98)	400	227	32	19	158	90	20	10
Total deaths (all causes)	803	1,209	1,139	458	463	762	950	645

Note: Data are for NSW, Qld, WA, SA and NT.
Source: AIHW National Mortality Database.

Analysis at the broad disease group level showed that chronic diseases contributed 26% of the PYLL mortality gap for persons aged less than 35 years, which compares with 80% for persons aged 35–74 (Table 2).

Indigenous and ‘other Australians’

Indigenous Australians refers to people who identified as Aboriginal and/or Torres Strait Islander. Data for Indigenous Australians was compared with data for ‘other Australians’.

For mortality data about 1% of deaths in 2006 were coded as ‘not stated’ for the Aboriginality question. These deaths were included with deaths for non-Aboriginal people and termed ‘other Australians’.

Death rates were based on population census estimates for Indigenous and ‘other Australians’ where estimates for ‘other Australians’ were calculated as the difference between total population estimates and Indigenous population estimates.

State of registration

The analysis was conducted on mortality data for New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, as these are the jurisdictions for which the quality of the Indigenous identification data is considered to be adequate. This meant that the mortality data was based on state of registration, while the corresponding population census estimates were based on place of usual residence. This incompatibility was considered to be negligible compared to the issue of under-identification in the mortality data.

Notes for the interpretation of tables

nec not elsewhere classified

Totals may differ slightly from the sum of components due to rounding.

Appendix 2: Classification of chronic diseases

This appendix lists the ICD-10 codes used to define chronic disease for this analysis.

- All causes of death are analysed at the ICD-10 chapter level (Table A1).
- Chronic disease causes of death are analysed at the ICD-10 block level (Table A2).
- Alternative chronic disease causes of death (chronic diseases of particular relevance to Indigenous Australians) are subsets of blocks or composites of blocks or parts thereof (Table A3).

Table A1: Cause of death and ICD-10 codes for major disease groups, all causes

Major disease group	ICD-10 codes
Certain infectious and parasitic diseases	A00–B99
Neoplasms	C00–D48
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50–D89
Endocrine, nutritional and metabolic diseases	E00–E90
Mental and behavioural disorders	F00–F99
Diseases of the nervous system	G00–G99
Diseases of the eye, adnexa, ear and mastoid process	H00–H95
Diseases of the circulatory system	I00–I99
Diseases of the respiratory system	J00–J99
Diseases of the digestive system	K00–K93
Diseases of the skin and subcutaneous tissue	L00–L99
Diseases of the musculoskeletal system and connective tissue	M00–M99
Diseases of the genitourinary system	N00–N99
Pregnancy, childbirth and the puerperium	O00–O99
Certain conditions originating in the perinatal period	P00–P96
Congenital malformations, deformations and chromosomal abnormalities	Q00–Q99
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00–R99
External causes of morbidity and mortality	V01–Y98

Note: Chronic diseases are shaded.

Table A2: Cause of death and ICD-10 codes for specific disease groups, chronic diseases only

Specific disease group	ICD-10 codes
Lip, oral cavity and pharynx (cancer)	C00–C14
Digestive organs (cancer)	C15–C26
Respiratory and intrathoracic organs (cancer)	C30–C39
Bone and articular cartilage (cancer)	C40–C41
Skin (cancer)	C43–C44
Mesothelial and soft tissue (cancer)	C45–C49
Breast (cancer)	C50
Female genital organs (cancer)	C51–C58
Male genital organs (cancer)	C60–C63
Urinary tract (cancer)	C64–C68
Eye, brain and other parts of central nervous system (cancer)	C69–C72
Thyroid and other endocrine glands (cancer)	C73–C75
Malignant neoplasms of ill-defined, secondary and unspecified sites	C76–C80
Malignant neoplasms, stated or presumed to be primary, of lymphoid, haematopoietic and related tissue	C81–C96
Malignant neoplasms of independent (primary) multiple sites	C97
In situ neoplasms	D00–D09
Benign neoplasms	D10–D36
Neoplasms of uncertain or unknown behaviour	D37–D48
Disorders of thyroid gland	E00–E07
Diabetes mellitus	E10–E14
Other disorders of glucose regulation and pancreatic internal secretion	E15–E16
Disorders of other endocrine glands	E20–E35
Malnutrition	E40–E46
Other nutritional deficiencies	E50–E64
Obesity and other hyperalimentation	E65–E68
Metabolic disorders	E70–E90
Organic, including symptomatic, mental disorders	F00–F09
Mental and behavioural disorders due to psychoactive substance use	F10–F19
Schizophrenia, schizotypal and delusional disorders	F20–F29
Mood (affective) disorders	F30–F39
Neurotic, stress-related and somatoform disorders	F40–F48
Behavioural syndromes associated with physiological disturbances and physical factors	F50–F59
Disorders of adult personality and behaviour	F60–F69
Mental retardation	F70–F79
Disorders of psychological development	F80–F89
Behavioural and emotional disorders with onset usually occurring in childhood and adolescence	F90–F98

(continued)

Specific disease group	ICD-10 codes
Inflammatory diseases of the central nervous system	G00–G09
Systemic atrophies primarily affecting the central nervous system	G10–G13
Extrapyramidal and movement disorders	G20–G26
Other degenerative diseases of the nervous system	G30–G32
Demyelinating diseases of the central nervous system	G35–G37
Episodic and paroxysmal disorders	G40–G47
Polyneuropathies and other disorders of the peripheral nervous system	G60–G64
Diseases of myoneural junction and muscle	G70–G73
Cerebral palsy and other paralytic syndromes	G80–G83
Other disorders of the nervous system	G90–G99
Rheumatic heart diseases	I00–I09
Hypertensive diseases	I10–I15
Ischaemic heart diseases	I20–I25
Pulmonary heart disease and diseases of pulmonary circulation	I26–I28
Other forms of heart disease	I30–I52
Cerebrovascular diseases	I60–I69
Diseases of arteries, arterioles and capillaries	I70–I79
Diseases of veins, lymphatic vessels and lymph nodes, not elsewhere classified	I80–I89
Other and unspecified disorders of the circulatory system	I95–I99
Acute upper respiratory infections	J00–J06
Influenza and pneumonia	J09–J18
Other acute lower respiratory infections	J20–J22
Other diseases of upper respiratory tract	J30–J39
Chronic lower respiratory diseases	J40–J47
Lung diseases due to external agents	J60–J70
Other respiratory diseases principally affecting the interstitium	J80–J84
Suppurative and necrotic conditions of lower respiratory tract	J85–J86
Other diseases of pleura	J90–J94
Other diseases of the respiratory system	J95–J99
Diseases of oral cavity, salivary glands and jaws	K00–K14
Diseases of oesophagus, stomach and duodenum	K20–K31
Diseases of appendix	K35–K38
Hernia	K40–K46
Non-infective enteritis and colitis	K50–K52
Other diseases of intestines	K55–K63

(continued)

Specific disease group	ICD-10 codes
Diseases of peritoneum	K65–K67
Diseases of liver	K70–K77
Disorders of gallbladder, biliary tract and pancreas	K80–K87
Other diseases of the digestive system	K90–K93
Infectious arthropathies	M00–M03
Inflammatory polyarthropathies	M05–M14
Arthrosis	M15–M19
Other joint disorders	M20–M25
Systemic connective tissue disorders	M30–M36
Deforming dorsopathies	M40–M43
Spondylopathies	M45–M49
Other dorsopathies	M50–M54
Disorders of muscles	M60–M63
Disorders of synovium and tendon	M65–M68
Other soft tissue disorders	M70–M79
Disorders of bone density and structure	M80–M85
Other osteopathies	M86–M90
Other disorders of the musculoskeletal system and connective tissue	M95–M99
Glomerular diseases	N00–N08
Renal tubulo-interstitial diseases	N10–N16
Renal failure	N17–N19
Urolithiasis	N20–N23
Other disorders of kidney and ureter	N25–N29
Other diseases of urinary system	N30–N39
Diseases of male genital organs	N40–N51
Disorders of breast	N60–N64
Inflammatory diseases of female pelvic organs	N70–N77
Non-inflammatory disorders of female genital tract	N80–N98
Other chronic diseases	All other chronic disease codes

Table A3: Cause of death and ICD-10 codes for alternative disease groups, chronic diseases only

Alternative disease groups	ICD-10 codes
Lung cancer	C33–C34
Mental and behavioural disorders due to use of alcohol	F10
Epilepsy	G40–G41
Stroke and transient ischaemic attack	I60–I64;G45
Chronic obstructive pulmonary disease	J40–J44
Alcoholic liver disease	K70
Fibrosis and cirrhosis of liver	K74
Chronic kidney disease	Codes below
Plasmodium malariae malaria with nephropathy	B52.0
Haemolytic-uraemic syndrome	D59.3
Insulin-dependent diabetes mellitus - With renal complications	E10.2
Non-insulin-dependent diabetes mellitus - With renal complications	E11.2
Other specified diabetes mellitus - With renal complications	E13.2
Unspecified diabetes mellitus - With renal complications	E14.2
Neuropathic heredofamilial amyloidosis	E85.1
Hypertensive renal disease	I12
Hypertensive heart and renal disease	I13
Renovascular hypertension	I15.0
Hypertension secondary to other renal disorders	I15.1
Acute nephritic syndrome	N00
Rapidly progressive nephritic syndrome	N01
Recurrent and persistent haematuria	N02
Chronic nephritic syndrome	N03
Nephrotic syndrome	N04
Unspecified nephritic syndrome	N05
Isolated proteinuria with specified morphological lesion	N06
Hereditary nephropathy, not elsewhere classified	N07
Chronic tubulo-interstitial nephritis	N11
Tubulo-interstitial nephritis, not specified as acute or chronic	N12
Drug- and heavy-metal-induced tubulo-interstitial and tubular conditions	N14
Other renal tubulo-interstitial diseases	N15
Chronic renal failure	N18
Unspecified renal failure	N19
Disorders resulting from impaired renal tubular function	N25
Unspecified contracted kidney	N26
Small kidney of unknown cause	N27

(continued)

Alternative disease groups	ICD-10 codes
Other disorders of kidney and ureter, nec	N28
Persistent proteinuria, unspecified	N39.1
Orthostatic proteinuria, unspecified	N39.2
Renal agenesis and other reduction defects of kidney	Q60
Cystic kidney disease	Q61
Congenital obstructive defects of renal pelvis and congenital malformations of ureter	Q62
Other congenital malformations of kidney	Q63
Mechanical complication of vascular dialysis catheter	T82.4
Kidney transplant failure and rejection	T86.1

Appendix 3: Deaths, PYLL and PYLL rates for tables 4 to 13

Table A4: Deaths, PYLL and PYLL rates for leading causes of the chronic disease mortality gap by specific chronic diseases, persons aged 35–74 years, 2006^(a)

Rank	Cause of death (ICD-10 block codes)	Deaths 2005–2007		PYLL 2005–2007		Annual PYLL rates		PYLL gap ^(b)
		Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	
1	Ischaemic heart diseases (I20–I25)	667	12,065	12,876	141,993	333.6	70.7	263.0
2	Diabetes mellitus (E10–E14)	356	1,965	5,896	20,048	152.8	10.0	142.8
3	Diseases of liver (K70–K77)	227	2,169	6,021	37,177	156.0	18.5	137.5
4	Other forms of heart disease (I30–I52)	161	2,505	3,529	32,203	91.4	16.0	75.4
5	Chronic lower respiratory diseases (J40–J47)	224	3,371	3,438	29,713	89.1	14.8	74.3
6	Cerebrovascular diseases (I60–I69)	186	3,802	3,056	40,937	79.2	20.4	58.8
7	Respiratory and intrathoracic organs (cancer) (C30–C39)	262	8,975	4,003	100,525	103.7	50.0	53.7
8	Digestive organs (cancer) (C15–C26)	254	11,116	4,419	136,426	114.5	67.9	46.6
9	Renal failure (N17–N19)	88	627	1,667	5,839	43.2	2.9	40.3
10	Influenza and pneumonia (J09–J18)	70	793	1,570	9,277	40.7	4.6	36.1
11	Mental and behavioural disorders due to psychoactive substance use (F10–F19)	60	485	1,507	8,842	39.0	4.4	34.6
12	Lip, oral cavity and pharynx (cancer) (C00–C14)	67	872	1,347	12,005	34.9	6.0	28.9
	Other chronic diseases	859	30,135	15,793	378,072	409.2	188.2	221.0
	Total PYLL gap (chronic diseases)	3,481	78,880	65,122	953,057	1,687.4	474.4	1,213.0

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

Table A5: Deaths, PYLL and PYLL rates for leading causes of the chronic disease mortality gap by alternative disease groups, persons aged 35–74 years, 2006^(a)

Alternative cause of death groups (ICD-10 codes) ^(b)	Deaths 2005–2007		PYLL 2005–2007		Annual PYLL rates		PYLL gap ^(c)
	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	
Alcoholic liver disease (K70)	149	1,226	3,956	22,215	102.5	11.1	91.4
Chronic kidney disease ^(d)	163	916	3,040	8,541	78.8	4.3	74.5
Stroke and transient ischaemic attack (I60–I64; G45)	156	3,226	2,727	36,509	70.7	18.2	52.5
Chronic obstructive pulmonary disease (J40–J44)	172	2,939	2,271	23,964	58.8	11.9	46.9
Lung cancer (C33–C34)	238	8,627	3,563	96,433	92.3	48.0	44.3
Mental and behavioural disorders due to use of alcohol (F10)	53	384	1,376	7,320	35.7	3.6	32.0

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Diseases known to have specific relevance to Indigenous Australians that comprise only part of an ICD-10 block or several codes from different blocks.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(d) Includes codes from cardiovascular disease, diabetes and other disease chapter/blocks (see Appendix 2 for list of codes).

Source: AIHW National Mortality Database.

Table A6: Deaths, PYLL and PYLL rates for leading causes of the chronic disease mortality gap by specific chronic diseases, males aged 35–54 years, 2006^(a)

Rank	Cause of death (ICD-10 block codes)	Deaths 2005–2007		PYLL 2005–2007		Annual PYLL rates		PYLL gap ^(b)
		Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	
1	Ischaemic heart diseases (I20–I25)	231	1,826	6,726	49,330	477.6	80.4	397.2
2	Diseases of liver (K70–K77)	96	590	2,963	16,090	210.4	26.2	184.2
3	Diabetes mellitus (E10–E14)	64	156	1,722	4,342	122.3	7.1	115.2
4	Other forms of heart disease (I30–I52)	59	407	1,789	11,634	127.0	19.0	108.1
5	Digestive organs (cancer) (C15–C26)	70	1,250	1,905	33,218	135.3	54.1	81.2
6	Chronic lower respiratory diseases (J40–J47)	36	141	1,106	3,734	78.5	6.1	72.5
7	Cerebrovascular diseases (I60–I69)	36	335	1,036	9,133	73.6	14.9	58.7
8	Influenza and pneumonia (J09–J18)	27	99	815	2,837	57.9	4.6	53.3
9	Respiratory and intrathoracic organs (cancer) (C30–C39)	44	668	1,116	17,068	79.2	27.8	51.4
10	Mental and behavioural disorders due to psychoactive substance use (F10–F19)	26	159	802	4,659	56.9	7.6	49.4
11	Lip, oral cavity and pharynx (cancer) (C00–C14)	25	155	667	4,126	47.4	6.7	40.6
12	Renal failure (N17–N19)	20	43	573	1,197	40.7	2.0	38.7
	Other chronic diseases	170	2,704	5,139	74,740	364.9	121.8	243.2
	Total PYLL gap (chronic diseases)	904	8,533	26,359	232,108	1,871.7	378.1	1,493.6

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

Table A7: Deaths, PYLL and PYLL rates for leading causes of the chronic disease mortality gap by alternative disease groups, males aged 35–54 years, 2006^(a)

Alternative cause of death groups (ICD-10 codes) ^(b)	Deaths 2005–2007		PYLL 2005–2007		Annual PYLL rates		PYLL gap ^(c)
	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	
Alcoholic liver disease (K70)	68	358	2,068	9,842	146.8	16.0	130.8
Chronic kidney disease ^(d)	32	61	888	1,670	63.1	2.7	60.3
Stroke and transient ischaemic attack (I60–I64; G45)	36	316	1,036	8,642	73.6	14.1	59.5
Mental and behavioural disorders due to use of alcohol (F10)	23	138	731	4,020	51.9	6.5	45.4
Lung cancer (C33–C34)	37	624	945	15,896	67.1	25.9	41.2
Chronic obstructive pulmonary disease (J40–J44)	19	85	552	2,120	39.2	3.5	35.7

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Diseases known to have specific relevance to Indigenous Australians that comprise only part of an ICD-10 block or several codes from different blocks.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(d) Includes codes from cardiovascular disease, diabetes and other disease chapter/blocks (see Appendix 2 for list of codes).

Source: AIHW National Mortality Database.

Table A8: Deaths, PYLL and PYLL rates for leading causes of the chronic disease mortality gap by specific chronic diseases, males aged 55–74 years, 2006^(a)

Rank	Cause of death (ICD-10 block codes)	Deaths 2005–2007		PYLL 2005–2007		Annual PYLL rates		PYLL gap ^(b)
		Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	
1	Ischaemic heart diseases (I20–I25)	218	7,433	2,419	65,634	566.4	169.6	396.8
2	Diabetes mellitus (E10–E14)	112	1,143	1,230	9,228	288.0	23.8	264.2
3	Respiratory and intrathoracic organs (cancer) (C30–C39)	110	5,134	1,218	45,209	285.2	116.8	168.4
4	Chronic lower respiratory diseases (J40–J47)	85	1,784	789	12,580	184.7	32.5	152.2
5	Digestive organs (cancer) (C15–C26)	101	5,960	1,194	55,381	279.6	143.1	136.5
6	Cerebrovascular diseases (I60–I69)	62	1,825	527	14,067	123.4	36.4	87.0
7	Other forms of heart disease (I30–I52)	40	1,290	460	11,312	107.7	29.2	78.5
8	Diseases of liver (K70–K77)	32	1,008	443	11,374	103.7	29.4	74.3
9	Renal failure (N17–N19)	26	316	322	2,253	75.4	5.8	69.6
10	Lip, oral cavity and pharynx (cancer) (C00–C14)	22	547	244	5,808	57.1	15.0	42.1
11	Influenza and pneumonia (J09–J18)	21	379	205	2,876	48.0	7.4	40.6
12	Mental and behavioural disorders due to psychoactive substance use (F10–F19)	15	223	184	2,337	43.1	6.0	37.0
	Other chronic diseases	225	13,260	2,351	111,876	550.5	289.1	261.4
	Total PYLL gap (chronic diseases)	1,069	40,302	11,586	349,935	2,712.8	904.3	1,808.5

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

Table A9: Deaths, PYLL and PYLL rates for leading causes of the chronic disease mortality gap by alternative disease groups, males aged 55–74 years, 2006^(a)

Alternative cause of death groups (ICD-10 codes) ^(b)	Deaths 2005–2007		PYLL 2005–2007		Annual PYLL rates		PYLL gap ^(c)
	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	
Lung cancer (C33–C34)	99	4,885	1,079	42,916	252.6	110.9	141.7
Chronic obstructive pulmonary disease (J40–J44)	73	1,654	658	11,529	154.1	29.8	124.3
Chronic kidney disease ^(d)	45	443	561	3,333	131.4	8.6	122.7
Stroke and transient ischaemic attack (I60–I64; G45)	47	1,485	429	11,902	100.4	30.8	69.7
Alcoholic liver disease (K70)	20	574	274	6,790	64.2	17.5	46.6

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Diseases known to have specific relevance to Indigenous Australians that comprise only part of an ICD-10 block or several codes from different blocks.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(d) Includes codes from cardiovascular disease, diabetes and other disease chapter/blocks (see Appendix 2 for list of codes).

Source: AIHW National Mortality Database.

Table A10: Deaths, PYLL and PYLL rates for leading causes of the chronic disease mortality gap by specific chronic diseases, females aged 35–54 years, 2006^(a)

Rank	Cause of death (ICD-10 block codes)	Deaths 2005–2007		PYLL 2005–2007		Annual PYLL rates		PYLL gap ^(b)
		Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	
1	Diseases of liver (K70–K77)	76	213	2,296	5,992	150.5	9.7	140.8
2	Ischaemic heart diseases (I20–I25)	79	331	2,302	8,922	150.9	14.4	136.5
3	Diabetes mellitus (E10–E14)	56	77	1,604	2,141	105.1	3.5	101.7
4	Other forms of heart disease (I30–I52)	32	153	997	4,331	65.3	7.0	58.4
5	Cerebrovascular diseases (I60–I69)	38	298	1,035	8,362	67.8	13.5	54.3
6	Chronic lower respiratory diseases (J40–J47)	26	117	745	3,187	48.8	5.1	43.7
7	Female genital organs (cancer) (C51–C58)	29	399	854	11,046	56.0	17.8	38.1
8	Respiratory and intrathoracic organs (cancer) (C30–C39)	34	507	891	13,374	58.4	21.6	36.8
9	Rheumatic heart diseases (I00–I09)	17	15	514	418	33.7	0.7	33.0
10	Renal failure (N17–N19)	17	28	496	770	32.5	1.2	31.3
11	Mental and behavioural disorders due to psychoactive substance use (F10–F19)	16	45	481	1,293	31.5	2.1	29.4
12	Influenza and pneumonia (J09–J18)	15	56	476	1,557	31.2	2.5	28.7
	Other chronic diseases	177	3,738	5,146	103,423	337.3	167.0	170.2
	Total PYLL gap (chronic diseases)	612	5,977	17,837	164,816	1,169.1	266.2	902.9

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

Table A11: Deaths, PYLL and PYLL rates for leading causes of the chronic disease mortality gap by alternative disease groups, females aged 35–54 years, 2006^(a)

Alternative cause of death groups (ICD-10 codes) ^(b)	Deaths 2005–2007		PYLL 2005–2007		Annual PYLL rates		PYLL gap ^(c)
	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	
Alcoholic liver disease (K70)	48	135	1,438	3,754	94.3	6.1	88.2
Chronic kidney disease ^(d)	33	43	995	1,181	65.2	1.9	63.3
Stroke and transient ischaemic attack (I60–I64; G45)	33	273	886	7,624	58.1	12.3	45.8
Lung cancer (C33–C34)	30	500	783	13,159	51.3	21.3	30.1
Mental and behavioural disorders due to use of alcohol (F10)	15	33	450	963	29.5	1.6	27.9
Fibrosis and cirrhosis of liver (K74)	13	27	407	728	26.7	1.2	25.5
Chronic obstructive pulmonary disease (J40–J44)	14	65	396	1,686	26.0	2.7	23.2

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Diseases known to have specific relevance to Indigenous Australians that comprise only part of an ICD-10 block or several codes from different blocks.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(d) Includes codes from cardiovascular disease, diabetes and other disease chapter/blocks (see Appendix 2 for list of codes).

Source: AIHW National Mortality Database.

Table A12: Deaths, PYLL and PYLL rates for leading causes of the chronic disease mortality gap by specific chronic diseases, females aged 55–74 years, 2006^(a)

Rank	Cause of death (ICD-10 block codes)	Deaths 2005–2007		PYLL 2005–2007		Annual PYLL rates		PYLL gap ^(b)
		Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	
1	Diabetes mellitus (E10–E14)	124	589	1,340	4,337	268.9	11.1	257.8
2	Ischaemic heart diseases (I20–I25)	139	2,475	1,429	18,107	286.8	46.5	240.3
3	Chronic lower respiratory diseases (J40–J47)	77	1,329	798	10,212	160.2	26.2	133.9
4	Respiratory and intrathoracic organs (cancer) (C30–C39)	74	2,666	778	24,874	156.1	63.9	92.2
5	Cerebrovascular diseases (I60–I69)	50	1,344	458	9,375	91.9	24.1	67.8
6	Diseases of liver (K70–K77)	23	358	319	3,721	64.0	9.6	54.5
7	Renal failure (N17–N19)	25	240	276	1,619	55.4	4.2	51.2
8	Digestive organs (cancer) (C15–C26)	57	3,166	594	27,932	119.2	71.8	47.5
9	Other forms of heart disease (I30–I52)	30	655	283	4,926	56.8	12.7	44.1
10	Female genital organs (cancer) (C51–C58)	30	1,233	307	12,254	61.6	31.5	30.1
11	Rheumatic heart diseases (I00–I09)	11	75	140	532	28.1	1.4	26.7
12	Breast (cancer) (C50)	35	2,274	438	24,760	87.9	63.6	24.3
	Other chronic diseases	221	7,664	2,180	63,549	437.5	163.3	274.3
	Total PYLL gap (chronic diseases)	896	24,068	9,340	206,198	1,874.6	529.8	1,344.8

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

Source: AIHW National Mortality Database.

Table A13: Deaths, PYLL and PYLL rates for leading causes of the chronic disease mortality gap by alternative disease groups, females aged 55–74 years, 2006^(a)

Alternative cause of death groups (ICD-10 codes) ^(b)	Deaths 2005–2007		PYLL 2005–2007		Annual PYLL rates		PYLL gap ^(c)
	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	
Chronic kidney disease ^(d)	53	369	596	2,357	119.6	6.1	113.6
Chronic obstructive pulmonary disease (J40–J44)	66	1,135	665	8,629	133.5	22.2	111.3
Lung cancer (C33–C34)	72	2,618	756	24,462	151.7	62.8	88.9
Stroke and transient ischaemic attack (I60–I64; G45)	40	1,152	376	8,341	75.5	21.4	54.0
Alcoholic liver disease (K70)	13	159	176	1,829	35.3	4.7	30.6

(a) Annual estimates for 2006 are derived from death data for NSW, Qld, WA, SA and NT for 2005–2007 and corresponding population data for 2006 times 3.

(b) Diseases known to have specific relevance to Indigenous Australians that comprise only part of an ICD-10 block or several codes from different blocks.

(c) The PYLL gap is calculated as the annual PYLL mortality rate for Indigenous Australians – the annual PYLL mortality rate for other Australians, and expressed per 10,000 population.

(d) Includes codes from cardiovascular disease, diabetes and other disease chapter/blocks (see Appendix 2 for list of codes).

Source: AIHW National Mortality Database.

References

Australian Institute of Health and Welfare (AIHW) 2006. Chronic diseases and associated risk factors in Australia, 2006. Cat. No. PHE 81. Canberra: AIHW.

AIHW 2009. Aboriginal and Torres Strait Islander Health Performance Framework 2008 report: detailed analysis. Cat. No. IHW 22. Canberra: AIHW.

AIHW 2010. Australia's health 2010. Australia's health series no 12. Cat. No. AUS 122. Canberra: AIHW.

AIHW: Mathur S, Moon L & Leigh S 2006. Aboriginal and Torres Strait Islander people with coronary heart disease: further perspectives on health status and treatment. Cardiovascular disease series no. 25. Cat. No. CVD 33. Canberra: AIHW).

AIHW: Perm E 2008. Cardiovascular disease and its associated risk factors in Aboriginal and Torres Strait Islander peoples 2004-5. Cardiovascular disease series no. 29. Cat. No. CVD 41. Canberra: AIHW.

AIHW: Tong B & Stevenson C 2007. Comorbidity of cardiovascular disease, diabetes and chronic kidney disease in Australia. Cardiovascular disease series no. 28. Cat. No. CVD 37. Canberra: AIHW.

Australian Bureau of Statistics 2009. Experimental life tables for Aboriginal and Torres Strait Islander Australians, 2005-2007. ABS Cat. No. 3302.0.55.003. Canberra: ABS.

McDermott R 2009. Commentary: Closing the health gap for Indigenous Australians – will better counting mean better services and investment in the social production of health? *International Journal of Epidemiology* 2009;38:477-479.

Oxfam Australia 2007. Close the gap. Solutions to the Indigenous health crisis facing Australia. A Policy briefing paper from the National Aboriginal Community Controlled Health Organisation and Oxfam Australia.

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

Wilson M, Stearne A, Gray D & Siggers S 2010. The harmful use of alcohol amongst Indigenous Australians. Viewed 12 October 2010, <http://www.healthinfolnet.ecu.edu.au/alcoholuse_review>.