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Cancer in Aboriginal and Torres Strait Islander peoples of Australia:

an overview

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Cancer in Aboriginal and Torres Strait Islander peoples of Australia

An overview

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Foreword

Cancer in Aboriginal and Torres Strait Islander peoples of Australia: an overview is one of a series of reports commissioned by Cancer Australia and developed in collaboration with the Australian Institute of Health and Welfare.

This report provides, for the first time, a comprehensive summary of population-level cancer statistics across a number of states and territories in Australia for Aboriginal and Torres Strait Islander peoples alongside comparative figures for non-Indigenous Australians. It aims to document key cancer statistics to inform health professionals, policy makers, health planners, educators, researchers and the broader public of relevant data to understand and work towards reducing the impact of cancer for Indigenous Australians.

On average, per day, around two Aboriginal and Torres Strait Islander people are diagnosed with cancer and there is just over one cancer-related death.

Importantly, this report identifies significant differences between Indigenous Australians and their non-Indigenous counterparts. While incidence rates for cancer overall were marginally higher for Indigenous peoples, mortality and survival differences between the two population groups were more marked with cancer mortality rates 1.5 times higher and survival percentages 1.3 times lower for Aboriginal and Torres Strait Islander peoples.

This report also looks at the 10 most commonly diagnosed cancers as well as the 10 most commonly reported causes of cancer deaths for Aboriginal and Torres Strait Islander peoples of Australia, accounting for over 60% of cancers in these groups. Lung cancer was both the most commonly diagnosed cancer and the leading cause of cancer deaths for this population group. Differences between gender and across age groups are also identified.

In addition, data for survival, prevalence, hospitalisations and burden of disease from cancer contextualises the impact of cancer on this population group, and information about hospitalisations and expenditure provides an overview of the impact on the health system.

The work of the Australian Institute of Health and Welfare informs and supports the development of policy and programs for Australia through the provision of relevant, timely and high-quality information. The Institute collaborates with the Australian, state and territory governments and non-governmental organisations in undertaking its mission to provide authoritative information and statistics to promote better health and wellbeing.

Cancer Australia works to reduce the impact of cancer and improve the wellbeing of those diagnosed by ensuring that evidence informs cancer prevention, screening, diagnosis, treatment and supportive care. This report provides a foundational, evidence-based resource upon which to inform Cancer Australia’s work in improving cancer outcomes for Aboriginal and Torres Strait Islander peoples. The report also highlights the significant burden of disease that cancer places on Aboriginal and Torres Strait Islander peoples and underscores the concerted action required across the research and health service sectors to address the cancer needs of this community.

David Kalisch Director Australian Institute of Health and Welfare	Helen Zorbas, AO CEO Cancer Australia

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Acknowledgments

Staff in the Cancer and Screening Unit of the Australian Institute of Health and Welfare (AIHW) prepared this report. The main authors were Chun Chen and Ellen Connell. Other AIHW staff who made a substantial contribution are, in alphabetical order, Anne Ganner Bech, Brett Davis, Melissa Goodwin, Justin Harvey, Theresa Negrello, Mark Short and Shubhada Shukla. The authors would like to thank those AIHW staff who commented on earlier drafts of the report.

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The support of the Australasian Association of Cancer Registries in providing data and reviewing the draft report is also gratefully acknowledged.

Abbreviations

ABS	Australian Bureau of Statistics
ACD	Australian Cancer Database
ACN	Australian Cancer Network
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
ALL	acute lymphoblastic leukaemia
ALOS	average length of stay
ASGC RA	Australian Standard Geographical Classification Remoteness Area
ASR	age-standardised rate
CA	Cancer Australia
CCA	Cancer Council Australia
CI	confidence interval
CS	crude survival
DALY	disability-adjusted life year
DoHA	Department of Health and Ageing
HBV	Hepatitis B virus
HPV	human papilloma virus
IARC	International Agency for Research on Cancer
ICD-10	International Statistical Classification of Diseases and Related Health Problems, tenth revision
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, tenth revision, Australian modification
MIR	mortality-to-incidence ratio
NBCSP	National Bowel Cancer Screening Program
NCCH	National Centre for Classification in Health
NDI	National Death Index
NHCDC	National Hospital Costs Data Collection
NHL	non-Hodgkin lymphoma

NHMD	National Hospital Morbidity Database
NMD	National Mortality Database
No.	number
NSW	New South Wales
NT	Northern Territory
PHED	Public Hospitals Establishments Database
PSA	prostate-specific antigen
Qld	Queensland
SA	South Australia
Tas	Tasmania
UPS	unknown primary site
Vic	Victoria
WA	Western Australia
WCRF	World Cancer Research Fund
YLD	years lost due to disability
YLL	years of life lost (due to premature mortality)

Symbols

$	Australian dollars, unless otherwise specified
%	per cent
<	less than
+	and over
. .	not applicable
n.a.	not available
n.p.	not published (data cannot be released due to quality issues)

Summary

Cancer in Aboriginal and Torres Strait Islander peoples of Australia: an overview provides a summary of statistics on cancer in Aboriginal and Torres Strait Islander peoples of Australia.

Cancer incidence and mortality rates are higher for Indigenous Australians

In 2004–2008, Indigenous Australians had a higher rate of new cancer cases diagnosed than non-Indigenous Australians (461 compared with 434 per 100,000) using age-standardised data. Lung cancer was the most commonly diagnosed cancer for Indigenous Australians.

In 2007–2011, the age-standardised cancer mortality rate was higher for Indigenous Australians than for non-Indigenous Australians (252 compared with 172 per 100,000). Lung cancer was the leading cause of cancer death for Indigenous Australians.

Cancer survival is lower for Indigenous Australians

Indigenous Australians diagnosed with cancer between 1999 and 2007 had a 40% chance of surviving for at least 5 years, which was lower than non-Indigenous Australians (52%).

Fewer cancer-related hospitalisations occurred for Indigenous Australians

From 2006–07 to 2010–11, Indigenous Australians were less likely to be hospitalised for a principal diagnosis of cancer compared with other Australians (113 compared with 170 per 10,000), although they had longer hospitalisations than other Australians (9.6 compared with 7.7 days on average).

Higher prevalence of cancer-related modifiable risk factors

Aboriginal and Torres Strait Islander peoples have higher rates of certain lifestyle risk factors, which can partly explain some cancer incidence and mortality patterns such as:

- *Liver cancer:* Indigenous Australians are 3 times as likely to develop, and 3.3 times as likely to die from liver cancer and had a lower chance of surviving another 1 year (21% compared with 33%) than non-Indigenous Australians. Higher rates of risky alcohol consumption and higher prevalence of hepatitis B infection in this population group may be contributing factors.
- *Cervical cancer:* Indigenous females are 2.8 times as likely to develop and 3.9 times as likely to die from cervical cancer and had a lower chance of surviving another 5 years (51% compared with 67%) than non-Indigenous females. A contributing factor in the higher rates in Indigenous females could be lower rates of cervical screening for this population group.
- *Lung cancer:* Indigenous Australians are 1.9 times as likely to develop and die from lung cancer as non-Indigenous Australians. A contributing factor may be the higher prevalence of smoking among Indigenous Australians than non-Indigenous Australians (38% compared with 18%).
- *Breast cancer in females:* Indigenous females diagnosed with breast cancer in 2003–2007 had a 100% higher risk of dying from any cause by 2010 than non-Indigenous females. The poorer prognosis could be at least partly explained by the lower participation of Indigenous females in breast cancer screening (36%) than non-Indigenous females (54%).

Data at a glance

Cancer in Aboriginal and Torres Strait Islander peoples of Australia: an overview provides a summary of national statistics on cancer in Aboriginal and Torres Strait Islander peoples of Australia. The following table presents summary data on incidence, mortality, hospitalisation and survival for Aboriginal and Torres Strait Islander peoples for selected cancers. Data presented are restricted to those states and territories for which information on Indigenous status is considered of sufficient completeness for reporting (see chapters 3, 4, 5 and 7 for further information). Comparisons throughout this section are made between Indigenous Australians and their non-Indigenous counterparts (or other Australians for hospitalisation).

Age-standardised rates[a] for incidence, mortality, hospitalisation and 5-year crude survival[b] for selected cancers, Indigenous Australians

Cancer site/type	Incidence[c] 2004–2008	Mortality 2007–2011	Hospitalisation 2006–07 to 2010–11	Survival 1999–2007
Lung (C33–C34)				
Indigenous	79.8	63.6	12.3	7.4
Non-Indigenous	43.0	33.2	7.9	10.7
Breast in females (C50)				
Indigenous	82.1	27.5	13.7	69.9
Non-Indigenous	103.6	21.4	20.4	81.3
Bowel (C18–C20)				
Indigenous	47.8	13.4	7.8	46.8
Non-Indigenous	58.8	16.2	12.7	52.9
Prostate (C61)				
Indigenous	105.2	30.6	11.8	62.5
Non-Indigenous	147.6	29.9	29.1	72.0
Unknown primary site/Secondary site (C77–C80)[d]				
Indigenous	23.6	15.7	14.3	6.6
Non-Indigenous	12.2	9.6	16.8	8.3
Cervix (C53)				
Indigenous	18.0	7.1	4.8	51.2
Non-Indigenous	6.5	1.8	1.6	67.2
Liver (C22)				
Indigenous	15.3	17.2	3.1	n.p.
Non-Indigenous	5.1	5.2	1.5	12.1
All cancers combined[e]				
Indigenous	**460.8**	**251.7**	**113.0**	**40.2**
Non-Indigenous	**434.4**	**172.4**	**170.1**	**51.9**

(a) Rates were directly age-standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population for incidence and mortality and per 10,000 population for hospitalisations.

(b) Data for 5-year crude survival, expressed as a percentage.

(c) Incidence refers to the number of new cases diagnosed during a given period.

(d) For incidence the applicable code is C80 (unknown primary site) and for hospitalisation the applicable codes are C77–C79 (secondary site).

(e) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Source: AIHW Australian Cancer Database 2009 and 2007, AIHW National Mortality Database and AIHW National Hospital Morbidity Database.

Overview

The following pages present key findings for leading cancers affecting Aboriginal and Torres Strait Islander peoples. Comparisons throughout this section are made between Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians (or other Australians for hospitalisation) using the latest available data.

Lung cancer

Indigenous Australians were 1.9 times as likely to develop, 1.9 times as likely to die from, and 1.6 times as likely to be hospitalised for, lung cancer. Indigenous Australians had a lower chance of surviving 5 years following a diagnosis of lung cancer (7% compared with 11%).

Demographics

Indigenous Australians had higher mortality rates among all age groups, higher incidence rates among those aged 45 and older, higher hospitalisation rates among those aged under 75 and a lower chance of surviving another 5 years after a lung cancer diagnosis among those aged 50 to 69.

Indigenous males and females had higher incidence, mortality and hospitalisation rates.

Indigenous Australians had higher incidence rates among those living in all remoteness areas, and higher hospitalisation rates among those living in *Inner regional, Outer regional* and *Remote and very remote* areas.

Modifiable risk factors

The higher rates of lung cancer in Indigenous Australians could be explained by the higher prevalence of smoking (38% compared with 18% in 2010 after age-standardisation) in this population group than non-Indigenous Australians (Roder 2005; AIHW 2011a; Cunningham et al. 2008).

Breast cancer in females

Indigenous females were 20% less likely to be diagnosed with, and 30% less likely to be hospitalised for, breast cancer but were 1.3 times more likely to die from breast cancer.

Indigenous females diagnosed with breast cancer in 2003–2007 had a 2 times higher risk of dying from any cause by 2010, after adjusting for age, sex and geographic remoteness.

Demographics

Indigenous females had lower incidence rates among those aged under 65, lower hospitalisation rates among those aged under 75 and a lower chance of surviving another 5 years after a breast cancer diagnosis among all age groups.

Indigenous females had a lower incidence rate among those living in *Remote and very remote* areas, and a lower chance of surviving another 5 years after a breast cancer diagnosis among those living in *Inner regional, Outer regional* and *Remote and very remote* areas.

Screening behaviour

The lower incidence, but higher mortality rates, of breast cancer in Indigenous females could be explained in part by the lower participation in breast cancer screening (36% in Indigenous females compared with 54% in non-Indigenous females aged 50–69 in 2010–2011 in screening through BreastScreen Australia), meaning that breast cancers are diagnosed at a later stage where treatment is not as effective (Roder 2005).

Bowel cancer

Indigenous Australians were 20% less likely to be diagnosed with, 20% less likely to die from, and 40% less likely to be hospitalised for, bowel cancer. Indigenous Australians had a lower chance of surviving 5 years following a diagnosis of bowel cancer (47% compared with 53%).

Demographics

Indigenous Australians had lower incidence rates of bowel cancer among those aged less than 45 and those aged between 55 and 74, and lower mortality rates among those aged 75 and older.

Indigenous males and females had lower hospitalisation rates, and Indigenous males had lower incidence rates, for bowel cancer.

Indigenous Australians had lower hospitalisation rates among those living in all remoteness areas. Indigenous Australians had lower incidence rates and a lower chance of surviving another 5 years after a bowel cancer diagnosis among those living in *Remote and very remote* areas.

Screening behaviour

The lower incidence rates in Indigenous Australians could be partly explained by the lower participation in bowel cancer screening. Of the Australian population aged 50, 55 and 65, 1.5% identified as Indigenous in the 2011 Census, but only 0.6% of National Bowel Cancer Screening Program participants in 2011–12 identified as Indigenous, indicating that not all eligible Indigenous Australians participated in this program (or chose not to identify).

Cervical cancer

Indigenous females were 2.8 times as likely to develop, 3.9 times as likely to die from, and 3 times as likely to be hospitalised for, cervical cancer. Indigenous Australians had a lower chance of surviving 5 years following a diagnosis of cervical cancer (51% compared with 67%).

Demographics

Indigenous females had higher incidence and hospitalisation rates for cervical cancer among those aged under 75, and higher mortality rates among those aged under 65.

Indigenous females had higher incidence rates and hospitalisation rates among those living in all remoteness areas, and a lower chance of surviving another 5 years among those living in *Remote and very remote* areas.

Modifiable risk factors

The higher rates of cervical cancer in Indigenous females could be explained in part by the higher prevalence of chronic infections, such as the human papilloma virus (HPV), and potentially from lower participation in cancer screening which detects precancerous lesions and infection with HPV (Roder 2005; Cunningham et al. 2008).

Liver cancer

Indigenous Australians were 3 times as likely to develop, 3.3 times as likely to die from and 2.1 times as likely to be hospitalised for, liver cancer. Indigenous Australians had a lower chance of surviving 1 year following a diagnosis of liver cancer (21% compared with 33%).

Demographics

Indigenous Australians had higher incidence and mortality rates among those aged 45 and older and higher hospitalisation rates among those aged 45 to 74.

Indigenous males and females had higher incidence, mortality and hospitalisation rates.

Indigenous Australians had higher hospitalisation rates among those living in all remoteness areas, and higher incidence rates among those living in *Major cities*, *Outer regional* and *Remote and very remote* areas.

Modifiable risk factors

The higher rates of liver cancer in Indigenous Australians could be explained by the higher prevalence of smoking, risky alcohol consumption and chronic infections (Roder 2005; Cunningham et al. 2008).

Prostate cancer

Indigenous Australians were 30% less likely to be diagnosed with prostate cancer, and 60% less likely to be hospitalised for prostate cancer. Indigenous Australians had a lower chance of surviving 5 years following a diagnosis of prostate cancer (63% compared with 72%).

Demographics

Indigenous Australians had lower hospitalisation rates among all age groups and lower incidence rates among all age groups except those aged 75 and older.

Indigenous Australians living in all remoteness areas had lower incidence and hospitalisation rates.

Cancer of unknown primary site

Indigenous Australians were 1.9 times more likely to be diagnosed with, and 1.6 times more likely to die from, cancer of unknown primary site.

Demographics

Indigenous Australians had higher incidence and mortality rates among those aged 45 to 74.

Indigenous males and females had higher incidence and mortality rates.

Indigenous Australians living in *Major cities*, *Outer regional* and *Remote and very remote* areas had higher incidence rates.

1 Introduction

This report provides a summary of national statistics on cancer in Aboriginal and Torres Strait Islander peoples of Australia. It aims to increase understanding of how this disease affects the Aboriginal and Torres Strait Islander population, to inform decision making and the development and evaluation of programs and policies. It is directed at a wide audience, including health professionals, policy makers, health planners, educators, researchers, consumers and the general public.

For this report, *Aboriginal and Torres Strait Islander peoples* is the preferred term for referring to Aboriginal and Torres Strait Islanders collectively as it recognises the distinct cultures, languages and homelands of Australia's Indigenous communities. However, the term *Indigenous Australians* is sometimes used in place of *Aboriginal and Torres Strait Islander peoples* to improve presentation when comparing cancer statistics with other population groups and in presenting information in tables or graphs.

Demographic characteristics

Preliminary analysis of the 2011 Census of Population and Housing data suggests that 3% of the Australian population identified as being of Aboriginal and/or Torres Strait Islander origin (see Box 1.1 for more information).

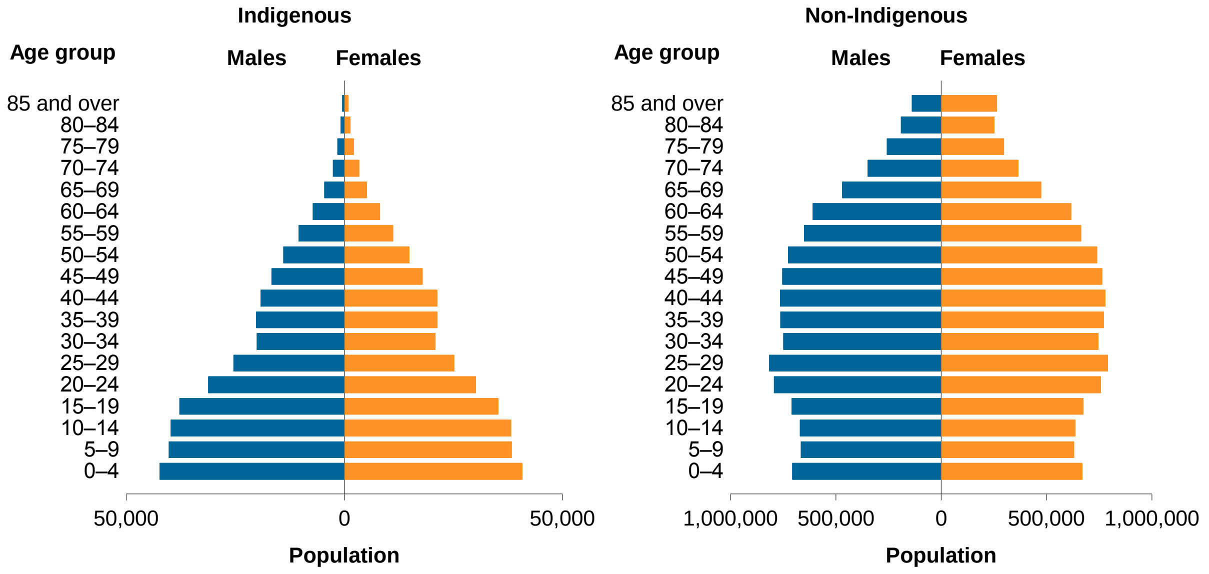
Box 1.1: How do changes in the level of Indigenous identification affect cancer counts?

Preliminary analysis of the 2011 Census of Population and Housing data suggests that the proportion of the Australian population identifying as being of Aboriginal or Torres Strait Islander origin has risen since the 2006 Census. The observed increases may be due to population growth, improved identification and a decrease in the belief that identifying can have negative repercussions (ABS 2012b).

The Australian Bureau of Statistics (ABS) recommends that 2011 preliminary Indigenous population estimates released in 2012 should not be used for reporting; instead data based on the 2006 Census should continue to be used until final population estimates and projections are released (ABS 2012a). Final 2011 population estimates for Aboriginal and Torres Strait Islander peoples will be released in August 2013 and revised estimates for previous and future years will be released by April 2014. While preliminary population estimates are available and presented in this section, following on ABS recommendations population estimates and projections based on 2006 Census data are used in this report.

Changes over time in the accuracy of identification of Aboriginal and Torres Strait Islander Australians will impact on cancer incidence, mortality and hospitalisation rates as both the numerator and denominator used to calculate rates will change. Therefore rates presented in this report using estimated populations derived from the 2006 Census should be interpreted with this in mind.

The Indigenous population has a younger overall age structure than the non-Indigenous population (Figure 1.1). In 2011, Aboriginal and Torres Strait Islander people aged under 15 constitute 36% of the Indigenous population, whereas this age group represents 18% of the non-Indigenous population. Those aged 65 and over comprise only 3% of the Indigenous population, compared with 14% of the non-Indigenous population (ABS 2013).



Source: ABS 2013.

Figure 1.1: Age structure, by sex and Indigenous status, Australia, 2011

Indigenous population estimates from the 2011 Census are not yet available by remoteness areas, therefore the latest available data by remoteness is sourced from the 2006 Census. The Indigenous population is more likely to live in remote areas of Australia than non-Indigenous Australians. In 2006, about one-quarter of Aboriginal and Torres Strait Islander peoples lived in remote areas of Australia (9% in *Remote* and 15% in *Very remote* areas). The remaining three-quarters lived in *Major cities* (32%), *Inner regional* areas (21%) and *Outer regional* areas (22%) (Table 1.1).

Table 1.1: Geographical distribution of the Australian population by Indigenous status, per cent, 2006

Remoteness area	Indigenous	Non-Indigenous
Major cities	32.1	69.4
Inner regional	21.4	19.7
Outer regional	21.9	9.2
Remote	9.3	1.3
Very remote	15.4	0.4
Total[(a)]	**100.0**	**100.0**

(a) The percentages may not add up to total due to rounding.

Source: ABS 2008.

Data interpretation

This report uses the term *cancer* to refer to tumours that are invasive (that is, malignant), and excludes benign or non-invasive tumours. The original site in which a cancerous tumour forms is referred to as the primary cancer site, while the spread of cancerous cells to another (that is, secondary) site is referred to as metastasis. In general, data in this report are presented by primary site, but data in chapters 7 and 8 also include data on metastasis.

The report refers to a number of different disease classifications including ICD-10 (International Statistical Classification of Diseases and Related Health Problems, tenth revision) and ICD-10-AM (International Statistical Classification of Diseases and Related Health Problems, tenth revision, Australian modification). See Appendix A for further information on the use of these codes.

This report also presents information on the number of cancer cases and deaths, together with age-standardised rates. The use of age-standardised rates takes into account differences in the age structure and size of the population. This is especially important with regard to cancer since the risk of many cancers rises with age. Rates have been standardised to the Australian population at 30 June 2001 and are generally expressed per 100,000 population unless otherwise specified. See Appendix B for further information.

Confidence intervals (at the 95% level) are shown in graphs and in tables. CIs can be used as a guide when considering whether differences in rates may be a result of chance variation. Where CIs do not overlap, the difference between rates is regarded as greater than would be attributable to chance. A narrow CI indicates good precision or little random error and, conversely, a wider CI indicates poorer precision. See Appendix B for further information.

In some cases, data based on a small number of cases may need to be suppressed in order to maintain data confidentially and to avoid publishing statistics of very low reliability. The table or figure where this is applicable notes such cases.

The quality of cancer data can vary according to the availability of source data. In Australia, all states and territories have legislation that makes cancer a notifiable disease and cancer data is relatively complete (see Appendix C). However, a range of factors influence key cancer measures, such as incidence, mortality and survival (Black et al. 1998; WCRF & AICR 2007) including:

- characteristics of those diagnosed with cancer (such as age, sex, race, ethnicity, socioeconomic status, presence of additional illness and behaviour, including awareness of cancer symptoms and compliance with treatment)
- the nature of the tumours (such as stage at diagnosis, site of tumour, structure of the tumour and extent of disease)
- health-care system and cancer control (such as availability of and access to screening, early detection, changes to treatment facilities and supportive care, quality of treatment and follow-up care)
- completeness of cancer registrations, death registrations and estimated residential populations (including the level of Indigenous identification).

Due to these factors, data presented in this report should be interpreted with care and used as a guide.

Aboriginal and Torres Strait Islander peoples may have poor access to health-care services due to financial, language, cultural or geographical barriers (Queensland Health 2006; Stumpers & Thomson 2009). In addition, Indigenous Australians may be less likely to participate in cancer screening and other prevention programs than non-Indigenous Australians (Roder 2005; Burns et al. 2010). Therefore, when Aboriginal and Torres Strait Islander peoples in Australia present for diagnosis, they may have a more advanced stage of cancer and can have a number of additional diagnoses (Moore et al. 2010). Aboriginal and Torres Strait Islander peoples in Australia can also have a lower uptake of cancer treatment (Cunningham et al. 2008).

Box 1.2: Terminology used throughout this report

- The term *cancer* is used to refer to tumours which are invasive.
- The term *significant* refers to a statistically significant difference, where 95% CIs do not overlap. Such differences may or may not be significant from a practical or clinical perspective. Note that while rates for Indigenous and non-Indigenous Australians may differ, the smaller size of the Indigenous population has led to broader CIs that may overlap.

Population groups used throughout this report:

- *Aboriginal and Torres Strait Islander peoples* or *Indigenous Australians* refers to those people who identify as being of Aboriginal and/or Torres Strait Islander descent.
- *Non-Indigenous Australians* refers to people who have declared they are not of Aboriginal or Torres Strait Islander descent.
- *Other Australians* includes people who have declared that they are not of Aboriginal or Torres Strait Islander descent and others who have not stated their Indigenous status.
- *Total Australians* includes Aboriginal and Torres Strait Islander peoples of Australia, non-Indigenous Australians and others who have not stated their Indigenous status.

Data sources

This report uses the most up-to-date data available. The registration of cancer is a dynamic process in that existing records may be modified if new information is received. It can take some time for the necessary information to be become available and to be finalised before being provided to the AIHW. Once the AIHW receives the data, further time is needed to process and finalise them into a national data set. As a result, the statistics in the main chapters refer to different years ranging from 2011 to earlier periods, depending on the data process (see Table 1.2 for information on years reported by data source).

A key data source for this report was the *2009 Australian Cancer Database* (ACD). The ACD contains information on all new cases of primary, invasive cancer diagnosed in Australia, excluding basal and squamous cell carcinomas of the skin. State and territory cancer registries collect data from a number of sources, such as pathology and haematology laboratories, hospitals and death registrations, and these data are supplied annually to the AIHW. The 2009 data files for NSW and the ACT were not available for inclusion in the 2009 version of the ACD. As a consequence, this report does not use 2009 cancer data as the most recent national incidence data available for inclusion were for 2008.

The Registries of Births, Deaths and Marriages, the ABS and the National Coronial Information System provided the mortality data used in this report, and these data are maintained in the *National Mortality Database* (NMD). Death information presented in this report relates to the year of death, except for data from the most recent year available (namely, 2011) where year of registration is used. Generally, for the most part, the year of death and year of registration correspond, but deaths that occur at the end of the year often do not get registered until the following year due to a lag in processing. Therefore, the number of deaths registered for the most recent year is used as an estimate to account for these deaths.

This report uses several other data sources, including the National Death Index (NDI), the National Hospital Morbidity Database and the 2008 GLOBOCAN database. See Appendix C for information on each data source, including data quality statements.

Quality of Indigenous status data

The quality of information on Indigenous status varies among these data sources by jurisdiction and year of collection. In some areas, data presented are restricted to those states and territories where information on Indigenous status is considered of sufficient completeness for reporting (see Table 1.2 for a summary). This report presents incidence data by Indigenous status for four jurisdictions, mortality data for five jurisdictions and hospitals data for six jurisdictions. Each chapter provides details of the Indigenous status data quality.

Table 1.2: Availability of cancer data by Indigenous status

Data source	Measure	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Missing data[a]
Australian Cancer database (2009 version, reporting years 2004–2008)	Incidence	✓	×	✓	✓	×	×	×	✓	12%
National Mortality Database (reporting years 2007–2011)	Mortality	✓	×	✓	✓	✓	×	×	✓	0.8%
National Hospital Morbidity Database(b) (2006–07 to 2010–11 financial years)	Hospitalisation	✓	✓	✓	✓	✓	×	×	✓	11%
BreastScreen Australia(c) (2 years 2010–2011)	Breast screening	✓	✓	✓	✓	✓	✓	✓	✓	n.a.
National Bowel Cancer Screening Program(c) (July 2011 and June 2012)	Bowel screening	✓	✓	✓	✓	✓	✓	✓	✓	n.a.
National Cervical Screening Program	Cervical screening	×	×	×	×	×	×	×	×	n.a.

(a) Missing data refers to the per cent of records with unknown Indigenous status.

(b) The Northern Territory data by Indigenous status considered acceptable for analysis purposes are restricted to public hospitals only.

(c) Information on the BreastScreen Australia and National Bowel Cancer Screening Program require people to self-report and therefore some Aboriginal and Torres Strait Islander people may choose to not identify.

Source: AIHW Australian Cancer Database 2009, AIHW National Mortality Database, AIHW National Hospital Morbidity Database, AIHW 2012e, AIHW 2013b, AIHW 2013d and AIHW 2013f.

What is missing from the picture?

The ACD currently does not contain information on the stage of cancer at diagnosis, presence of co-morbidity, treatment or frequency of recurrence of cancer after treatment (AIHW 2012b). Some pilot projects are underway to collect these data with the aim of extending the method to national data collection (CA 2010).

Reliable national data on the incidence and mortality of cancer for Aboriginal and Torres Strait Islander peoples are not available. Further, information on cervical screening by Indigenous status are not reported, as there are no national mechanisms for collecting Indigenous status on pathology or cytology forms. There are also no nationally coordinated approaches to collecting national primary health-care data on cancer by Indigenous status.

As part of the National Indigenous Reform Agreement, *National best practice guidelines for collecting Indigenous status in health data sets* have been developed to improve the collection of baseline Indigenous status information (AIHW 2013g). Further, Federal, state and territory governments are reviewing practices for collecting pathology information (AIHW forthcoming 2013), including introducing a standard question on Indigenous status. They are also developing Key Performance Indicators for Indigenous-specific primary health-care services (Council of Australian Governments 2011).

2 Risk factors

Understanding what causes cancer is important to enable successful prevention, detection and treatment of the disease. For most cancers, the causes are not fully understood. However some factors are well-recognised as contributing to the development of cancer. These factors include genetic, lifestyle and environmental factors (Figure 2.1). While some risk factors cannot be changed, others, mainly those relating to behaviours and lifestyles, are modifiable, and improvements in these areas could be beneficial in lowering cancer rates.

Biomedical factors

- Genetic susceptibility
- Hormonal factors in females

Lifestyle factors

- Smoking
- Alcohol consumption
- Diet
- Physcial inactivity and obesity
- Chronic infections

Environmental factors

- Sunlight
- Radiation
- Occupational exposure
- Pollution

Note: Based on information published in IARC 2008 and WCRF & AICR 2007.

Figure 2.1: Risk factors for cancer

Aboriginal and Torres Strait Islander peoples

Compared with their non-Indigenous counterparts, Indigenous Australians as a group are more socially disadvantaged and this contributes to their poorer health status. On average, they have higher rates of unemployment, lower educational attainment and live in more overcrowded households (AIHW 2012b; AIHW 2013a).

Data suggests that Aboriginal and Torres Strait Islander peoples have risk factors relevant to cancer, including tobacco smoking, risky alcohol consumption, poor diet, low levels of physical activity and high levels of infection such as Hepatitis B (Condon 2004; Cunningham et al. 2008). The high prevalence of these risk factors could play a part in the higher cancer incidence and mortality rates observed in this population group (Cunningham et al. 2008).

Cancers associated with risk factors that are of particular concern for Aboriginal and Torres Strait Islander peoples are listed in the boxes below, divided into lifestyle (and potentially modifiable) factors, biomedical factors and other factors.

Lifestyle factors

Smoking and passive smoking

Smoking is a major cause of cancer in humans, and is responsible for one in five of all deaths in Aboriginal and Torres Strait Islander peoples in Australia (Vos et al. 2007). Indigenous Australians generally take up smoking at an earlier age, continue to smoke for longer and make fewer quitting attempts than non-Indigenous Australians (CCA 2007).

In 2010, Indigenous Australians were 2.2 times as likely as non-Indigenous Australians to smoke tobacco (38% compared with 18% after age-standardisation). Further, among current smokers, on average Indigenous Australians smoked 46 cigarettes more per week (147) than non-Indigenous Australians (101) (AIHW 2011a).

Evidence indicates that active and for some cases, passive smoking, can cause cancers of the following sites:

- bladder
- cervix
- kidney
- larynx
- liver
- lung
- myeloid leukaemia
- nasal cavity and nasal sinuses
- oral cavity (lip, mouth, tongue)
- oesophagus
- pancreas
- pharynx
- stomach.

Alcohol consumption

Alcohol consumption is an important risk factor for cancer with the risk increasing with the amount of alcohol consumed (IARC 2008). It is associated with an estimated 6% of the total burden of disease for Aboriginal and Torres Strait Islander people in Australia (Vos et al. 2007).

In 2010, 23% of Indigenous Australians compared with 16% of non-Indigenous Australians had more than four standard drinks at least once a week, and 30% compared with 20% had on average more than two standard drinks per day, which means Indigenous Australians were about 1.5 times as likely to drink alcohol at risky levels on both single occasions and during their lifetime (AIHW 2011a).

Cancers associated with alcohol consumption include those of the:

- bowel
- breast (females)
- larynx
- liver
- oesophagus
- oral cavity (lip, mouth, tongue)
- pharynx.

Diet

Good nutrition contributes to quality of life, helps maintain a healthy body weight and reduces the risk of chronic diseases such as cancer. Alternatively, poor diets are associated with many chronic diseases that are a major cause of death (AIHW 2012a).

In 2004–05, Indigenous Australians were about 7 times as likely as non-Indigenous Australians to report no usual daily vegetable consumption (5% compared with 0.8%) and twice as likely to report no usual daily fruit consumption (13% compared with 7%) (AIHW 2011b). Fruit and vegetables were reported to be less accessible for approximately two-thirds of Indigenous Australians living in regional and remote areas of Australia (ABS 2009b; AIHW 2011b).

Evidence suggests that high intake of particular foods (such as processed meat and foods that are high in fat) may be associated with an increased risk of cancers of the:

- bowel
- breast
- kidney
- oesophagus
- pancreas
- prostate
- stomach
- uterus.

Obesity and physical inactivity

Obesity is defined as abnormal or excessive fat accumulations that may impair health and a body mass index of 30 and over.

Physical activity is an important part of a healthy lifestyle. Doing little or no physical activity increases an individual's risk of being overweight or obese, and is associated with a higher risk of developing cancer (AIHW 2012b).

In 2004–2005, Indigenous Australians were 1.8 times more likely to be obese than non-Indigenous Australians. Approximately 29% of adult Indigenous Australians were classified as overweight, and 31% as obese (AIHW 2011b).

Indigenous Australians were also more likely to be sedentary and less physically active than non-Indigenous Australians. In 2004–05, approximately half (51%) of Indigenous Australians reported their exercise level as sedentary compared to a third (33%) of non-Indigenous Australians (AIHW 2011b).

Obesity and lack of physical activity is thought to increase the risk of cancers of the:

- bowel
- breast (females)
- endometrium
- gall bladder
- kidney
- oesophagus
- ovary
- pancreas.

Chronic infections

Chronic infections, such as hepatitis B virus (HBV) and human papilloma virus (HPV) can cause cancer.

HBV infection occurs among Indigenous Australians at a higher rate than non-Indigenous Australians. In 2005, Indigenous Australians were 7 times as likely to have HBV compared with non-Indigenous Australians (DoHA 2010).

Recent research has found that about half of the total liver cancer mortality can be attributed to HBV infection (Lozano et al. 2012).

Cancers associated with chronic infections are thought to include those of the:

- bladder
- cervix
- blood or bone marrow (leukaemias)
- liver
- lung
- lymphatic system (lymphomas)
- nasopharynx and oropharynx
- oral cavity (lip, mouth, tongue)
- stomach.

Biomedical factors

Reproductive and hormonal factors

Reproductive hormones are thought to influence the risk of developing some cancers. For women, the risk can be related to early pregnancies and to multiple pregnancies (Roder 2005).

In 2010, Indigenous women had a higher birth rate than non-Indigenous women (2.6 compared with 1.9 babies), and on average had children at a younger age (median age of 24.6 compared with 30.7, respectively) (ABS 2011).

Cancers that are associated with reproductive and hormonal factors include those of the:

- breast
- endometrium
- ovary.

Other factors

Participation in cancer screening

Australia has three national population cancer screening programs (BreastScreen Australia, the National Cervical Screening Program and the National Bowel Cancer Screening Program), directed at reducing illness and death from cancer through early detection and effective follow-up treatment. Finding cancers early can mean that the cancers are less advanced, which for some cancers may be associated with increased treatment options (NBOCC 2009) and improved survival (AIHW & NBCC 2007).

Indigenous Australians have lower participation in screening programs than non-Indigenous Australians. Over 2010 and 2011, participation in screening through BreastScreen Australia by Indigenous women in the target age group (50–69 years) was lower at 36% than their non-Indigenous counterparts (54%) (AIHW 2013b). Of the Australian population aged 50, 55 and 65, 1.5% identified as Indigenous in the 2011 Census, but only 0.6% of National Bowel Cancer Screening Program participants in 2011–12 identified as Indigenous, indicating that not all eligible Indigenous Australians participated in this program or chose not to identify (AIHW 2013f). Of particular concern, research in cervical cancer screening has found that Indigenous Australians participate in screening at a lower rate than non-Indigenous Australians (Coory et al. 2002; Binns & Condon 2006), but have higher incidence and mortality rates of cervical cancer (Condon 2004; Condon et al. 2005; Roder 2005; Stumpers & Thomson 2009).

Invasive cancers that could be prevented or detected earlier by participating in national population screening programs include those of the:

- bowel
- breast
- cervix.

Area of residence

People living in rural and remote areas tend to be less healthy, have higher mortality rates and lower levels of education, income and employment than their city counterparts (AIHW 2012b). Further, the cost of basic nutritious food can be 30% higher in rural and remote areas than in urban and metropolitan areas (Harrison et al. 2010). The availability of quality fresh fruit and vegetables and better food choices decreases in remote communities while the cost rises (AIHW 2012a).

In 2006, approximately one-quarter (24%) of Aboriginal and Torres Strait Islander peoples lived in remote or very remote areas of Australia (ABS 2008). For these Aboriginal and Torres Strait Islander peoples, there can be issues with accessing preventive, diagnostic and curative health-care services because of geographical barriers (Stumpers & Thomson 2009).

Research suggests that the further a person's residential address is from major treatment centres, the poorer their cancer outcome (CA 2009).

3 Incidence of cancer

Key findings

Between 2004 and 2008 in New South Wales, Queensland, Western Australia and the Northern Territory:

- 3,875 Aboriginal and Torres Strait Islander people were diagnosed with cancer.
- Indigenous Australians were more likely to be diagnosed with cancer at a younger age than non-Indigenous Australians.
- The age-standardised incidence rate for all cancers combined was significantly higher for:
  - Indigenous Australians compared with non-Indigenous Australians (461 and 434 per 100,000, respectively)
  - Indigenous males than for Indigenous females (549 compared with 400 per 100,000)
  - Indigenous females than for non-Indigenous females (400 compared with 361 per 100,000)
  - Indigenous Australians living in *Outer regional* areas compared with non-Indigenous Australians living in these areas (285 compared with 243 per 100,000).
- The most commonly diagnosed cancers for Aboriginal and Torres Strait Islander peoples were cancers of the lung (603 cases), breast in females (438), bowel (348), prostate (291) and unknown primary site (167).
- Indigenous Australians were 3 times as likely to be diagnosed with liver cancer, 2.8 times as likely to be diagnosed with cervical cancer, 1.9 times as likely to be diagnosed with lung cancer and 1.9 times as likely to be diagnosed with cancer of unknown primary site as their non-Indigenous counterparts.

About incidence

- Incidence is the number of new primary cancers and not a recurrence of a previous primary cancer (IARC 2004).
- The main data source was the 2009 ACD.
- Data provided is for new primary invasive cancer cases diagnosed in Aboriginal and Torres Strait Islander peoples during 2004–2008.
- Information in the ACD on Indigenous status is only considered of sufficient completeness for reporting for New South Wales, Queensland, Western Australia and the Northern Territory.
- Comparisons have been made throughout with non-Indigenous Australians, with the analysis excluding those for whom Indigenous status was not given. The overall level of missing data on Indigenous status was 12% (Table 3.1).
- The Australian Standard Geographical Classification Remoteness Area (ASGC RA) (ABS 2006) was used to make comparisons by remoteness status (see Appendix A for more details).
- More detailed data are available in *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: supplementary data tables* on the AIHW website.

All cancers combined

In 2004–2008, in the four jurisdictions analysed, 3,875 Aboriginal and Torres Strait Islander people were diagnosed with cancer (Table 3.1). This means, on average, about two Indigenous Australians were diagnosed with cancer every day in these states and territories.

During the same period, the age-standardised incidence rate of all cancers combined for Indigenous Australians was 461 cases per 100,000 persons, which was significantly higher than the rate for non-Indigenous Australians (434 per 100,000).

Table 3.1: Incidence of all cancers combined[(a)] by Indigenous status, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

Indigenous status	Number	Per cent	ASR[(b)]	95% CI
Indigenous	3,875	1.1	460.8	443.8–478.2
Non-Indigenous	292,949	86.8	434.4	432.8–436.0
Not stated	40,494	12.0	. .	. .
Total	**337,318**	**100.0**	**494.1**	**492.4–495.8**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

(b) Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

Source: AIHW Australian Cancer Database 2009.

Age

Indigenous Australians were diagnosed with cancer at a younger age than non-Indigenous Australians (Table 3.2). The higher relative proportion of new cases among Indigenous Australians aged less than 55 is likely to be due to the relatively younger age structure in this population group and the lower overall life expectancy (AIHW 2012b).

The age-specific incidence rates for all cancers combined increased with age for both groups and were generally higher for Indigenous Australians than non-Indigenous Australians in all age groups except for those aged less than 45 (Table 3.2). The incidence rate for Indigenous Australians within this younger age category was significantly lower than that of non-Indigenous Australians (42 compared with 63 per 100,000).

Sex

The number of new cancer cases diagnosed among Aboriginal and Torres Strait Islander peoples was equally distributed among males and females (Table 3.2). However the age-standardised incidence rate for all cancers combined was significantly higher for Aboriginal and Torres Strait Islander males than for their female counterparts (549 compared with 400 per 100,000).

Indigenous females had a significantly higher age-standardised incidence rate than their non-Indigenous counterparts (400 compared with 361 per 100,000) (Table 3.2). Indigenous males also had a higher rate than their non-Indigenous counterparts, but the difference was not significant.

A smaller proportion of Indigenous Australians diagnosed with cancer lived in *Major cities* compared with non-Indigenous Australians (29% compared with 65%), and a greater proportion lived in *Remote and very remote* areas (27% compared with 2%) (Table 3.2).

The age-standardised incidence rate for all cancers combined was significantly higher for Indigenous Australians living in *Outer regional* areas compared with their non-Indigenous counterparts (285 compared with 243 per 100,000). Among Indigenous Australians, the highest incidence rate was for those living in *Outer regional* areas (285 per 100,000), significantly higher than the rate for *Remote and very remote* areas (245 per 100,000).

Table 3.2: Incidence of all cancers combined(a) by Indigenous status, age group, sex and remoteness area, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

	Indigenous				Non-Indigenous			
	Number	Per cent	Rate(b)	95% CI	Number	Per cent	Rate(b)	95% CI
Age groups (years)								
<45	763	19.7	42.2	39.2–45.3	24,793	8.5	62.5	61.7–63.3
45–54	815	21.0	435.8	406.4–466.8	35,028	12.0	393.6	389.5–397.7
55–64	975	25.2	968.7	908.8–1,031.4	65,690	22.4	929.9	922.8–937.1
65–74	836	21.6	1,870.4	1,745.8–2,001.6	75,797	25.9	1,719.2	1,707.0–1,731.5
75+	486	12.5	2,380.3	2,173.3–2,601.6	91,640	31.3	2,354.9	2,339.7–2,370.2
Sex								
Males	1,931	49.8	549.1	519.1–580.1	165,103	56.3	524.7	522.2–527.3
Females	1,944	50.2	399.9	379.8–420.8	127,846	43.6	361.0	359.0–363.0
Remoteness area								
Major cities	1,139	29.4	269.3	253.2–286.1	191,504	65.4	252.5	251.2–253.8
Inner regional	734	18.9	258.5	239.3–278.7	65,285	22.3	256.7	254.3–259.1
Outer regional	924	23.8	284.6	265.9–304.3	29,175	10.0	243.0	239.7–246.2
Remote and very remote	1,059	27.3	245.3	230.1–261.3	5,661.54	1.9	260.0	252.8–267.3
Not stated	19	0.5	. .	. .	1,323	0.5	252.5	. .
Total	**3,875**	**100.0**	**460.8**	**443.8–478.2**	**292,949**	**100.0**	**434.4**	**432.8–436.0**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

(b) The rates for age groups (years) are expressed per 100,000 population. The rates for sex, remoteness area and the total were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

Source: AIHW Australian Cancer Database 2009.

Cancer type

The 10 most commonly diagnosed cancers among Aboriginal and Torres Strait Islander peoples accounted for 63% of all cancers diagnosed within this population (Table D3.1). The top 10 cancer incidence rankings for Indigenous Australians differed from those for non-Indigenous Australians and all Australians (Table 3.3, online supplementary Table G3.2). Cancer types that were ranked higher in the Indigenous population than in the non-Indigenous population include:

- lung cancer (ranked first compared with fourth)
- cervical cancer (ranked seventh compared with twenty-second)
- liver cancer (ranked ninth compared with eighteenth).

Table 3.3: The 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

	Indigenous		Non-Indigenous	
Cancer site/type	**Number**	**Ranking**	**Number**	**Ranking**
Lung (C33–C34)	603	1	28,998	4
Breast in females(C50)	438	2	35,851	3
Bowel (C18–C20)	348	3	39,725	2
Prostate (C61)	291	4	47,404	1
Unknown primary site (C77–C80)	167	5	8,329	7
Non-Hodgkin lymphoma (C82–C85)	125	6	10,945	6
Cervix (C53)	121	7	2,185	22
Uterus (C54–C55)	120	8	5,243	13
Liver (C22)	118	9	3,429	18
Pancreas (C25)	110	10	7,046	8
All cancers combined[(a)]	**3,875**	. .	**292,949**	. .

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Notes

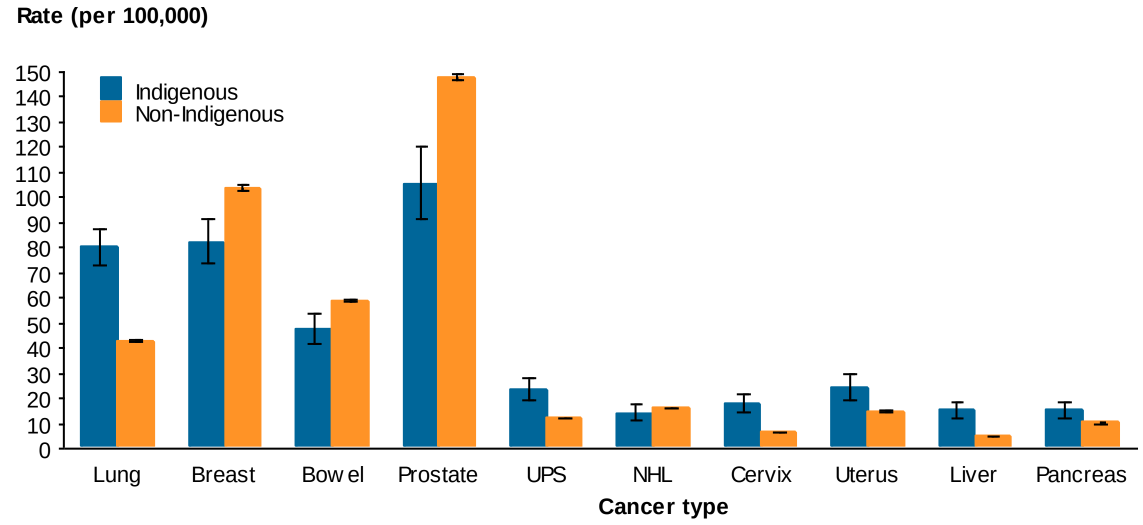
1. Full list of cancer types can be found in online supplementary Table G3.1.
2. Top 10 rankings of Indigenous, non-Indigenous and all Australians can be found in online supplementary Table G3.2.

Source: AIHW Australian Cancer Database 2009.

Comparison of the age-standardised incidence rates for the 10 most common cancers indicates that Indigenous Australians (Figure 3.1):

- were 3 times as likely to develop liver cancer, 2.8 times as likely to develop cervical cancer, 1.9 times as likely to develop lung cancer, 1.9 times as likely to develop cancer of unknown primary site and 1.5 times as likely to develop pancreatic cancer as non-Indigenous Australians
- were less likely to develop breast cancer in females (rate ratio of 0.8), bowel (0.8) and prostate cancers (0.7) as non-Indigenous Australians.

The high prevalence of risk factors, such as smoking, risky alcohol consumption and higher levels of chronic infections may explain the higher rates of liver, cervical and lung cancer. The lower rates of breast cancer in females, bowel and prostate cancer could be related to the lower participation in screening (Roder 2005; Cunningham et al. 2008).



Notes

1. Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.
2. Breast cancer is for females only. UPS stands for unknown primary site. NHL stands for non-Hodgkin lymphoma.
3. Figure is ordered based on top 10 cancer incidence numbers for Indigenous Australians.
4. The data for this figure are shown in Table D3.1.

Source: AIHW Australian Cancer Database 2009.

Figure 3.1: Age-standardised incidence rates of the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

Age

Consistent with the overall findings, the age-specific incidence rate for Indigenous Australians, compared with non-Indigenous Australians (Figure 3.2), was:

- significantly higher for lung and liver cancers among all age groups except those aged less than 45; for cervical cancer among all age groups except those aged 75 and older; and for cancer of unknown primary site among those aged 45 to 74
- significantly lower for prostate cancer among all age groups except those aged 75 and older; breast cancer in females among all age groups except those aged 65 and older; and bowel cancer among those aged less than 45 and those aged between 55 and 74.

Other cancers where Indigenous Australians had significantly higher age-specific incidence rates than non-Indigenous Australians include uterine cancer among those aged 45–54 and pancreatic cancer among those aged 45 to 64.

Sex

Consistent with the overall findings, the age-standardised incidence rate (Figure 3.3) was:

- significantly higher for Indigenous males than non-Indigenous males for liver cancer, lung cancer and cancer of unknown primary site; and for Indigenous females than non-Indigenous females for liver cancer, cervical cancer, lung cancer and cancer of unknown primary site

- significantly lower for Indigenous males than non-Indigenous males for bowel cancer and prostate cancer; and for Indigenous females than non-Indigenous females for breast cancer.

Other cancers of interest include significantly higher rates of uterine cancer and pancreatic cancer in Indigenous females. Within the Indigenous population, Indigenous males had significantly higher rates of liver cancer and lung cancer than Indigenous females.

Remoteness

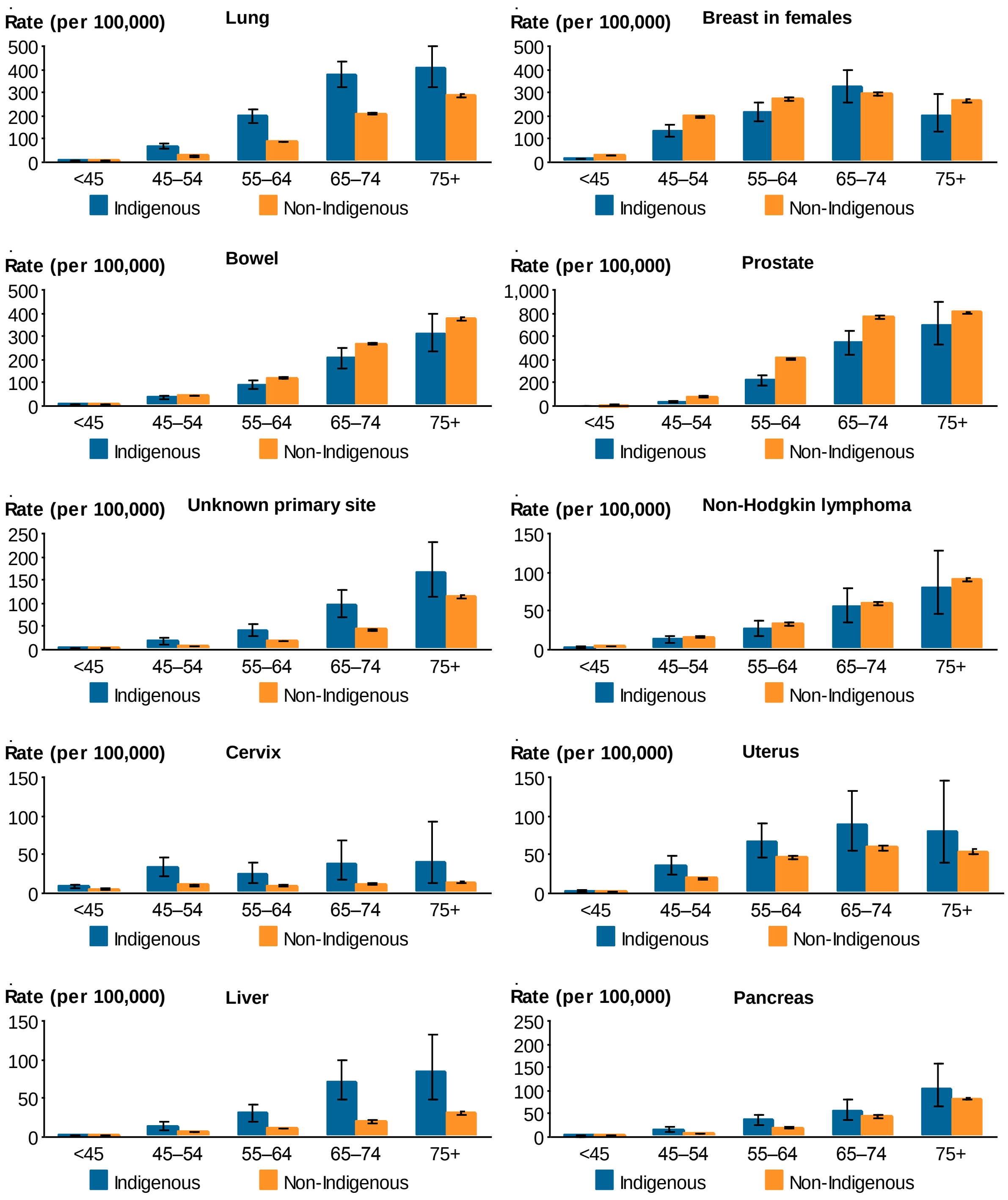
Consistent with the overall findings, the age-standardised incidence rate for Indigenous Australians compared with non-Indigenous Australians (Figure 3.4) was significantly:

- higher for those living in all remoteness areas for lung and cervical cancers
- higher for those living in *Major cities*, *Outer regional* and *Remote and very remote* areas for liver cancer and cancer of unknown primary site
- lower for those living in all remoteness areas for prostate cancer, and for those living in *Remote and very remote* for breast cancer in females and bowel cancer.

When comparing within the Indigenous population, Indigenous Australians living in *Remote and very remote* areas had significantly:

- higher rate of cancer of unknown primary site and significantly lower rates of bowel and prostate cancers and breast cancer in females than those living in *Major cities*
- lower rates of bowel and prostate cancers than those living in *Inner regional* and *Outer regional* areas.

These results could suggest that Indigenous Australians living in Remote and very remote areas have poorer access to health-care services and are more likely to have cancers that are diagnosed at a later stage when the primary site is no longer apparent (Roder 2005; Cunningham et al. 2008).

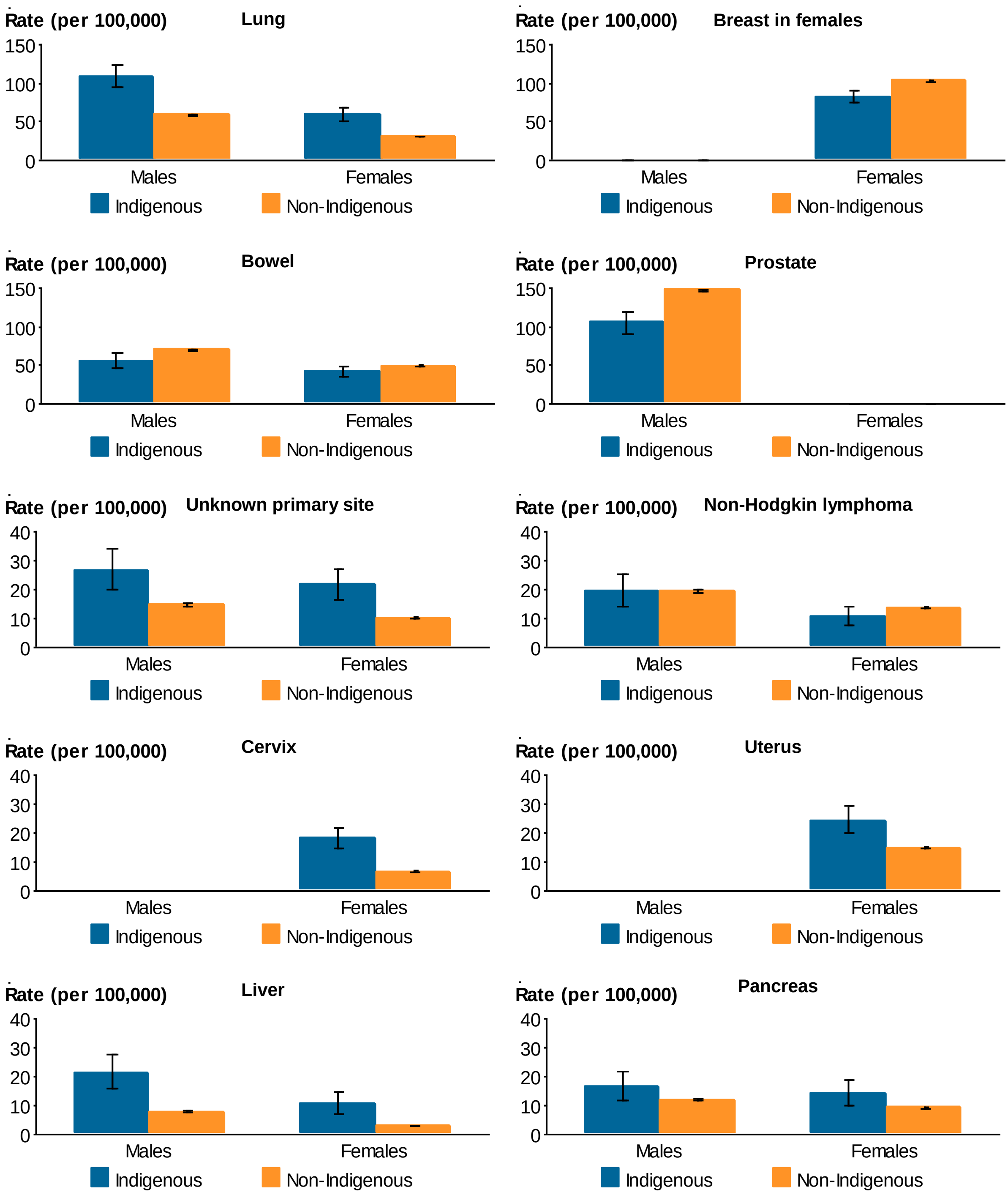


Notes

1. There are differences in the scale on the y-axis between cancer types.
2. The rates are expressed per 100,000 population.
3. The data for this figure are shown in Table D3.2.

Source: AIHW Australian Cancer Database 2009.

Figure 3.2: Age-specific incidence rates for the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

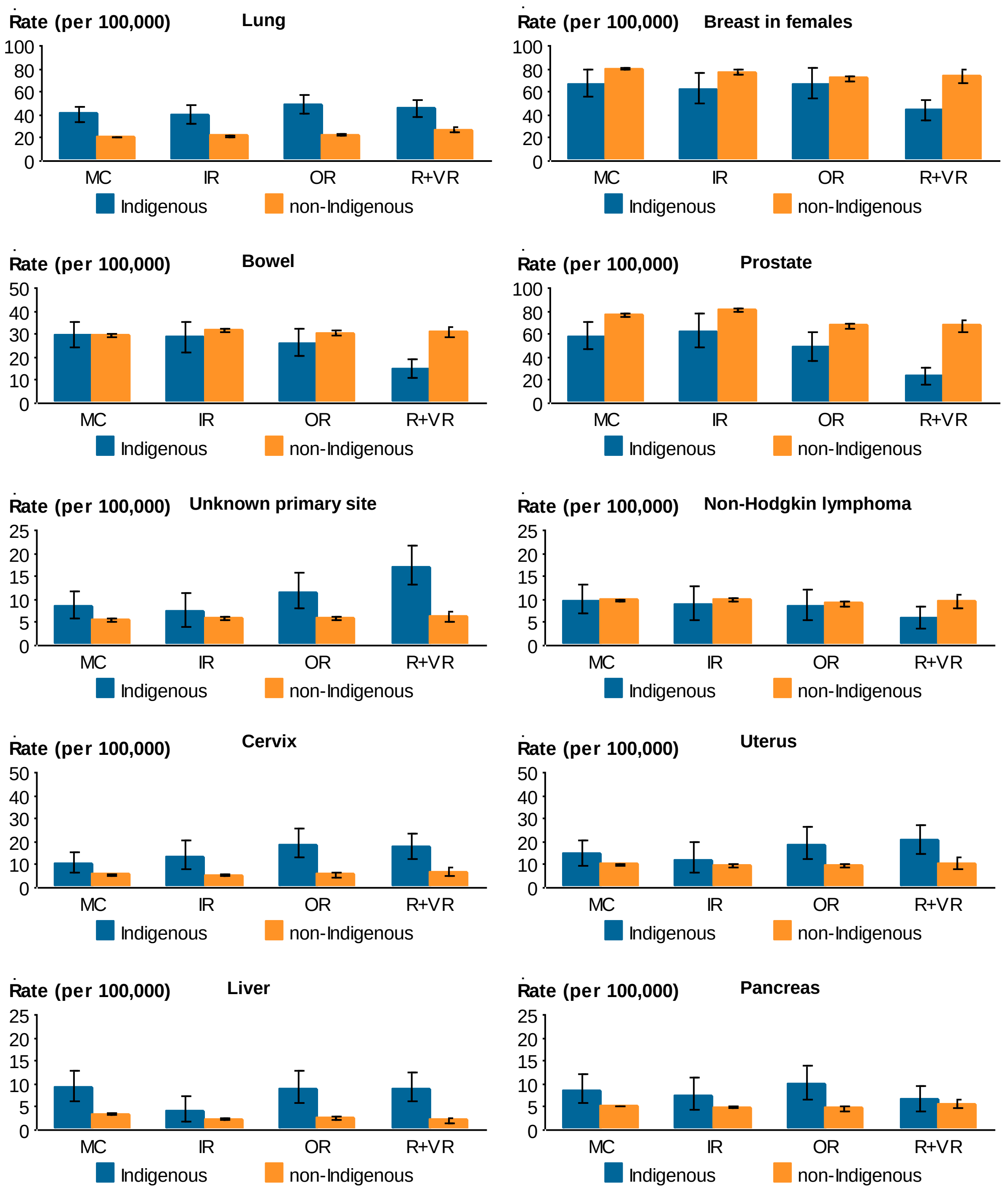


Notes

1. There are differences in the scale on the y-axis between cancer types.
2. Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.
3. The data for this figure are shown in Table D3.3.

Source: AIHW Australian Cancer Database 2009.

Figure 3.3: Age-standardised incidence rates for the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, by sex, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008



Notes

1. MC stands for *Major cities*, IR stands for *Inner regional*, OR stands for *Outer regional* and R+VR stands for *Remote and very remote*.
2. There are differences in the scale on the y-axis between cancer types.
3. Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.
4. The data for this figure are shown in Table D3.4.

Source: AIHW Australian Cancer Database 2009.

Figure 3.4: Age-standardised incidence rates for the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, by remoteness area, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

Clinical cancer groupings

This section presents statistics on cancer incidence based on clinical cancer groupings. Cancer types are categorised into groups based on clinical categories. For example, prostate, testicular, bladder and kidney cancers are grouped as 'urogenital cancers' as these cancers are most often treated by an urologist. Similarly, all cancers of the female genital organs are grouped as 'gynaecological cancers' as these cancers are most often treated by a gynaecologist or gynaecological oncologist (see Appendix E).

The three clinical cancer groupings with the highest number of cases for Aboriginal and Torres Strait Islander peoples in Australia were respiratory (631 cases), urogenital (487 cases) and upper gastrointestinal (479 cases) (Table 3.4). The proportional distributions differed significantly for Indigenous Australians and non-Indigenous Australians as follows:

- Indigenous Australians were more likely than non-Indigenous Australians to be diagnosed with respiratory (16% compared with 11%), upper gastrointestinal (12% compared with 8%), gynaecological (9% compared with 4%) and head and neck (8% compared with 3%) cancers
- Indigenous Australians were less likely than non-Indigenous Australians to be diagnosed with urogenital (13% compared with 22%), colorectal (10% compared with 14%) and skin (2% compared with 9%) cancers.

Table 3.4: Incidence of cancer, by Indigenous status and clinical grouping, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

	Indigenous		Non-Indigenous	
Clinical cancer grouping (ICD-10 codes)	**Number**	**Per cent**	**Number**	**Per cent**
Respiratory (C33–C34, C37–C38, C45)	631	16.3	31,293	10.7
Urogenital (C60–C68)	487	12.6	64,661	22.1
Upper gastrointestinal (C15–C17, C22–C25)	479	12.4	22,562	7.7
Breast (C50)	441	11.4	36,141	12.3
Colorectal (C18–C21)	370	9.5	40,605	13.9
Lymphohaematopoietic (C81–C85, C88, C90–C96, D45, D46, D47.1, D47.3)	369	9.5	29,094	9.9
Gynaecological (C51–C59)	332	8.6	12,414	4.2
Head and neck (C01–C14, C30–C32)	295	7.6	8,357	2.9
Ill-defined and unknown primary sites (C26, C39, C48, C76–C79, C80)	186	4.8	9,465	3.2
Thyroid and other endocrine (C73–C75)	105	2.7	5,931	2.0
Skin (C00, C43, C44, C46)	89	2.3	25,207	8.6
Neurological (C70–C72)	59	1.5	4,462	1.5
Bone and other connective tissue (C40–C41, C47, C49)	26	0.7	1,946	0.7
Eye (C69)	6	0.2	811	0.3
Total[(a)]	**3,875**	**100.0**	**292,949**	**100.0**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Source: AIHW Australian Cancer Database 2009.

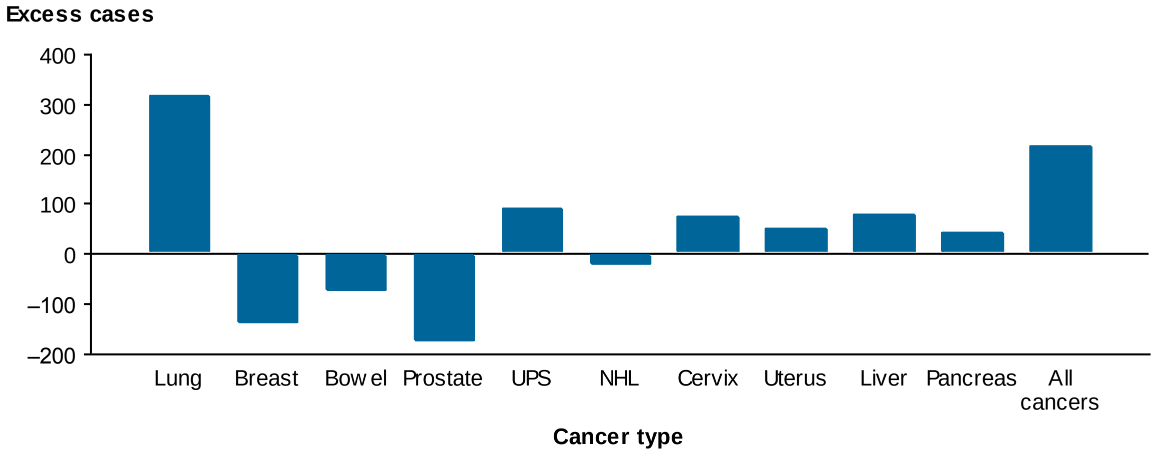
Excess cancer incidence

Indigenous Australians are 1.1 times more likely to be diagnosed with cancer than non-Indigenous Australians (Table 3.1). Another way to detect the average slight over-representation of cancer in Indigenous Australians is to compare the number of observed cases with the expected cases if the non-Indigenous age-specific incidence rates were applied to the Indigenous population. A positive number (higher number of cases observed than expected) indicates an excess in cancer cases, while a negative number indicates that there were fewer cancer cases than expected (see Appendix B). Note that the numbers of excess cases for individual cancer types are not expected to sum to the number of excess case for all cancers.

If the non-Indigenous incidence rate was applied to the Indigenous population, there would be an expected 3,662 new cancer cases, rather than the observed 3,875 cases (Table D3.5). This means that overall there were 213 excess cases of cancer among Aboriginal and Torres Strait Islander peoples than would be expected. The number of excess cancer cases varied by cancer type as follows (Figure 3.5):

- Lung cancer accounted for the largest number of excess cases (315), followed by cancer of unknown primary site (91), liver cancer (77) and cervical cancer (75).
- For breast cancer in females, bowel cancer, prostate cancer and non-Hodgkin lymphoma, there were less cancers observed among Indigenous Australians than would be expected if the non-Indigenous incidence rates applied.

More detailed data on the number of excess cancer cases in Aboriginal and Torres Strait Islander peoples by cancer type, age group and sex are available in *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: supplementary data tables* on the AIHW website.



Notes

1. Excess new cases are the observed new cases minus the expected new cases.
2. Breast cancer is for females only. UPS stands for unknown primary site. NHL stands for non-Hodgkin lymphoma.
3. All cancers includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.
4. Excess cases are derived by applying the age-specific rates from the non-Indigenous population to the age distribution of the Indigenous population. The numbers of excess cases for individual cancer types are not expected to sum to the number of excess case for all cancers.
5. The data for this figure are shown in Table D3.5.

Source: AIHW Australian Cancer Database 2009.

Figure 3.5: Excess new cases for the 10 most commonly diagnosed cancers and for all cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

4 Mortality from cancer

Key findings

Between 2007 and 2011 in New South Wales, Queensland, Western Australia, South Australia and the Northern Territory:

- 2,197 Aboriginal and Torres Strait Islander people died from cancer (1,137 males and 1,060 females).
- Indigenous Australians died from cancer at a younger age than non-Indigenous Australians.
- The age-standardised mortality rate for all cancers combined was:
  - 1.5 times as high for Indigenous Australians compared with non-Indigenous Australians (252 and 172 per 100,000, respectively)
  - higher for both Indigenous males and females than non-Indigenous males and females (1.4 and 1.6 times, respectively).
- The most common causes of cancer death among Aboriginal and Torres Strait Islander peoples were cancers of the lung (549 deaths), liver (145), breast in females (140), unknown primary site (131) and bowel (118).
- Indigenous Australians were 3.9 times as likely to die from cervical cancer, 3.3 times as likely to die from liver cancer, 2.3 times as likely to die from oesophageal cancer and 1.9 times as likely to die from lung cancer as non-Indigenous Australians.
- Cancer was recorded as an associated cause of death for 605 Aboriginal and Torres Strait Islander people; for 61% of these, cancer was the underlying cause of death.

About mortality

- The main data source was the National Mortality Database (NMD) (see Appendix C for more information).
- Data provided are for deaths during 2007–2011 for which the underlying cause of death was cancer.
- Mortality data presented are based on the year of death, except in 2011 (the latest available year), where the year of registration of death is used instead. Previous investigation has shown that, due to a lag in the processing of death information, number of deaths registered in that year is closer to the true value.
- Information in the NMD on Indigenous status is only considered of sufficient completeness for reporting for New South Wales, Queensland, Western Australia, South Australia and the Northern Territory.
- Comparisons have been made throughout with non-Indigenous Australians, with the analysis excluding those for whom Indigenous status was not given. The overall level of missing data on Indigenous status was 0.8% (Table 4.1).
- More detailed data are available in *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: supplementary data tables* on the AIHW website.

All cancers combined

From 2007 to 2011, 2,197 Aboriginal and Torres Strait Islander people from New South Wales, Queensland, Western Australia, South Australia and the Northern Territory died from cancer (Table 4.1). This accounted for 19% of all deaths for this population group. This means on average about one Indigenous Australian died from cancer every day during this time in these states and territories.

During the same period, the age-standardised mortality rate of all cancers combined for Indigenous Australians was 252 per 100,000 persons, which was significantly higher (1.5 times) than for non-Indigenous Australians (172 per 100,000).

Table 4.1: Mortality from all cancers combined[(a)], by Indigenous status, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

Indigenous status	Number	Per cent of cancer deaths	Per cent of all deaths	ASR[(b)]	95% CI
Indigenous	2,197	1.5	19.4	251.7	239.4–264.4
Non-Indigenous	144,791	97.8	29.6	172.4	171.5–173.3
Not stated	1,120	0.8	21.4	. .	. .
Total	**148,108**	**100.0**	**29.3**	**174.7**	**173.8–175.6**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.

(b) Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

Note: Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.

Source: AIHW National Mortality Database.

Age

A greater proportion of Indigenous Australians died from cancer at a younger age than non-Indigenous Australians (Table 4.2). For Indigenous Australians, 29% died from cancer before the age of 55 compared with 10% of non-Indigenous Australians. The relatively younger age structures for the Indigenous population may affect the lower proportion of cancer deaths in Indigenous Australians aged 75 and older (AIHW 2012b).

For both Indigenous and non-Indigenous Australian population groups, there was a significant overall trend of increasing cancer mortality rate with increasing age. The age-specific mortality rates for all cancers combined were significantly higher for Indigenous Australians than non-Indigenous Australians for all age groups under 75 (Table 4.2). The high proportion of deaths for Indigenous Australians from chronic diseases including cancer is of concern to the Australian Government (AHMAC 2012).

Sex

The number of deaths among Aboriginal and Torres Strait Islander males and females were similar (1,137 and 1,060, respectively) but the age-standardised mortality rate for Indigenous males was 1.4 times that for Indigenous females (305 compared with 214 per 100,000) (Table 4.2).

The age-standardised mortality rates were significantly higher for Indigenous males and females than for non-Indigenous males and females (rate ratio of 1.4 and 1.6, respectively) (Table 4.2).

Table 4.2: Mortality from all cancers combined[(a)] by Indigenous status, age group and sex, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

	Indigenous				Non-Indigenous			
	Number	Per cent	Rate[(b)]	95% CI	Number	Per cent	Rate[(b)]	95% CI
Age groups (years)								
<45	248	11.3	12.3	10.8–13.9	4,392	3.0	9.5	9.3–9.8
45–54	394	17.9	176.9	159.9–195.3	9,630	6.7	91.9	90.0–93.7
55–64	570	25.9	447.8	411.8–486.1	22,779	15.7	261.7	258.3–265.1
65–74	588	26.8	1,061.5	977.4–1150.8	34,890	24.1	634.6	628.0–641.3
75+	397	18.1	1,979.3	1,789.3–2,183.9	73,096	50.5	2,119.5	2,104.2–2,134.9
Sex								
Males	1,137	51.8	305.2	283.3–328.1	82,591	57.0	220.0	218.5–221.5
Females	1,060	48.2	214.4	199.8–229.6	62,200	43.0	135.4	134.3–136.5
Total	**2,197**	**100.0**	**251.7**	**239.4–264.4**	**144,791**	**100.0**	**172.4**	**171.5–173.3**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.

(b) The rates for age groups (years) are expressed per 100,000 population. The rates for sex and the total were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

Note: Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.

Source: AIHW National Mortality Database.

Cancer type

The 10 most common causes of cancer deaths among Aboriginal and Torres Strait Islander peoples accounted for 68% of all cancer deaths in this population (Table D4.1). The top 10 cancer rankings for Indigenous Australians differed from that for non-Indigenous Australians and all Australians (Table 4.3, online supplementary Table G4.3). Lung cancer was the most common cause of cancer-related death for both Indigenous and non-Indigenous Australians. Cancer types that ranked higher among Indigenous than non-Indigenous Australians include:

- liver cancer (ranked second compared with ninth)
- cervical cancer (ranked tenth compared with twenty-seventh)
- oesophageal cancer (ranked seventh compared with twelfth)
- stomach cancer (ranked ninth compared with thirteenth).

Table 4.3: The 10 leading causes of cancer deaths among Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

	Indigenous		Non-Indigenous	
Cancer site/type	**Number**	**Ranking**	**Number**	**Ranking**
Lung (C33–C34)	549	1	27,678	1
Liver (C22)	145	2	4,289	9
Breast in females (C50)	140	3	9,586	4
Unknown primary site (C77–C80)	131	4	8,119	5
Bowel (C18–C20)	118	5	13,644	2
Pancreas (C25)	112	6	7,938	6
Oesophagus (C15)	106	7	4,020	12
Prostate (C61)	72	8	10,754	3
Stomach (C16)	65	9	3,674	13
Cervix (C53)	52	10	793	27
All cancers combined[(a)]	**2,197**	. .	**144,791**	. .

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.

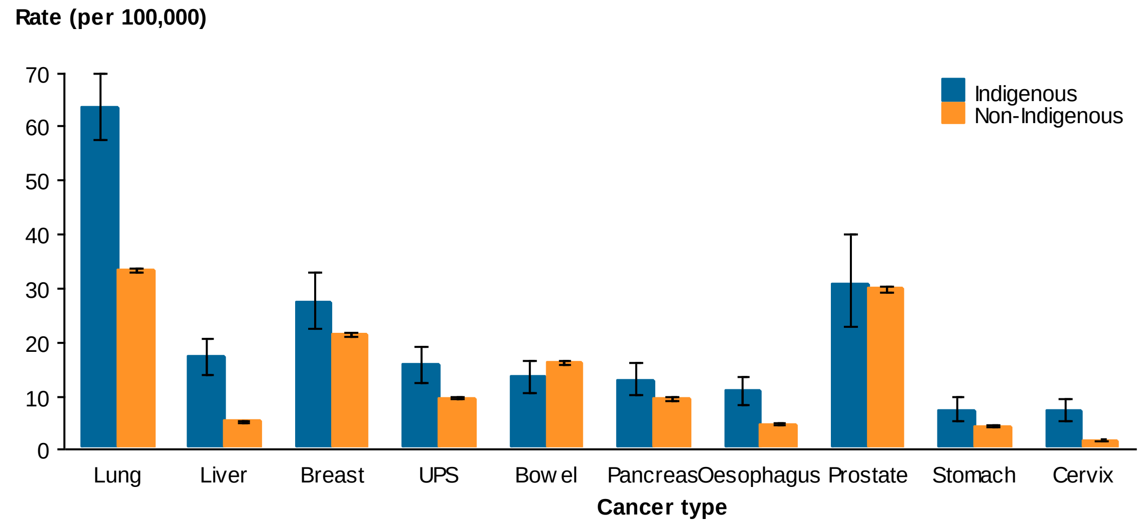
Notes

1. Full list of cancer types can be found in online supplementary Table G4.2.
2. Top 10 rankings of Indigenous, non-Indigenous and all Australians can be found in online supplementary Table G4.3.
3. Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.

Source: AIHW National Mortality Database.

Comparison of the age-standardised mortality rates for the 10 leading causes of cancer deaths indicates that Indigenous Australians are more likely to die from cervical cancer (rate ratio 3.9), liver cancer (3.3), oesophageal cancer (2.3), lung cancer (1.9), stomach cancer (1.7), cancer of unknown primary site (1.6), pancreatic cancer (1.4) and breast cancer in females (1.3) than non-Indigenous Australians (Figure 4.1).

The higher prevalence of risk factors for these cancers in this population group such as smoking, alcohol consumption and HPV infection rates may explain the higher rates of lung, liver and cervical cancers. Cancers of the lung and liver have a poor prognosis in both Indigenous and non-Indigenous Australians. However, Indigenous Australians are usually diagnosed with these cancers at a later stage, are less likely to receive adequate treatment and are more likely to die from these cancers than non-Indigenous Australians (Cunningham et al. 2008).



Notes

1. Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.
2. Breast cancer is for females only. UPS stands for unknown primary site.
3. Cancer types are ordered based on top 10 cancer mortality numbers for Indigenous Australians.
4. Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.
5. The data for this figure are shown in Table D4.1.

Source: AIHW National Mortality Database.

Figure 4.1: Age-standardised mortality rates for the 10 leading causes of cancer deaths among Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

Age

Consistent with the overall findings, the age-specific mortality rate for Indigenous Australians compared with non-Indigenous Australians was significantly higher for lung cancer among all age groups, for liver cancer among those aged 45 and older, for cervical cancer among those aged less than 65, for oesophageal cancer and cancer of unknown primary site among those aged between 45 and 74 and for stomach cancer among those aged 55–64 (Figure 4.2).

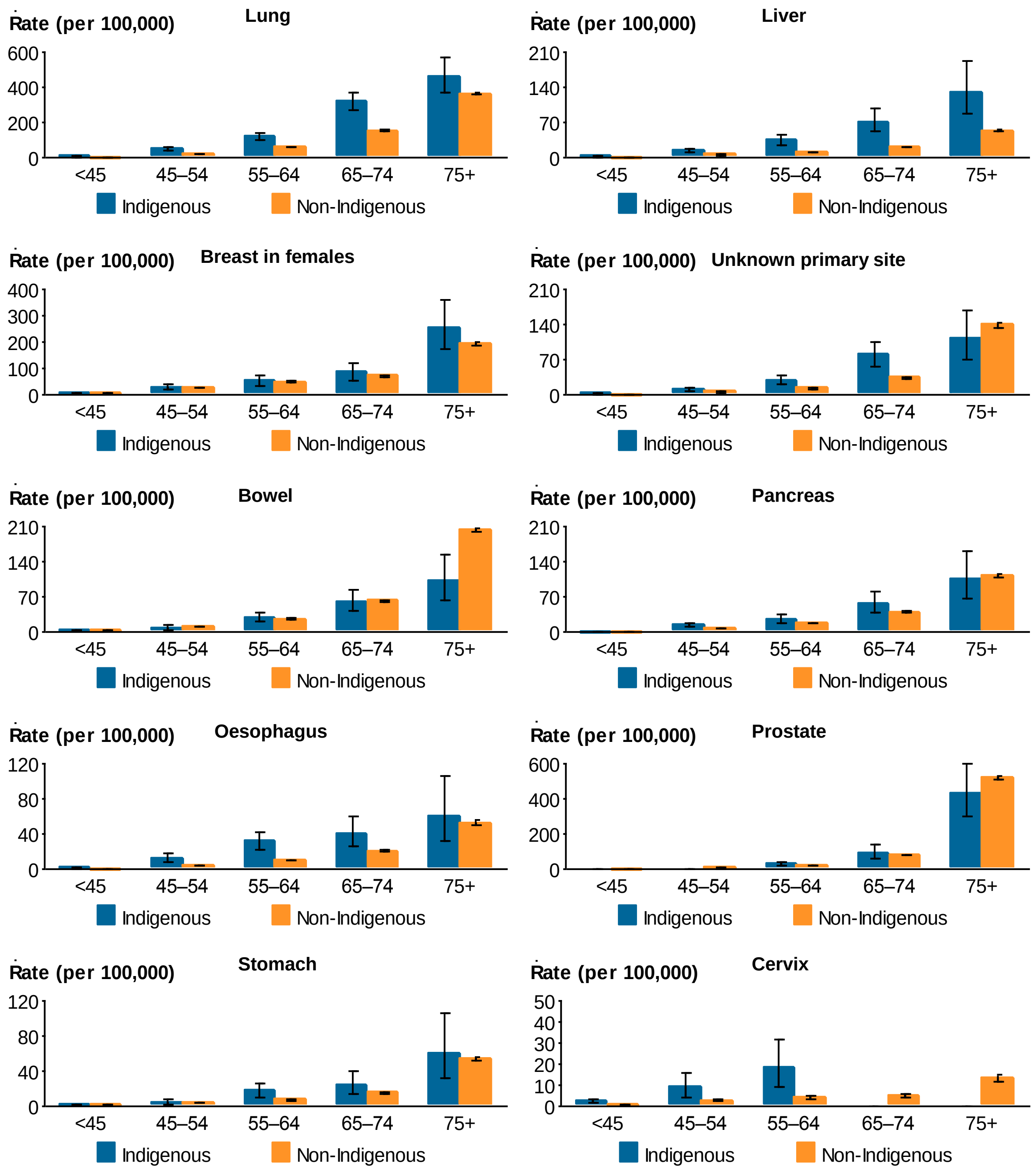
Other findings of interest for Indigenous Australians compared with non-Indigenous Australians include significantly higher rates of pancreatic cancer among those aged 45–54 and 55–64, and significantly lower rates of bowel cancer for those aged 75 and older.

Sex

Consistent with the overall findings, the age-standardised mortality rate was significantly higher (Figure 4.3):

- for Indigenous males than non-Indigenous males for liver cancer (rate ratio of 3.1), oesophageal cancer (2.3), lung cancer (2.0), stomach (1.7) and unknown primary site (1.6)
- for Indigenous females than non-Indigenous females for liver cancer (rate ratio of 4.1), cervical cancer (3.9), oesophageal cancer (2.6), lung cancer (1.9) and unknown primary site (1.7).

Other findings of interest include significantly higher rates of pancreatic cancer (rate ratio of 1.6) and breast cancer (1.3) among Indigenous females than non-Indigenous females. Within the Indigenous population, Indigenous males had significantly higher rates of oesophageal cancer (2.9), lung cancer (2.0) and liver cancer (1.9) than Indigenous females.

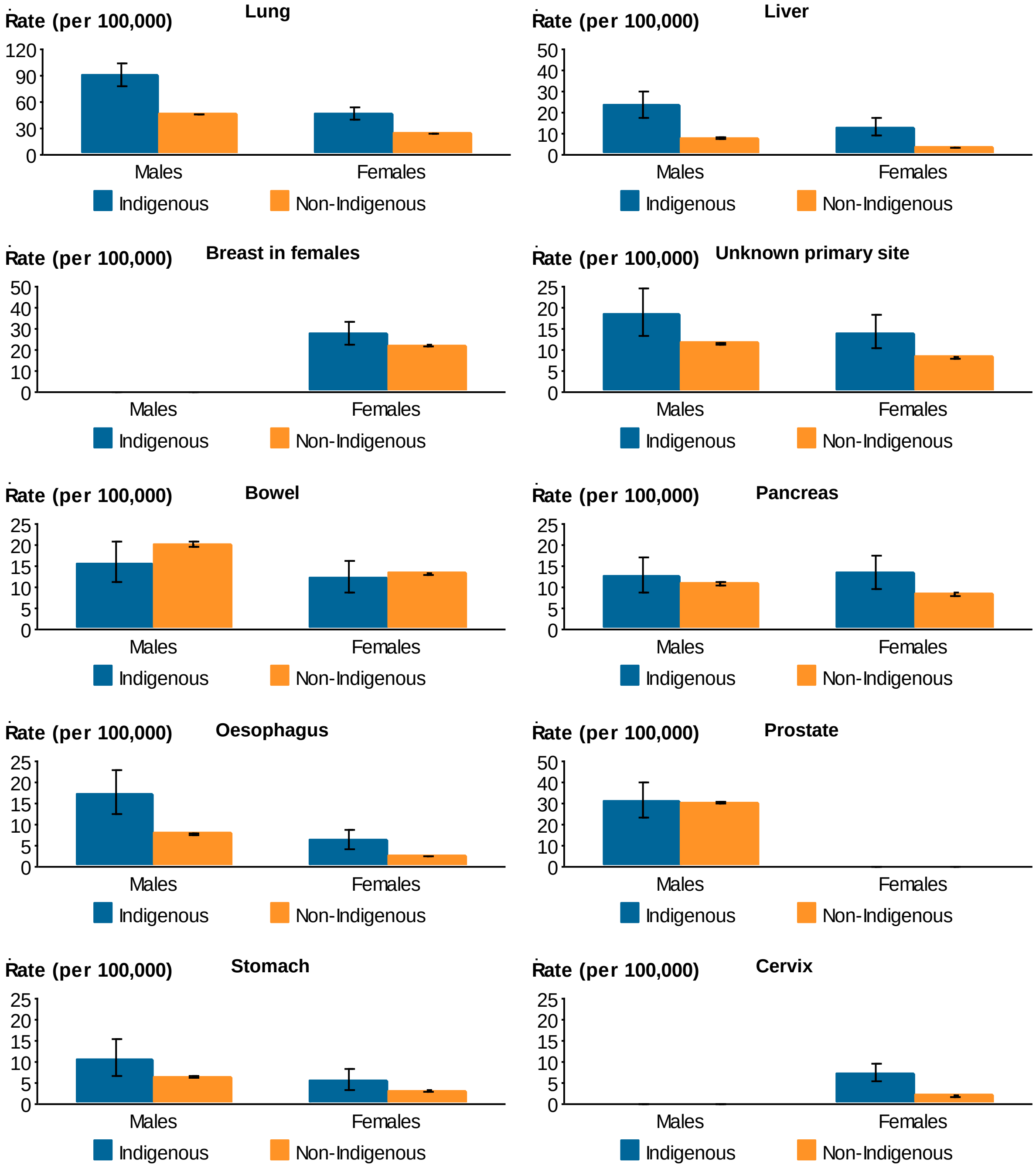


Notes

1. There are differences in the scale on the y-axis between cancer types.
2. Rates are expressed per 100,000 population.
3. Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.
4. The data for this figure are shown in Table D4.2.

Source: AIHW National Mortality Database.

Figure 4.2: Age-specific mortality rates for the 10 leading causes of cancer deaths among Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011



Notes

1. There are differences in the scale on the y-axis between cancer types.
2. Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.
3. Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.
4. The data for this figure are shown in Table D4.3.

Source: AIHW National Mortality Database.

Figure 4.3: Age-standardised mortality rates for the 10 leading causes of cancer deaths among Aboriginal and Torres Strait Islander peoples, by sex, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

Clinical cancer groupings

This section presents statistics on cancer mortality based on clinical cancer grouping categories. See Chapter 3 and Appendix E for information on clinical group.

The three cancer clinical groupings with the highest number of deaths for Aboriginal and Torres Strait Islander peoples were respiratory (563 deaths), upper gastrointestinal (463 deaths) and ill-defined and unknown primary sites (197 deaths) (Table 4.4).

The proportional distributions of cancer mortality by clinical cancer groupings differed between Indigenous and non-Indigenous Australians as follows:

- a greater proportion of Indigenous Australians than non-Indigenous Australians died from respiratory (26% compared with 21%), upper gastrointestinal (21% compared with 15%), head and neck (8% compared with 2%), and gynaecological (6% compared with 4%) cancers
- Indigenous Australians were less likely than non-Indigenous Australians to die from lymphohaematopoietic (7% compared with 11%), colorectal (6% compared with 10%), urogenital (6% compared with 12%), and skin (2% compared with 5%) cancers.

Table 4.4: Mortality from cancer, by Indigenous status and clinical groupings, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

	Indigenous		Non-Indigenous	
Clinical cancer grouping (ICD-10 codes)	**Number**	**Per cent**	**Number**	**Per cent**
Respiratory (C33–C34, C37–C38, C45)	563	25.6	30,096	20.8
Upper gastrointestinal (C15–C17, C22–C25)	463	21.1	21,110	14.6
Ill-defined and unknown primary sites (C26, C39, C48, C76–C79, C80)	197	9.0	13,352	9.2
Head and neck (C01–C14, C30–C32)	167	7.6	3,288	2.3
Lymphohaematopoietic (C81–C85, C88, C90–C96, D45, D46, D47.1, D47.3)	145	6.6	15,151	10.5
Breast (C50)	140	6.4	9,664	6.7
Colorectal (C18–C21)	125	5.7	13,870	9.6
Gynaecological (C51–C59)	121	5.5	5,447	3.8
Urogenital (C60–C68)	133	6.1	17,767	12.3
Skin (C00, C43, C44, C46)	40	1.8	7,111	4.9
Neurological (C70–C72)	38	1.7	4,131	2.9
Multiple primary (C97)	25	1.1	1,932	1.3
Thyroid and other endocrine (C73–C75)	19	0.9	562	0.4
Bone and other connective tissue (C40–C41, C47, C49)	19	0.9	1,219	0.8
Eye (C69)	2	0.1	91	0.1
Total[(a)]	**2,197**	**100.0**	**144,791**	**100.0**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.

Note: Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.

Source: AIHW National Mortality Database.

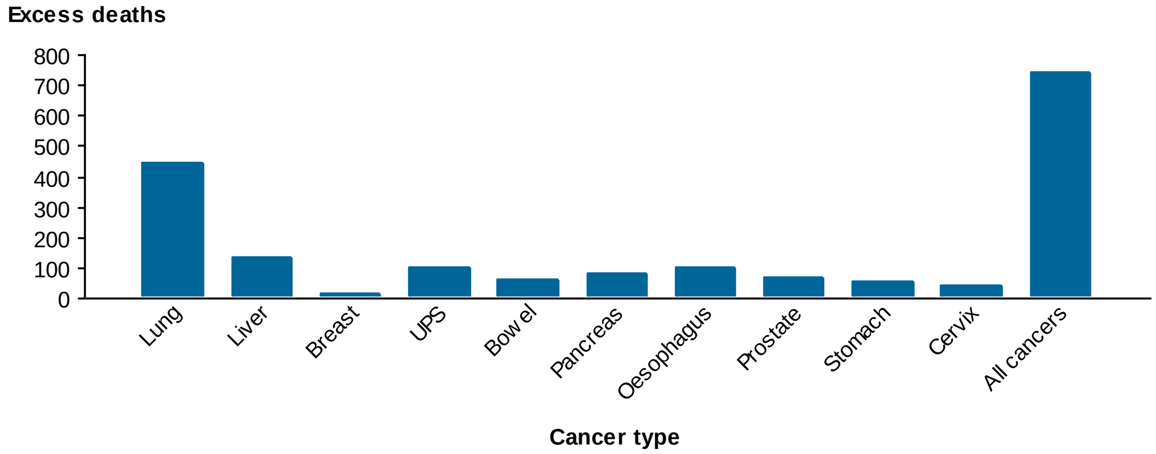
Excess cancer deaths

Indigenous Australians were 1.5 times as likely to die from cancer as non-Indigenous Australians (Table 4.1). Another way to express the over-representation of cancer deaths for Indigenous Australians is to compare the observed number of cancer deaths with the number of expected cancer deaths if the non-Indigenous age-specific mortality rates were to apply to the Indigenous population. A positive number indicates an excess in cancer deaths in Indigenous Australians, while a negative number indicates that there were less cancer-related deaths than would be expected if similar rates applied to both populations (see Appendix B). Note that the numbers of excess deaths for individual cancer types are not expected to sum to the number of excess case for all cancers.

If the non-Indigenous mortality rate was applied to the Indigenous population, there would be an expected 1,459 deaths rather than the observed 2,197 deaths (Table D4.4). This means that overall there were 738 excess cancer deaths among Aboriginal and Torres Strait Islander peoples than would be expected. Aboriginal and Torres Strait Islander peoples with cancer are diagnosed at a later stage and are less likely to receive adequate treatment and this may in part explain the excess deaths in this population. (Cunningham et al. 2008).

For Aboriginal and Torres strait Islander peoples, the number of excess cancer cases varied by cancer type (Figure 4.4). Lung cancer accounted for the largest number of excess death (443 excess), followed by liver cancer (131 excess), cancer of unknown primary site and oesophageal cancer (both 97 excess).

More detailed data on the number of excess Aboriginal and Torres Strait Islander deaths by cancer type, age group and sex are available in *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: supplementary data tables* on the AIHW website.



Notes

1. Excess deaths are the observed deaths minus the expected deaths.
2. Breast cancer is for females only. UPS stands for unknown primary site.
3. All cancers Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.
4. Excess deaths are derived by applying the age-specific rates from the non-Indigenous population to the age distribution of the Indigenous population. The numbers of excess deaths for individual cancer types are not expected to sum to the number of excess deaths for all cancers.
5. Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.
6. The data for this figure are shown in Table D4.4.

Source: AIHW Australian Cancer Database 2009.

Figure 4.4: Excess cancer deaths for the 10 leading causes of cancer deaths among Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

Associated cause of death

The data presented so far in this chapter apply to deaths for which cancer was the underlying cause of death. However, information about diseases or conditions contributing to the death (multiple causes of death) is also available. In this section, the number of people who died from any cause where cancer was also mentioned as an associated cause of death (see Box 4.1) is presented.

Box 4.1: What is an associated cause of death?

A Medical Certificate of Cause of Death (death certificate) enables a medical practitioner to record all medical conditions instrumental in causing the death. The ABS codes the information recorded on the death certificates. The coding process considers the sequence of occurrence of each disease or health condition, removes duplicates and applies logical rules to select the underlying and associated causes (see *Multiple causes of death* (AIHW 2012g)).

Underlying cause of death refers to the disease, injury, accident or violence that initiated the sequence of events leading directly to death.

Associated causes of death refers to any other conditions or events that were instrumental in causing death, including conditions that occurred immediately before death or close to the time of death or conditions that occurred between the underlying and immediate causes.

Between 2007 and 2011, 605 Aboriginal and Torres Strait Islander people died with cancer recorded as an associated cause of death (Table 4.5). Of the deaths where cancer was an associated cause, 61% had cancer also recorded as the underlying cause of death.

Table 4.5: Underlying causes of death where cancer was an associated cause of death, by Indigenous status, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

	Indigenous		Non-Indigenous		Total[(a)]	
Underlying cause of death (ICD-10 codes)	**No.**	**Per cent**	**No.**	**Per cent**	**No.**	**Per cent**
Cancer (C00–C97, D45, D46, D47.1, D47.3)	368	60.8	28,311	57.2	28,887	57.2
Cardiovascular disease (I00–I99)	82	13.6	10,391	21.0	10,567	20.9
Endocrine and metabolic disease (E00–E90)	32	5.3	1,299	2.6	1,343	2.7
Respiratory system disease (J00–J99)	34	5.6	2,948	6.0	3,014	6.0
Digestive disease (K00–K93)	23	3.8	1,251	2.5	1,288	2.6
Other diseases (All remaining ICD-10 codes)	12	2.0	548	1.1	568	1.1
Certain infectious and parasitic diseases (A00–B99)	13	2.1	692	1.4	711	1.4
Genitourinary system diseases (N00–N99)	11	1.8	706	1.4	723	1.4
Nervous system disease (G00–G99)	7	1.2	998	2.0	1,012	2.0
Skin and subcutaneous tissue diseases (L00–L99)	6	1.0	280	0.6	288	0.6
Mental and behavioural disorder (F00–F99)	10	1.7	1,266	2.6	1,281	2.5
External causes (V00–V98)	7	1.2	810	1.6	826	1.6
Total[(b)]	**605**	**100.0**	**49,500**	**100.0**	**50,508**	**100.0**

(a) Includes deaths for which information on Indigenous status was not available.

(b) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.

Note: Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.

Source: AIHW National Mortality Database.

5 Survival after a diagnosis of cancer

Key findings

Between 1999 and 2007 in New South Wales, Queensland, Western Australia and the Northern Territory:

- The 5-year crude survival for Indigenous Australians was 40% for all cancers combined, which was significantly lower than for non-Indigenous Australians (52%).
- Compared with their non-Indigenous counterparts, the 5-year crude survival rate for Indigenous Australians was significantly lower:
  - for all age groups
  - for both males and females
  - for those living in all remoteness areas
  - for lung cancer (7% compared with 11%), breast cancer in females (70% compared with 81%), bowel cancer (47% compared with 53%), prostate cancer (63% compared with 72%) and cervical cancer (51% compared with 67%).

The mortality-to-incidence ratio suggests that cancer survival among Indigenous Australians was similar to that for people in the regions of Southern Europe, Polynesia and Micronesia.

Indigenous Australians diagnosed with any cancer between 2003 and 2007 had a 97% higher risk of death from any cause by 2010 than non-Indigenous Australians, after adjusting for age, sex and geographic remoteness (hazard ratio of 1.97).

About survival

- The main data source was the ACD, with information on deaths (from any cause) sourced from the NDI.
- Data provided are for cancer-related crude survival estimates for Aboriginal and Torres Strait Islander peoples for the period 1999–2007 (note: for the multivariate regression analysis, data on deaths from all causes are used due to data availability).
- Information in the NMD on Indigenous status is considered of sufficient completeness for reporting for New South Wales, Queensland, Western Australia and the Northern Territory.
- Comparisons have been made throughout with non-Indigenous Australians, with the analysis excluding those for whom Indigenous status was not stated.
- Crude survival estimates were calculated using the cohort method, instead of the period method, as it provides more precise estimates (that is, estimates with narrower CIs). See Appendix B for more information.
- Crude survival is the proportion of people alive at a specified point in time subsequent to the diagnosis of cancer. This report’s main measure is 5-year crude survival, which refers to the proportion of people alive 5 years after their diagnosis.
- The ASGC RA (ABS 2006) was used to make comparisons by remoteness status (see Appendix A for more details)
- More detailed data are available in *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: supplementary data tables* on the AIHW website.

All cancers combined

Aboriginal and Torres Strait Islander peoples diagnosed with cancer between 1999 and 2007 had a 61% chance of surviving 1 year and a 40% chance of surviving for at least 5 years after a cancer diagnosis (Table 5.1). Indigenous Australians had significantly lower 5-year crude survival than non-Indigenous Australians (40% compared with 52%).

Table 5.1: Five-year crude survival for all cancers combined[(a)] by Indigenous status, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

	Indigenous		Non-Indigenous	
Survival	**Crude survival (%)**	**95% CI**	**Crude survival (%)**	**95% CI**
1-year survival	60.8	59.6–62.0	74.0	73.8–74.1
5-year survival	40.2	38.9–41.5	51.9	51.7–52.0

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Source: AIHW Australian Cancer Database 2007.

Age

For both Indigenous and non-Indigenous population groups, the 5-year crude survival from cancer tended to fall with age. For all age groups, the survival estimates for Indigenous Australians were significantly lower than those for non-Indigenous Australians (Table 5.2).

Sex

Both Indigenous males and females diagnosed with cancer had significantly lower 5-year survival rates than their non-Indigenous counterparts (34% compared with 48% for males and 46% compared with 56% for females) (Table 5.2). Within the Indigenous population, Indigenous females diagnosed with cancer were 1.3 times as likely to survive 5 years past diagnosis as their male counterparts.

Remoteness

Indigenous Australians living in all remoteness areas had significantly lower 5-year crude survival than their non-Indigenous counterparts (Table 5.2). Because cancer survival for Indigenous Australians tended to decrease with remoteness, the differences in survival between the two population groups increased with increasing remoteness.

Table 5.2: Five-year crude survival for all cancers combined[(a)] by Indigenous status, age group, sex and remoteness area, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

	Indigenous		Non-Indigenous	
	Crude survival (%)	**95% CI**	**Crude survival (%)**	**95% CI**
Age group (years)				
<50	57.3	54.9–59.6	78.1	77.8–78.4
50–59	38.5	35.9–41.1	67.6	67.2–67.9
60–69	36.7	34.2–39.3	58.9	58.6–59.2
70+	22.5	20.3–24.8	33.7	33.5–33.9
Sex				
Males	34.3	32.5–36.0	48.2	48.0–48.4
Females	45.8	44.0–47.6	56.4	56.2–56.6
Remoteness area				
Major cities	49.4	47.0–51.9	52.5	52.4–52.7
Inner regional	44.5	41.3–47.6	50.8	50.5–51.1
Outer regional	35.5	33.0–38.0	49.4	48.9–49.9
Remote and very remote	32.2	30.0–34.5	54.4	53.3–55.5
Total	**40.2**	**38.9–41.5**	**51.9**	**51.7–52.0**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Source: AIHW Australian Cancer Database 2007.

Cancer type

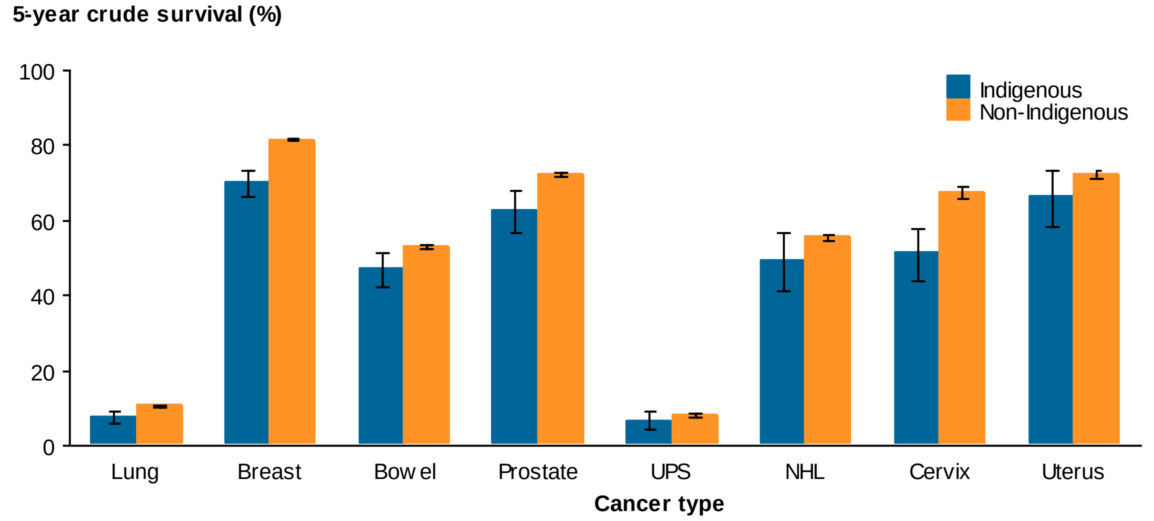
The 5-year crude survival rates were calculated for the most commonly diagnosed cancers among Aboriginal and Torres Strait Islander peoples (see Chapter 3 for full list).

Among the most commonly diagnosed cancers, 5-year crude survival for Indigenous Australians was significantly lower than that for their non-Indigenous counterparts (Figure 5.1) for lung cancer (7% compared with 11%), breast cancer in females (70% compared with 81%), bowel cancer (47% compared with 53%), prostate cancer (63% compared with 72%) and cervical cancer (51% compared with 67%).

To maintain appropriate levels of privacy and confidentiality, 5-year survival could not be presented for:

- liver and pancreatic cancers (ranked ninth and tenth respectively)
- unknown primary site (ranked fifth) by age, sex and remoteness area.

Of these individual cancer types, 1-year crude survival for Indigenous Australians was significantly lower for liver cancer (21% compared with 33%) and pancreatic cancer (11% compared with 20%) (Table D5.1). Further information on 1-year survival is provided in the *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: supplementary data tables* on the AIHW website.



Notes

1. Breast cancer is for females only. NHL stands for non-Hodgkin lymphoma. UPS stands for unknown primary site.
2. Data on liver cancer and pancreatic cancer (ranked ninth and tenth respectively) cannot be released due to the small number of cases.
3. Figure is ordered based on top 10 cancer incidence numbers for Indigenous Australians.
4. The data for this figure are shown in Table D5.1.

Source: AIHW Australian Cancer Database 2007.

Figure 5.1: Five-year crude survival for selected most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

Age

The 5-year crude survival rates generally fell with age irrespective of Indigenous status. Similar to the overall findings, 5-year crude survival estimates for Indigenous Australians were significantly lower than for non-Indigenous Australians for breast cancer in females among all age groups, bowel cancer among those aged under 60, cervical cancer among those aged under 50, prostate cancer among those aged 50 and older and lung cancer among those aged 50 to 69 (Figure 5.2).

Other findings of interest included significantly lower survival rates for Indigenous Australians than non-Indigenous Australians for non-Hodgkin lymphoma among those aged under 70 and uterine cancer among those aged 60–69.

Sex

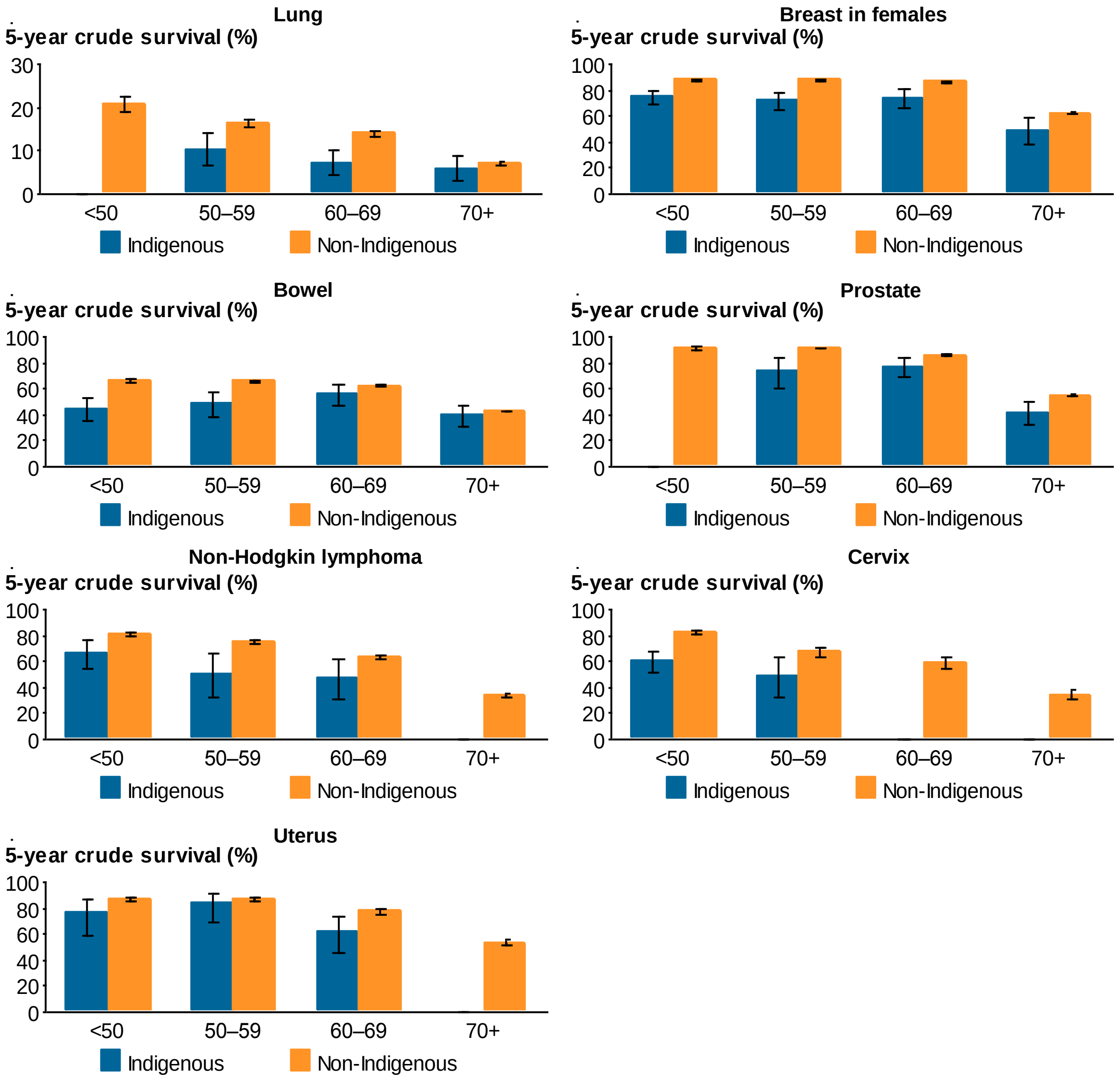
Similar to the overall findings, 5-year crude survival was significantly lower for (Figure 5.3):

- Indigenous males than non-Indigenous males for bowel cancer (45% compared with 52%) and prostate cancer (63% compared with 72%)
- Indigenous females than non-Indigenous females for lung cancer (7% compared with 13%), breast cancer (70% compared with 81%) and cervical cancer (51% compared with 67%).

Remoteness

Consistent with the overall findings, 5-year crude survival was significantly lower for those living in (Figure 5.4):

- *Inner regional* for breast cancer in females and prostate cancer
- *Outer regional* for breast cancer in females
- *Remote and very remote* areas for breast cancer in females, prostate cancer, cervical cancer, bowel cancer and non-Hodgkin lymphoma.

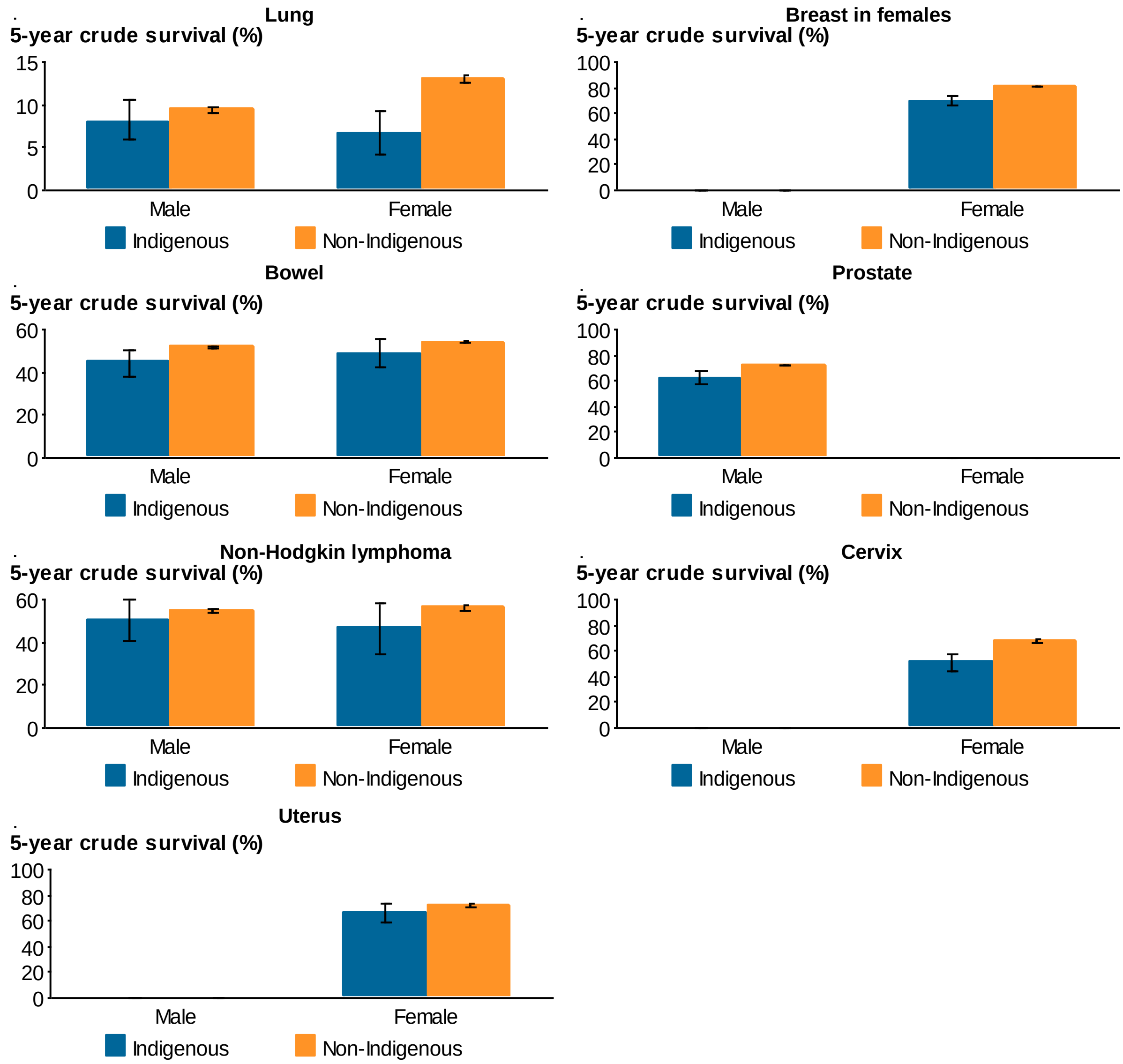


Notes

1. Data for Aboriginal and Torres Strait Islander peoples for lung cancer (<50 year), prostate cancer (<50 years), cervical cancer (60–69 and 70+ years), uterine cancer (70+ years) cannot be released due to small number of cases.
2. Data on cancer of unknown primary site, liver cancer and pancreatic cancer (ranked fifth, ninth and tenth respectively) cannot be released due to the small number of cases.
3. There are differences in the scale on the y-axis between cancer types.
4. The data for this figure are shown in Table D5.2.

Source: AIHW Australian Cancer Database 2007.

Figure 5.2: Five-year crude survival for selected most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

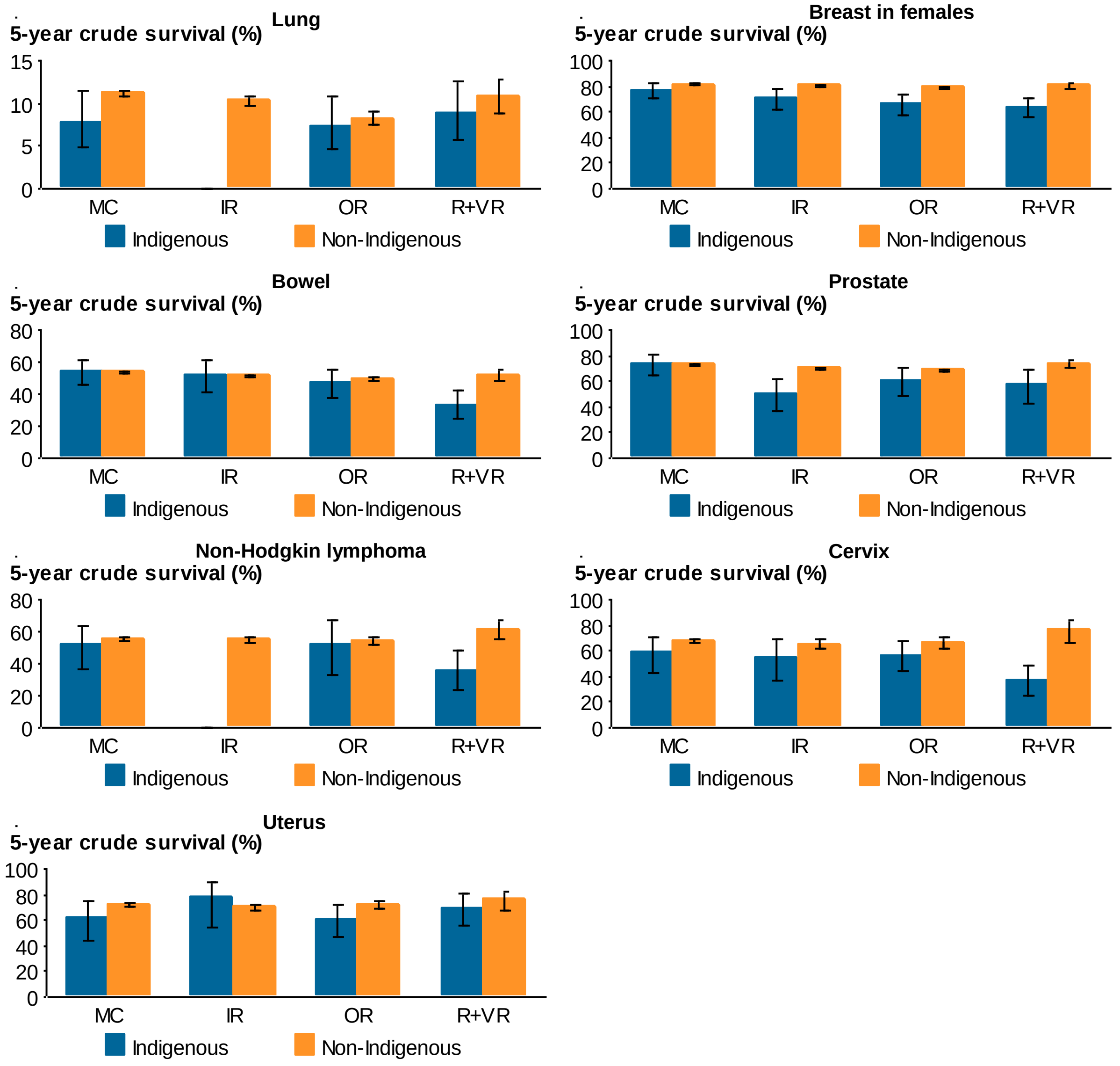


Notes

1. Data on cancer of unknown primary site, liver cancer and pancreatic cancer (ranked fifth, ninth and tenth for incidence, respectively) cannot be released due to the small number of cases.
2. There are differences in the scale on the y-axis between cancer types.
3. The data for this figure are shown in Table D5.3.

Source: AIHW Australian Cancer Database 2007.

Figure 5.3: Five-year crude survival for selected most commonly diagnosed cancers in Aboriginal and Torres Strait Islander people, by sex, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007



Notes

1. MC stands for *Major cities*, IR stands for *Inner regional*, OR stands for *Outer regional* and R+VR stands for *Remote and very remote*.
2. Data for Aboriginal and Torres Strait Islander peoples for lung cancer for *Inner regional* areas and for non-Hodgkin lymphoma for *Inner regional* areas cannot be released due to the small number of cases.
3. Data on cancer of unknown primary site, liver cancer and pancreatic cancer (ranked fifth, ninth and tenth respectively) cannot be released due to the small number of cases.
4. There are differences in the scale on the y-axis between cancer types.
5. The data for this figure are shown in Table D5.4

Source: AIHW Australian Cancer Database 2007.

Figure 5.4: Five-year crude survival for selected most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, by remoteness area, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

Multivariate survival analysis

Indigenous Australians have significantly lower 5-year crude survival from cancer than non-Indigenous Australians (40% compared with 52%). Another way to explore the extent of survival disadvantage is through a Cox proportional hazards regression analysis, which compares the risk of death (from all causes) for Indigenous Australians who had been diagnosed with cancer with that for non-Indigenous Australians (see Box 5.1).

Box 5.1: Cox proportional hazard regression analysis

This analysis allows the association between Indigenous status and the presence of cancer to be measured while accounting for the influence of factors such as sex, age and remoteness status. Factors such as individual screening or testing behaviours which might affect the survival analyses could not be taken into account (such as, participating in breast, cervical or bowel screening, or PSA testing for prostate cancer) due to data availability.

In this model, individuals diagnosed with cancer between 2003 and 2007 were followed to date of death or to the 31 December 2010, whichever came first. Death from any cause rather than a cancer-specific death was used due to data availability. The results are presented as hazard ratios that show how many times higher the probability of death occurs in one group than in the other group. A hazard ratio greater than 1 suggests that people with that factor have a worse survival compared with the chosen reference group. Ninety-five per cent CIs are presented as an indication of statistical precision. If the interval does not cross the value of one then it is interpreted as having a statistically significant impact (that is, not due to chance) (Kalbfleisch & Prentice 1980). More information about the Cox proportional hazards regression analysis is in Appendix B.

After adjusting for age, sex and residential remoteness, Indigenous Australians diagnosed with any cancer between 2003 and 2007 had a 97% higher risk of death from any cause by 2010 than non-Indigenous Australians (hazard ratio of 1.97) (Table 5.3).

Table 5.3: Cox proportional hazards regression analysis, hazard ratio of death from any cause, all persons diagnosed with cancer between 2003 and 2007 and followed until death or 31 December 2010 (whichever came first), New South Wales, Queensland, Western Australia and the Northern Territory

Factors	Number	Hazard ratio	95% CI
Indigenous status			
Non-Indigenous (reference group)	266,346	1.00	
Indigenous	3,355	1.97	1.88–2.06
Sex			
Female (reference group)	120,028	1.00	
Male	149,673	1.11	1.10–1.12
Age			
Increase in relative risk for each year after age 50		1.048	1.047–1.048
Remoteness area			
Major cities (reference group)	179,569	1.00	
Inner regional	59,037	1.03	1.02–1.05
Outer regional	25,808	1.14	1.12–1.16
Remote and very remote	5,287	1.25	1.20–1.30

Note: Analysis excludes people who did not state their Indigenous status.

Source: AIHW Australian Cancer Database 2007.

Sex

Indigenous males diagnosed with any cancer between 2003 and 2007 had a 101% higher risk of dying from any cause by 2010 than non-Indigenous males (hazard ratio of 2.01). For the same period, Indigenous females diagnosed with any cancer had a 94% higher risk of dying from any cause than non-Indigenous females (1.94) (Table 5.4).

Table 5.4: Cox proportional hazards regression analysis, hazard ratio of death from any cause, by sex, diagnosed with cancer between 2003 and 2007 and followed until death or 31 December 2010 (whichever came first), New South Wales, Queensland, Western Australia and the Northern Territory

	Males			Females		
Factors	**Number**	**Hazard ratio**	**95% CI**	**Number**	**Hazard ratio**	**95% CI**
Indigenous status						
Non-Indigenous (reference group)	148,002	1.00		118,344	1.00	
Indigenous	1,671	2.01	1.89– 2.14	1,684	1.94	1.81–2.08
Age						
Increase in relative risk						
for each year after age 50		1.043	1.043–1.044		1.052	1.051–1.053
Remoteness area						
Major cities (reference group)	97,569	1.00		82,000	1.00	
Inner regional	34,076	1.03	1.02–1.05	24,961	1.04	1.01–1.06
Outer regional	14,918	1.15	1.13–1.18	10,890	1.12	1.09–1.15
Remote and very remote	3,110	1.28	1.22–1.34	2,177	1.20	1.13–1.29

Note: Analysis excludes people who did not state their Indigenous status.

Source: AIHW Australian Cancer Database 2007.

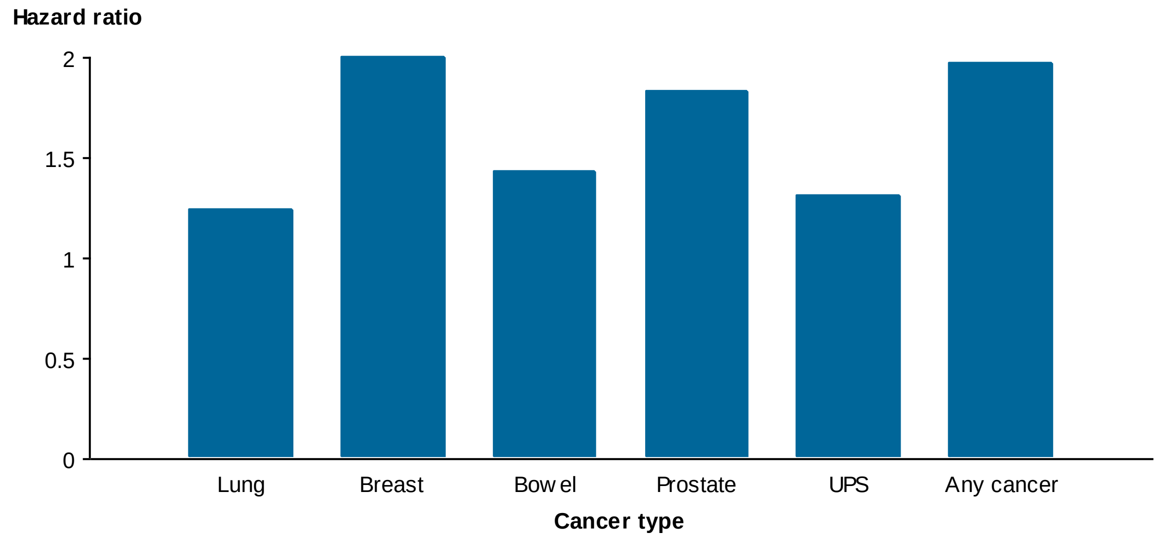
Cancer type

The Cox proportional hazards regression analysis was done for the five most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples (see Chapter 3 for full list). Of these cancers (Figure 5.5):

- breast cancer in females had the highest hazard ratio. Indigenous females diagnosed with breast cancer between 2003 and 2007 had a 100% higher risk of dying from any cause by 2010 than non-Indigenous females (hazard ratio of 2.00).
- For the same period, Indigenous males diagnosed with prostate cancer had an 83% higher risk of dying from any cause than non-Indigenous males (1.83).
- For the same period, Indigenous Australians diagnosed with bowel cancer had a 43% higher risk of dying from any cause than non-Indigenous Australians (1.43).
- For the same period, Indigenous Australians diagnosed with cancer of unknown primary site had a 31% higher risk of dying from any cause than non-Indigenous Australians (1.31).
- lung cancer, while being the most commonly diagnosed cancer for Indigenous Australians, had the lowest hazard ratio (1.24).

The high hazard ratio for breast cancer in females and prostate cancer may possibly be explained by lower participation in screening by Aboriginal and Torres Strait Islander peoples, which may result in delayed detection leading to poorer outcomes (see Chapter 9, Roder 2005; Roder 2007; AIHW 2012e, 2012f, 2013b).

The lower hazard ratio for lung cancer and cancer of unknown primary site may possibly be explained by the nature of these diseases. Overall, people diagnosed with these cancers generally have poorer survival rates irrespective of Indigenous status, as a high proportion of diagnoses are made at the advanced stage where treatment is less effective (AIHW 2011c). Therefore, the difference between these two population groups is less likely to be prominent.



Notes:

1. Breast cancer is for females only. UPS stands for unknown primary site.
2. The data for this figure are shown in Table D5.5, Table D5.6, Table D5.7, Table D5.8, Table D5.9 and Table 5.3.

Source: AIHW Australian Cancer Database 2007.

Figure 5.5: Cox proportional hazards regression analysis for selected cancers, hazard ratio of death from any cause, all persons diagnosed with cancer between 2003 and 2007 and followed until death or 31 December 2010 (whichever comes first), New South Wales, Queensland, Western Australia and the Northern Territory

International context

This section discusses the cancer survival prospects of Aboriginal and Torres Strait Islander peoples in Australia in an international context using the mortality-to-incidence ratio (MIR). The MIR is used as a proxy measure for survival because conventional survival estimates for different countries are not directly comparable. This ratio indicates the number of deaths relative to the number of new cases diagnosed during a particular year. For example, an MIR of 0.30 would indicate that there were 30 deaths for every 100 new cases of cancer diagnosed. If survival is low, then the ratio would be closer to 1.00. In contrast, if survival is higher, the ratio would be closer to zero (see Appendix B for more information).

The MIR for Aboriginal and Torres Strait Islander peoples in Australia was calculated using 2004–2008 age-standardised mortality and incidence rates for all cancers combined from AIHW National Mortality Database and Australian Cancer Database 2009, restricted to New

South Wales, Queensland, Western Australia and the Northern Territory. The data for all cancers combined encompass a narrower range of cancers than is generally considered in this report (includes ICD-10 as C00–C97, excluding C44 (non-melanoma skin cancer); see Appendix C for further information).

MIRs for countries and regions including Australia were calculated using rates estimated for 2008 from the GLOBOCAN database (Ferlay et al. 2010). All the rates were age-standardised to the World Standard Population (Doll et al. 1966).

The MIR for Aboriginal and Torres Strait Islander peoples in Australia was 0.5, which suggests survival among this population group was similar to survival for people in Southern Europe, Polynesia and Micronesia (Table 5.5). Difference in survival across the world could relate not only to the underlying number of cancer cases and deaths, but also to differences in the availability and quality of treatment, availability and completeness of cancer surveillance programs, cancer coding and registration practices, and characteristics of cancer diagnosed (AIHW 2012d).

Table 5.5: International comparisons of mortality-to-incidence ratios for all cancers combined(a)

Country or region	Mortality: ASR	Incidence: ASR	Mortality-to-incidence ratio
Australia	**102.8**	**314.1**	**0.33**
Northern America	105.1	299.9	0.35
New Zealand	110.7	309.2	0.36
Western Europe	108.1	286.6	0.38
Northern Europe	114.5	269.1	0.43
Southern Europe	112.0	244.4	0.46
Indigenous Australians	**168.0**	**330.4**	**0.51**
Polynesia	109.1	209.8	0.52
Micronesia	86.1	157.5	0.55
Caribbean	99.9	172.6	0.58
South America	100.3	171.8	0.58
World	105.6	180.8	0.58
Central and Eastern Europe	125.9	210.6	0.60
Central America	82.0	134.4	0.61
Eastern Asia	120.1	188.4	0.64
Western Asia	92.2	133.7	0.69
Southern Africa	133.2	189.6	0.70
South-Eastern Asia	99.5	141.4	0.70
South-Central Asia	74.5	104.6	0.71
Northern Africa	78.0	103.2	0.76
Melanesia	106.8	138.5	0.77
Western Africa	85.4	107.6	0.79
Eastern Africa	99.9	122.8	0.81
Middle Africa	76.4	91.8	0.83

(a) Includes cancers coded in ICD-10 as C00–C97, excluding C44 (that is, non-melanoma skin cancer), D45, D46, D47.1 and D47.3.

Notes

1. The ratios shown (except for Indigenous Australians) are based on estimates for 2008 by the International Agency for Research on Cancer (IARC) and are based on data from about 3 to 5 years earlier. The Indigenous Australians ratio is calculated using 2004–2008 New South Wales, Queensland, Western Australia and the Northern Territory data from the AIHW National Mortality Database and Australian Cancer Database 2009.
2. The mortality-to-incidence ratio equals the age-standardised mortality rate divided by the age-standardised incidence rate. The rates from GLOBOCAN were age-standardised by the IARC. All the rates were age-standardised to the World Standard Population (Doll et al. 1966).
3. Australian data from GLOBOCAN includes Indigenous, non-Indigenous and not stated.

Source: Ferlay et al. 2010, AIHW National Mortality Database and AIHW Australian Cancer Database 2009.

6 Prevalence of cancer

Key findings

At the end of 2007 in New South Wales, Queensland, Western Australia and the Northern Territory:

- 1,882 Aboriginal and Torres Strait Islander people were alive who had been diagnosed with cancer within the previous 5 years.
- Five-year prevalence was significantly lower among Indigenous Australians than non-Indigenous Australians; this pattern was consistent for all age groups and by sex.
- The five most prevalent cancers diagnosed among Aboriginal and Torres Islander peoples within the previous 5 years were breast cancer in females (325 people), melanoma of the skin (203), bowel (185), prostate (156) and lung (124) cancers.
- Compared with their non-Indigenous counterparts, 5-year prevalence was significantly higher for cervical cancer (rate ratio 2.1), lung cancer (1.5) and uterine cancer (1.5).

About prevalence

- Prevalence refers to the number of people alive who have been diagnosed with cancer.
- The main data source was the 2007 ACD, with information on deaths (from any cause) sourced from the NDI.
- Limited-duration prevalence is presented and refers to the number of people alive who had been diagnosed with cancer within a given period.
- The 26-year prevalence is the longest duration that can be calculated based on the available incidence data from 1982 to 2007.
- Information in the 2007 NMD on Indigenous status is considered of sufficient completeness for reporting for New South Wales, Queensland, Western Australia and the Northern Territory.
- Comparisons have been made throughout with non-Indigenous Australians, with the analysis excluding those for whom Indigenous status was not stated.
- More detailed data are available in *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: supplementary data tables* on the AIHW website.

All cancers combined

At the end of 2007, there were 3,305 Aboriginal and Torres Strait Islander people alive who had been diagnosed with cancer in the previous 26 years. Of these, 2,691 were diagnosed in the previous 10 years and 1,882 were diagnosed in the previous 5 years (Table 6.1).

All age-standardised rates in three specified prevalence periods were significantly lower for Indigenous Australians compared with non-Indigenous Australians. Five-year prevalence among Indigenous Australians was 991 per 100,000 compared with 1,270 per 100,000 for non-Indigenous Australians. The remainder of this chapter focuses on 5-year prevalence.

Table 6.1: Limited-duration prevalence for all cancers combined[(a)], New South Wales, Queensland, Western Australia and the Northern Territory, as at the end of 2007

	Indigenous			Non-Indigenous		
Prevalence	**Number**	**ASR[(b)]**	**95% CI**	**Number**	**ASR[(b)]**	**95% CI**
5-year prevalence	1,882	991.2	938.2–1,046.1	177,092	1,269.5	1,263.5–1,275.4
10-year prevalence	2,691	1,450.8	1,385.7–1,517.9	269,428	1,931.9	1,924.5–1,939.2
26-year prevalence	3,305	1,855.3	1,779.5–1,933.1	332,590	2,381.7	2,373.6–2,389.9

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

(b) Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

Source: AIHW Australian Cancer Database 2007.

Age

The age-specific 5-year prevalence for all cancers combined rose with age for both Indigenous and non-Indigenous Australians (Table 6.2). The 5-year prevalence was significantly lower among Indigenous than non-Indigenous Australians for all age groups.

Sex

The age-standardised 5-year prevalence for all cancers combined was significantly lower for Indigenous Australians than for non-Indigenous Australians for both males (1,091 compared with 1,444 per 100,000) and females (938 compared with 1,132 per 100,000) (Table 6.2).

Table 6.2: Five-year prevalence for all cancers combined[(a)], by Indigenous status, age group and sex, New South Wales, Queensland, Western Australia and the Northern Territory, as at the end of 2007

	Indigenous			Non-Indigenous		
	Number	**Rate[(b)]**	**95% CI**	**Number**	**Rate[(b)]**	**95% CI**
Age group (years)						
<45	471	127.0	115.8–139.0	17,385	215.7	212.5–219.0
45–54	393	991.3	895.7–1094.3	23,164	1,266.2	1250.0–1282.7
55–64	429	1,952.4	1,772.0–2,146.1	42,519	2,863.8	2,836.6–2,891.1
65–74	383	4,015.3	3,623.2–4,438.3	47,095	5,141.7	5,095.3–5,188.3
75+	206	4,813.1	4,178.2–5,517.1	46,929	5,817.8	5,765.3–5,870.7
Sex						
Males	849	1,091.0	999.5–1,187.3	95,379	1,444.3	1,435.1–1,453.6
Females	1,033	937.6	872.7–1,005.5	81,713	1,131.9	1,124.1–1,139.8
Total	**1,882**	**991.2**	**938.2–1,046.1**	**177,092**	**1,269.5**	**1,263.5–1,275.4**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

(b) The rates for age groups (years) are expressed per 100,000 population. The rates for sex and the total were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

Source: AIHW Australian Cancer Database 2007.

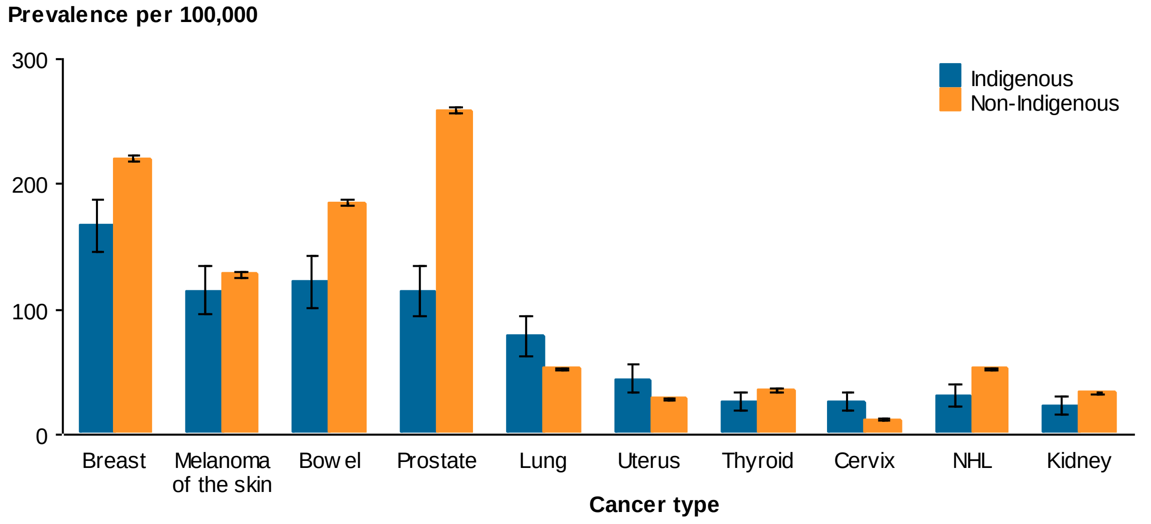
Cancer type

As at the end of 2007, the 10 most prevalent cancers for Indigenous Australians differed from those which non-Indigenous Australians experienced (Table D6.1). Cancer types that were more prevalent in the Indigenous population than in the non-Indigenous population include:

- breast cancer in females (ranked first compared with second)
- cervical cancer (ranked eighth in prevalence compared with seventeenth).

Comparison of the age-standardised 5-year prevalence for the 10 most prevalent cancers (Figure 6.1) indicates that Indigenous Australians have significantly:

- higher rates of cervical cancer (rate ratio 2.1), lung cancer (1.5) and uterine cancer (1.5)
- lower rates of thyroid cancer (rate ratio 0.8), breast cancer in females (0.8), bowel cancer (0.7), kidney cancer (0.7), non-Hodgkin lymphoma (0.6) and prostate cancer (0.4).



Notes

1. Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.
2. Breast cancer is for females only. NHL stands for non-Hodgkin lymphoma.
3. Figure is ordered based on top 10 cancer prevalence numbers for Indigenous Australians.
4. The data for this figure are shown in Table D6.1.

Source: AIHW National Mortality Database.

Figure 6.1: Five-year prevalence of the 10 most prevalent cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, as at the end of 2007

Age

Consistent with the overall findings, the age-specific 5-year prevalence for Indigenous Australians, compared with non-Indigenous Australians (Figure 6.2), was:

- significantly higher for lung cancer among those aged 45–54 and 65–74, cervical cancer and uterine cancer among those aged 45–54
- significantly lower for prostate cancer among those aged 45 and older, bowel cancer among those aged 45 to 74, breast cancer in females and melanoma of the skin among

those aged less than 65, non-Hodgkin lymphoma among those aged 45 to 64 and thyroid cancer among those aged less than 55.

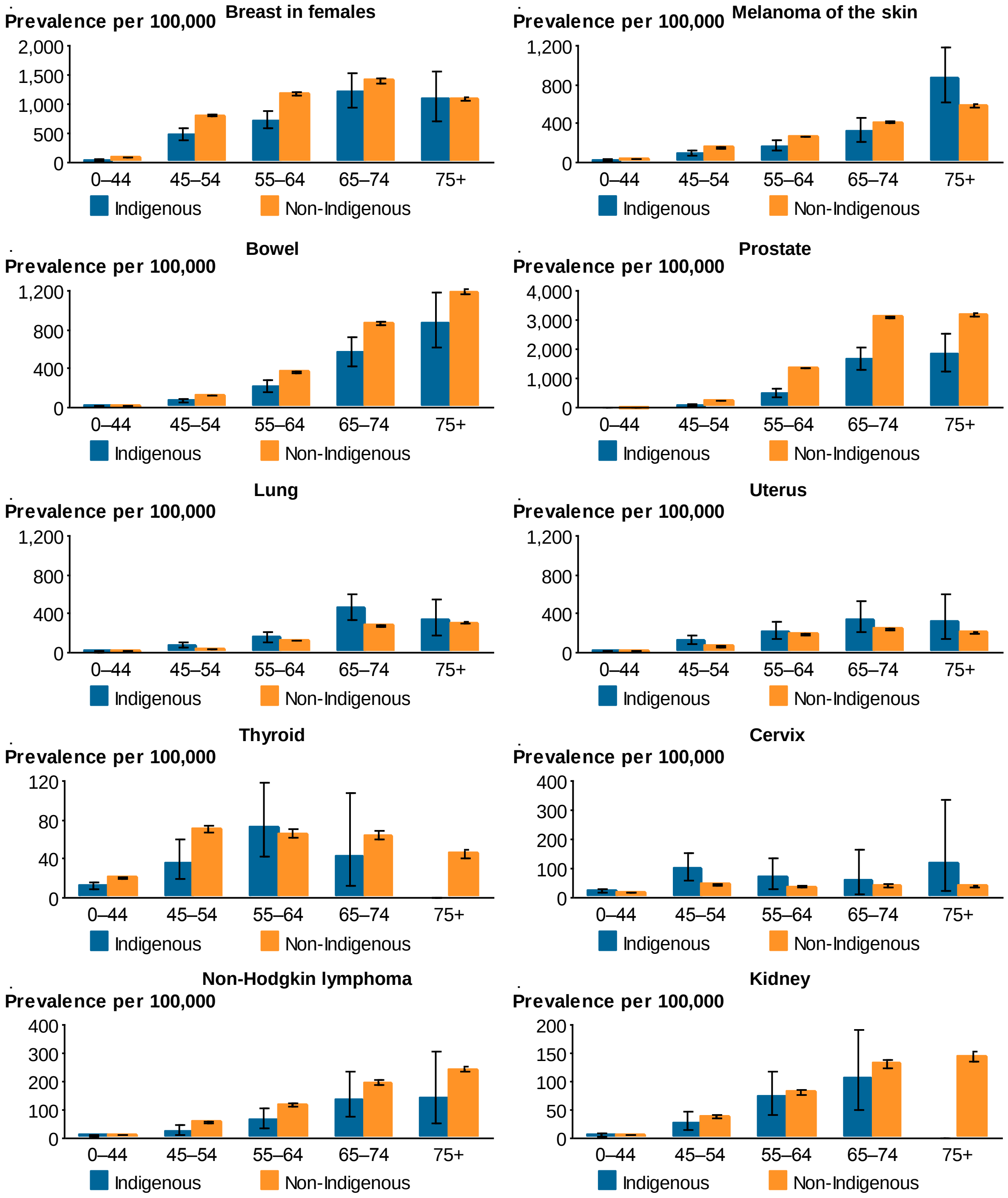
Other cancers of interest include higher rates of melanoma of the skin among those aged 75 and older.

Sex

Consistent with the overall findings, the age-standardised 5-year prevalence for Indigenous Australians, compared with non-Indigenous Australians (Figure 6.3), was:

- significantly higher for Indigenous males for lung cancer, and for Indigenous females for uterine cancer and cervical cancer
- significantly lower for both males and females for bowel cancer and non-Hodgkin lymphoma, for males with prostate cancer, and for females with breast cancer, thyroid cancer and melanoma of the skin.

Within the Indigenous population, Indigenous males had higher prevalence rates of melanoma of the skin and lung cancer, while Indigenous females had higher rates of thyroid cancer.

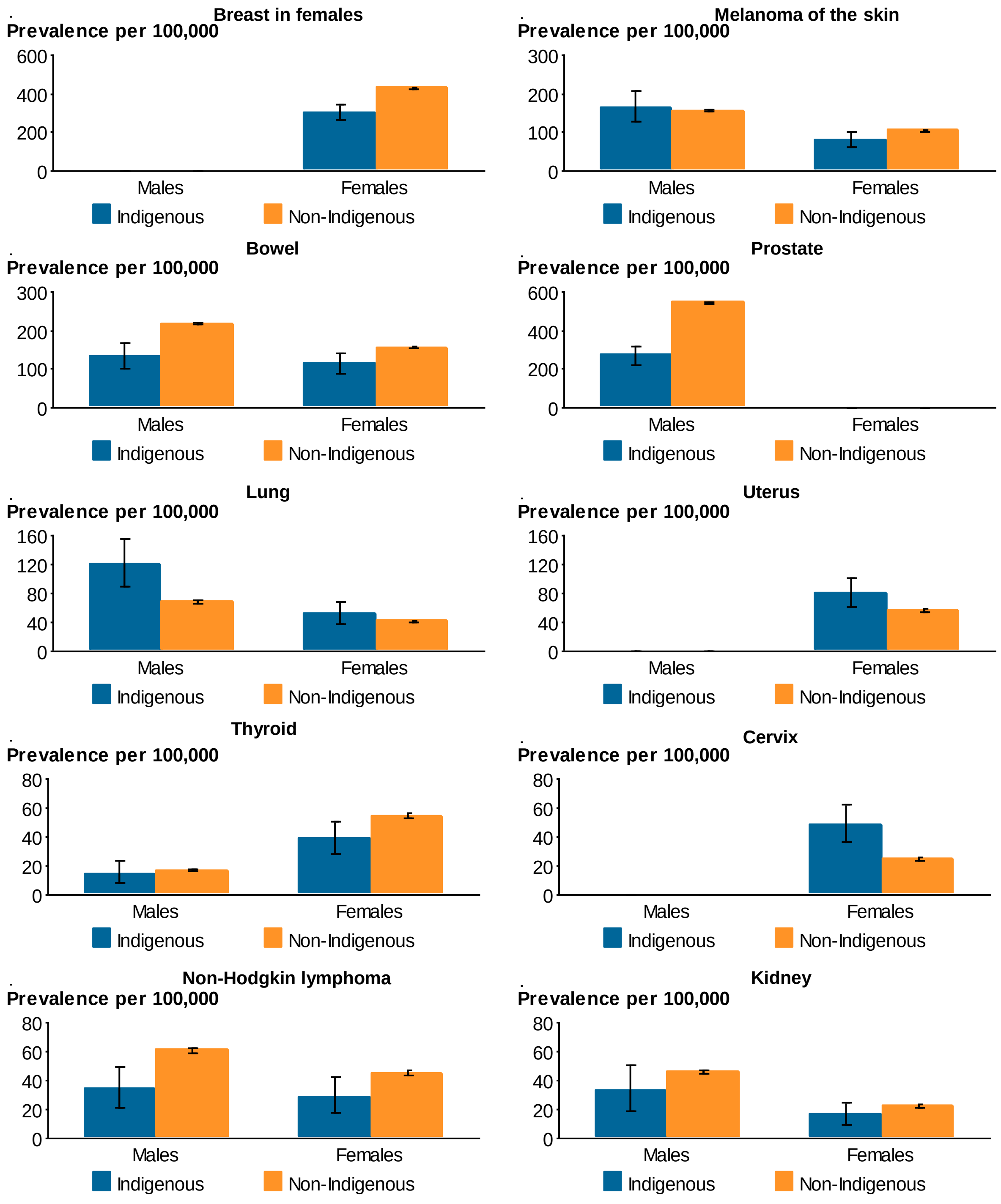


Notes

1. Data for Aboriginal and Torres Strait Islander peoples for prostate cancer (0–44 years), thyroid cancer (75+ years) and kidney cancer (75+ years) cannot be released due to small number of cases.
2. There are differences in the scale on the y-axis between cancer types.
3. The rates are expressed per 100,000 population.
4. The data for this figure are shown in Table D6.2.

Source: AIHW Australian Cancer Database 2007.

Figure 6.2: Five-year prevalence of the 10 most prevalent cancers in Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Queensland, Western Australia and the Northern Territory, as at the end of 2007



Notes

1. There are differences in the scale on the y-axis between cancer types.
2. Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.
3. The data for this figure are shown in Table D6.3.

Source: AIHW Australian Cancer Database 2007.

Figure 6.3: Five-year prevalence of the 10 most prevalent cancers in Aboriginal and Torres Strait Islander peoples, by sex, New South Wales, Queensland, Western Australia and the Northern Territory, as at the end of 2007

7 Hospitalisations for cancer

Key findings

From 2006–07 to 2010–11 in New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory:

- 14,086 Aboriginal and Torres Strait Islander people were hospitalised for a principal diagnosis of cancer.
- Indigenous Australians tended to have lower hospitalisation rates than other Australians for a principal diagnosis of cancer (113 compared with 170 per 10,000).
- Indigenous Australians spent on average 9.6 days in hospital following a principal diagnosis of cancer, compared with 7.7 days on average for other Australians.
- Indigenous Australians living in all geographic remoteness areas were less likely than other Australians to be hospitalised with a principal diagnosis of cancer.
- Indigenous Australians were more likely to be hospitalised for cervical (rate ratio 3.0), liver (2.1) and lung (1.6) cancers than other Australians.

About hospitalisations

- Data provided are for cancer-related hospitalisations for Aboriginal and Torres Strait Islander peoples between 2006–07 and 2010–11 financial years.
- Cancer hospitalisations are defined as an admitted patient hospitalisation in which a cancer was recorded as the principal diagnosis.
- The main data source was the National Hospital Morbidity Database (NHMD).
- Note that the data from the NHMD refer to hospitalisations, not individuals (see Appendix C and AIHW *Australian hospital statistics* reports (AIHW 2012c).
- Information in the NHMD on Indigenous status is only considered of sufficient completeness for reporting for New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory.
- Comparisons have been made throughout with other Australians, including those of unknown Indigenous status. This is different to other chapters, because assessment of the demographic profile of the 'not stated' shows a similar profile to non-Indigenous. The level of missing data on Indigenous status is 11% (see *Indigenous identification in hospital separations data – quality report* for more details (AIHW 2010a).
- Admission practices differ between states and territories and can change over time. For example, in public hospitals in New South Wales and South Australia, patients who receive same-day chemotherapy services are considered as outpatients rather than admitted patients (AIHW 2009).
- The Australian Standard Geographical Classification Remoteness Area (ABS 2006) was used to make comparisons by remoteness status (see Appendix A for more details).
- More detailed data are available in *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: supplementary data tables* on the AIHW website.

All cancers combined

Between 2006–07 and 2010–11, there were 25,403 cancer-related hospitalisations for Aboriginal and Torres Strait Islander peoples (Table 7.1). Of these hospitalisations, 14,086 were for a principal diagnosis of cancer and 11,317 were hospitalisations for other cancer-related treatment and care (which includes special screening examinations, follow-up after surgery or treatment and chemotherapy).

Other Australians were almost twice as likely to have cancer-related hospitalisations as Indigenous Australians (367 compared with 194 per 10,000). A similar pattern was observed for hospitalisations for a principal diagnosis of cancer (170 compared with 113). The discussion throughout the remainder of this chapter refers to hospitalisations data where the principal diagnosis was cancer.

While Indigenous Australians had fewer cancer hospitalisations, they experienced longer age-standardised length of stay than other Australians (9.6 days compared with 7.7 days). Note that average length of stay is calculated based on overnight hospitalisations and excludes same-day hospitalisations. Indigenous Australians may have longer hospitalisations as they might have to travel into cities for treatment (see Box 7.1), although other factors could include case severity and additional conditions.

Box 7.1: Issues facing Indigenous Australians living in remote areas

A greater proportion of Indigenous than non-Indigenous Australians live in remote areas of Australia (ABS 2008). Indigenous Australians living in remote areas can face issues with accessing health-care services within their community (Humphreys & Wakerman 2008), meaning that they need to travel to receive treatment. As a result, Indigenous Australians may face longer hospitalisations as they cannot receive other care in the community (Australian Indigenous HealthInfoNet 2013).

Table 7.1: Hospitalisations for all cancers combined by Indigenous status, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

	Indigenous			Other Australians		
Type of cancer hospitalisation	**Number**	**ASR[(a)]**	**ALOS[(b)(c)]**	**Number**	**ASR[(a)]**	**ALOS[(b)(c)]**
Principal diagnosis of cancer	14,086	113.0	9.6	1,895,294	170.1	7.7
Other cancer-related hospitalisations	11,317	80.7	. .	2,184,249	197.0	. .
Same-day chemotherapy	*9,165*	64.4	. .	*1,550,695*	139.6	. .
All cancer-related hospitalisations[(d)]	**25,403**	**193.8**	**. .**	**4,079,543**	**367.0**	**. .**
All hospitalisations	**1,443,300**	**8,361.7**	. .	**38,063,302**	**3,549.6**	. .

(a) Rates were directly age-standardised to the Australian population as at 30 June 2001 and are expressed per 10,000 population.

(b) Directly age-standardised to the national all cancer hospitalisation population 2006–07 to 2010–11.

(c) Average length of stay (ALOS) excludes same day hospitalisations.

(d) Pertain to hospitalisations in which (i) the principal diagnosis is cancer (ICD-10-AM codes C00–C97, D45, D46, 47.1 and D47.3), or (ii) the principal diagnosis is a health service or treatment that may be related to treatment of cancer.

Source: AIHW National Hospital Morbidity Database.

Age

A greater proportion of Indigenous Australians were hospitalised with a principal diagnosis of cancer at a younger age than non-Indigenous Australians. Forty-eight per cent of Indigenous Australians were hospitalised before the age of 55 compared with 21% for non-Indigenous Australians (Table 7.2). The relative proportion of hospitalisations of Indigenous Australians tended to fall with age, which was the reverse of the trend in relation to other Australians.

The age-specific hospitalisation rate increased with age for both groups, but Indigenous Australians had lower hospitalisation rates for all age groups compared with other Australians across all age groups (Table 7.2).

The overall average length of stay for hospitalisations was longer for Indigenous Australians for all age groups (Table 7.2).

Sex

The number of hospitalisations of Aboriginal and Torres Strait Islander peoples was equally distributed among males and females. However, the age-standardised hospitalisation rate was higher for Indigenous males than Indigenous females (129 compared with 102 per 10,000).

Both Indigenous males and females had lower hospitalisations following a principal diagnosis of cancer than other Australians. However, when hospitalised, Indigenous males and females experienced longer average length of stay than other Australian males and females. The difference in length of stay between the respective population groups was greater for males than females (Table 7.2).

Remoteness area

A smaller proportion of Indigenous Australians hospitalised with a principal diagnosis of cancer lived in *Major cities* than other Australians (30% compared with 68%), and a greater proportion lived in *Remote and very remote* areas (27% compared with 1%) (Table 7.2).

Indigenous Australians living in all geographical remoteness areas were less likely to be hospitalised following a principal diagnosis of cancer, but had an longer average length of stay than other Australians living in the same areas.

Table 7.2: Hospitalisations for all cancers combined[(a)], by Indigenous status and age group, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

	Indigenous Australians				Other Australians			
	Number	**Per cent**	**Rate(b)**	**ALOS(c)**	**Number**	**Per cent**	**Rate(b)**	**ALOS(c)**
Age group (years)								
<45	3,642	25.9	16.8	9.5	172,239	9.1	27.5	6.7
45–54	3,087	21.9	129.2	8.7	219,679	11.6	155.3	6.8
55–64	3,564	25.3	259.5	9.4	418,147	22.1	357.3	7.3
65–74	2,491	17.7	414.9	9.3	480,914	25.4	646.7	8.0
75+	1,302	9.2	491.9	10.6	604,315	31.9	925.4	8.7
Sex								
Males	7,024	49.9	129.0	10.1	1,092,663	57.7	209.1	7.9
Females	7,062	50.1	101.5	8.7	802,629	42.3	137.9	7.7
Remoteness area(d)								
Major cities	4,268	30.3	125.6	9.5	1,286,113	68.0	183.7	7.9
Inner regional	2,879	20.5	137.4	8.4	408,687	21.6	186.9	7.5
Outer regional	3,195	22.7	127.0	9.4	169,255	9.0	175.4	7.9
Remote and very remote	3,721	26.5	119.0	9.7	26,607	1.4	165.8	8.2
Total	**14,086**	**100.0**	**113.0**	**9.6**	**1,895,294**	**100.0**	**170.1**	**7.7**

(a) All cancers combined pertain to ICD-10-AM codes of C00–C97, D45, D46, D47.1 and D47.3.

(b) The rates for age groups (years) are expressed per 100,000 population. The rates for sex, remoteness area and the total were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

(c) ALOS excludes same-day hospitalisations.

(d) There were 23 Indigenous hospitalisations and 4,432 other Australian hospitalisations that could not be ascribed to a remoteness area.

Note: Rates for remoteness were calculated using 2006 estimated residential population due to data availability. This assumes that the population in each remoteness area has remained constant over the 5 years. New estimated residential population by Indigenous status and remoteness areas will be released by June 2014 (see Chapter 1) and may impact on the ASR presented here.

Source: AIHW National Hospital Morbidity Database.

Cancer type

The 10 cancers most commonly recorded as the primary reason for hospitalisation among Aboriginal and Torres Strait Islander peoples accounted for 57% of all cancer hospitalisations. The top 10 cancer rankings for hospitalisations for Indigenous Australians differed from that for other Australians (Table D7.1). Cancer types that were ranked higher in the Indigenous population than in the other Australian population include:

- lung cancer (ranked second compared with seventh)
- acute lymphoblastic leukaemia (ranked eighth compared with eighteenth)
- cervical cancer (ranked ninth compared with twenty-eighth)
- liver cancer (ranked tenth compared with twenty-second).

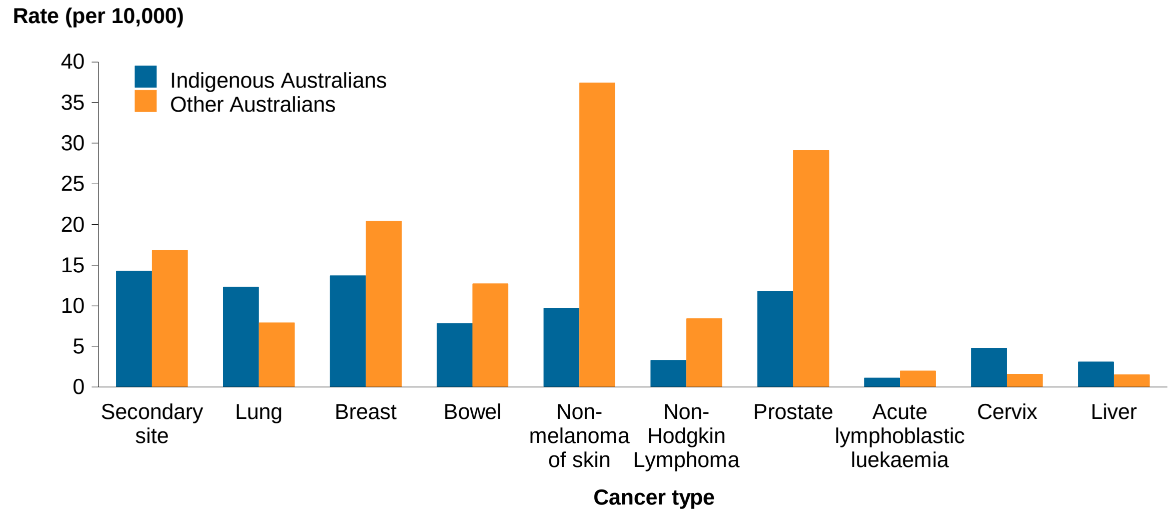
Comparison of age-standardised hospitalisation rates shows that Indigenous Australians, when compared with other Australians (Figure 7.1) were:

- about 3 times as likely to be hospitalised for cervical cancer, twice as likely to be hospitalised for liver cancer and 1.6 times as likely to be hospitalised for lung cancer

- were less likely to be hospitalised for non-melanoma skin cancer (rate ratio 0.3), non-Hodgkin lymphoma (0.4), prostate cancer (0.4), acute lymphoblastic leukaemia (0.6), bowel cancer (0.6), breast cancer in females (0.7) and cancer of secondary site (0.9).

Comparisons of average length of stay for individual cancer types showed that Indigenous Australians, compared with other Australians (Table D7.1) had:

- shorter hospitalisations for acute lymphoblastic leukaemia
- longer hospitalisations for all other top 10 cancers ranked for hospitalisations.



Notes

1. Rates were directly age-standardised to the Australian population as at 30 June 2001 and are expressed per 10,000 population.
2. Breast cancer is for females only.
3. Figure is ordered based on top 10 cancer hospitalisation numbers for Indigenous Australians.
4. The data for this figure are shown in Table D7.1.

Source: AIHW National Hospital Morbidity Database.

Figure 7.1: Age-standardised hospitalisation rates for the 10 most common principal diagnoses of cancer, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

Age

Consistent with the overall findings, the age-specific hospitalisation rates for Indigenous Australians, compared with other Australians (Figure 7.2), were:

- higher for lung and cervical cancers among those aged less than 75, and for liver cancer among those aged between 45 and 74
- lower for non-melanoma skin cancer, non-Hodgkin lymphoma and prostate cancer among all age groups, for breast cancer in females and acute lymphoblastic leukaemia among those aged less than 75, for bowel cancer among those aged 45 and older and for cancer of secondary site among those aged less than 45 and those aged 75 and older.

Other cancers where Indigenous Australians had higher age-specific hospitalisation rates than non-Indigenous Australians include acute lymphoblastic leukaemia among those aged 75 and older and cancer of secondary site among those aged 45–54.

Sex

Consistent with the overall findings, the age-standardised hospitalisation rate (Figure 7.3) was:

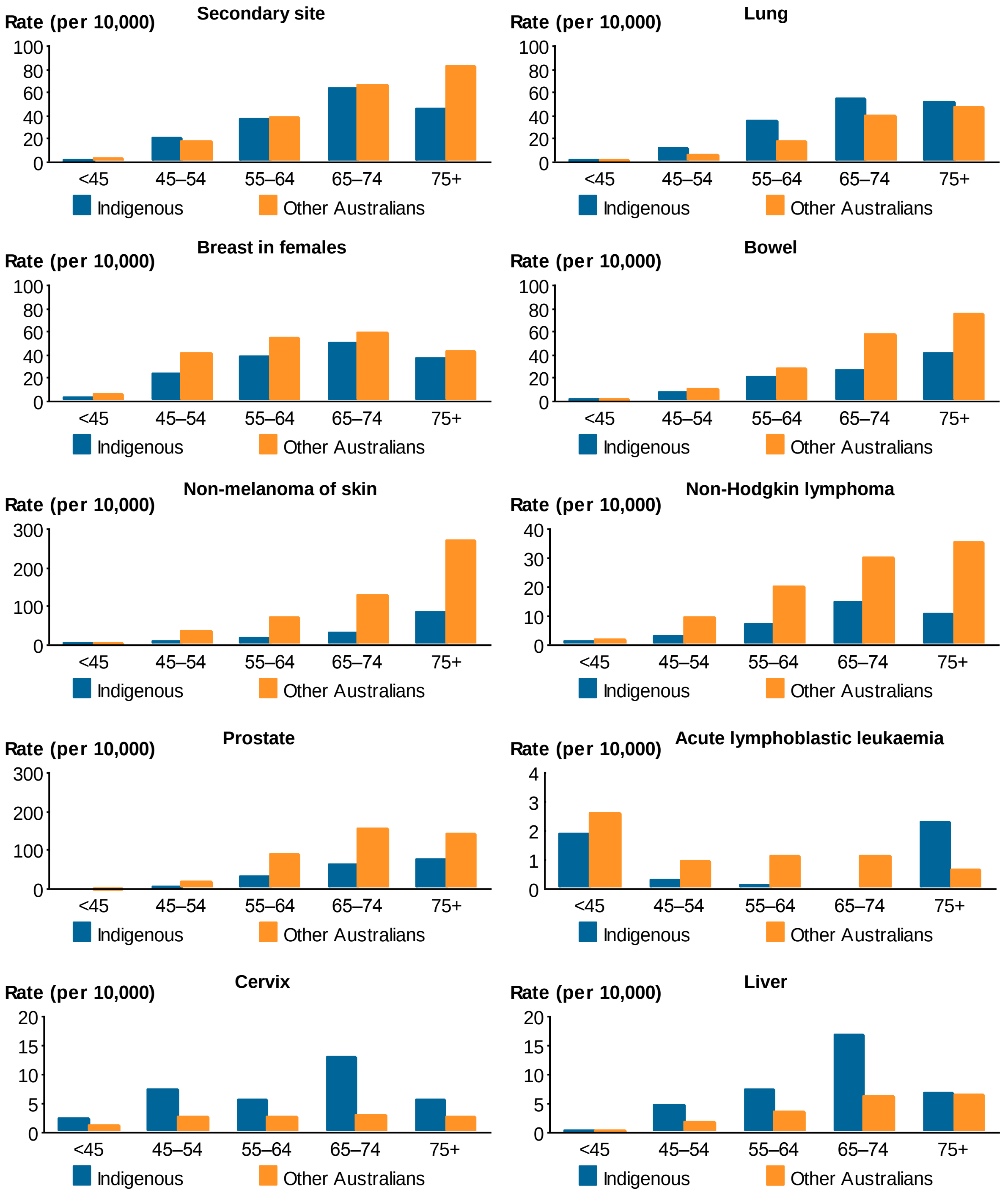
- higher for both Indigenous males and females for liver and lung cancers than for other Australians, and for Indigenous females for cervical cancer than for other females
- lower for both Indigenous males and females for non-melanoma skin cancer, non-Hodgkin lymphoma, cancer of secondary site, bowel cancer and acute lymphoblastic leukaemia than other Australians, and for Indigenous males for prostate cancer than other males, and for Indigenous females for breast cancer than other females.

Within the Indigenous population, Indigenous males had higher hospitalisation rates for liver, lung and bowel cancers and non-melanoma skin cancer than Indigenous females.

Remoteness area

Consistent with the overall findings, the age-standardised hospitalisation rates for Indigenous Australians, compared with other Australians (Figure 7.4), were:

- higher for those living in all remoteness areas for cervical and liver cancers, and higher for those living in *Inner regional, Outer regional* and *Remote and very remote* areas for lung cancer
- lower for those living in all remoteness areas for non-melanoma skin cancer, non-Hodgkin lymphoma, prostate cancer, bowel cancer and acute lymphoblastic leukaemia and for those living in *Major cities* for breast cancer in females.

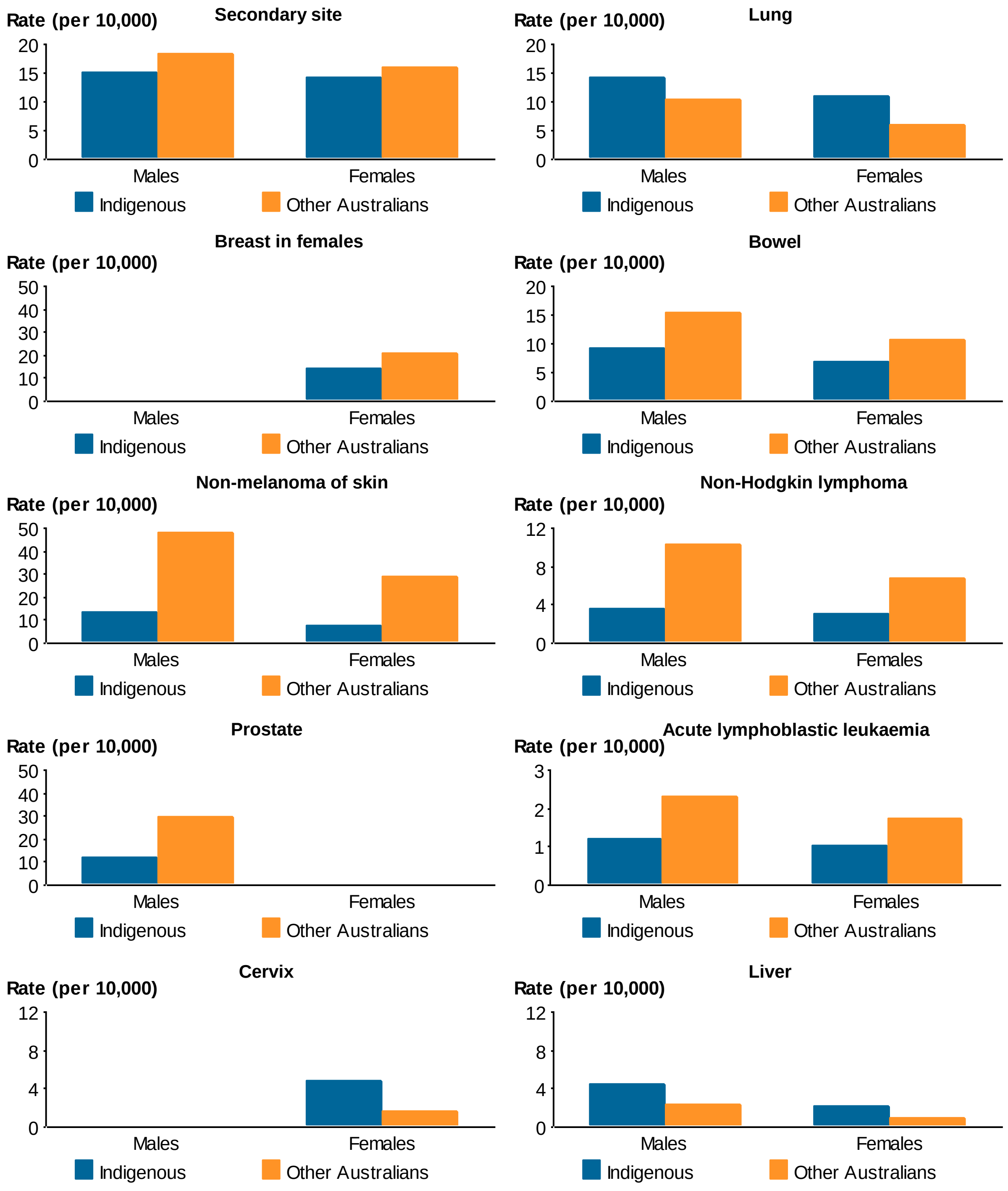


Notes

1. There are differences in the scale on the y-axis between cancer types.
2. Rates are expressed per 10,000 population.
3. The data for this figure are shown in Table D7.2.

Source: AIHW National Hospital Morbidity Database.

Figure 7.2: Age-specific hospitalisation rates for the 10 most common principal diagnoses of cancer, by age group, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

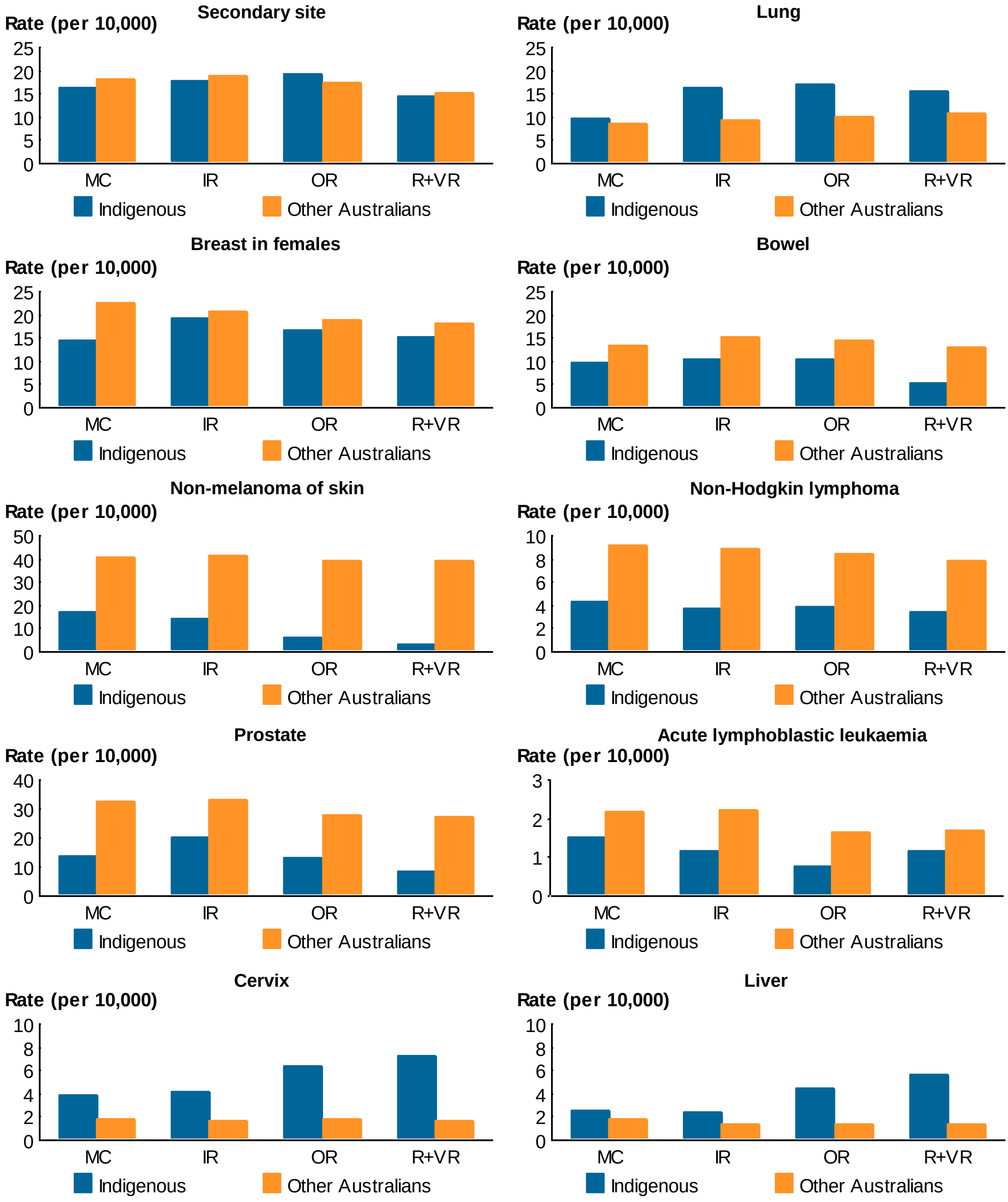


Notes

1. There are differences in the scale on the y-axis between cancer types.
2. Rates were directly age-standardised to the Australian population as at 30 June 2001 and are expressed per 10,000 population.
3. The data for this figure are shown in Table D7.3.

Source: AIHW National Hospital Morbidity Database.

Figure 7.3: Age-standardised hospitalisation rates for the 10 most common principal diagnoses of cancer, by sex, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11



Notes

1. MC stands for *Major cities*, IR stands for *Inner regional*, OR stands for *Outer regional* and R+VR stands for *Remote and very remote*.
2. There are differences in the scale on the y-axis between cancer types.
3. Rates were directly age-standardised to the Australian population as at 30 June 2001 and are expressed per 10,000 population
4. The data for this figure are shown in Table D7.4.

Source: AIHW National Hospital Morbidity Database.

Figure 7.4: Age-standardised hospitalisation rates for the 10 most common principal diagnoses of cancer, by remoteness area, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

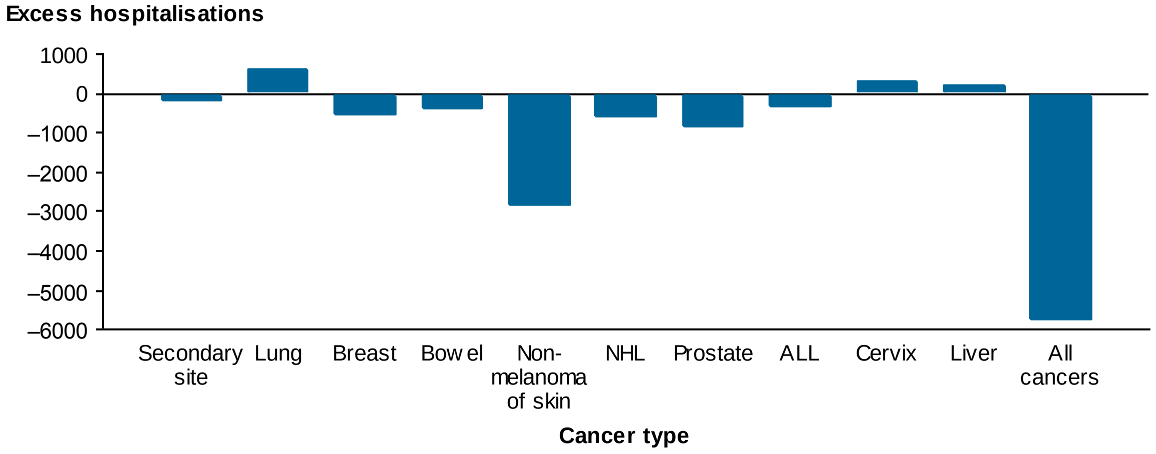
Fewer cancer hospitalisations

Another way to detect the under-representation of cancer hospitalisations for Indigenous Australians is to compare the number of observed hospitalisations with expected numbers if the other Australian age-specific hospitalisation rate was applied to the Indigenous population. A positive number indicates an excess in cancer hospitalisations cases than would be expected, while a negative number indicates that there were less cancer hospitalisations than expected (see Appendix B). The numbers of excess hospitalisations for individual cancer types are not expected to sum to the number of excess case for all cancers.

If the hospitalisation rate for other Australians was applied to the Indigenous population, there would be an expected 19,800 hospitalisations rather than the observed 14,086 hospitalisations (Figure 7.5). This means that for Indigenous Australians there were 5,714 fewer hospitalisations than would have been expected from the other Australians hospitalisation rate (Table D7.5). The difference varied by cancer type (Figure 7.5) including:

- non-melanoma skin cancer, which had the largest difference, with 2,808 fewer hospitalisations than expected
- lung, cervical and liver cancers, where the reverse pattern applies, with more hospitalisations than expected for Indigenous Australians.

More detailed data on the number of excess hospitalisations among Indigenous Australians by cancer type, age group and sex are available in *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: supplementary data tables* on the AIHW website.



Notes

1. Excess hospitalisations are the observed number of hospitalisations minus the expected number of hospitalisations.
2. All cancers pertain to hospitalisations in which the principal diagnosis is cancer (ICD-10-AM codes C00–C97, D45, D47.1 and D47.3).
3. Breast cancer is for females only. NHL stands for non-Hodgkin lymphoma. ALL stands for acute lymphoblastic leukaemia.
3. Excess hospitalisations are derived by applying the age-specific rates from the other Australians population to the age distribution of the Indigenous population. The numbers of excess hospitalisations for individual cancer types are not expected to sum to the number of excess hospitalisations for all cancers.
4. The data for this figure are shown in Table D7.5.

Source: AIHW National Hospital Morbidity Database.

Figure 7.5: Excess cancer hospitalisations for the 10 most common principal diagnoses of cancer, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

Additional diagnoses

This section looks at common additional diagnoses resulting in hospitalisation due to all cancers combined. An additional diagnosis is a condition or complaint that either coexists with the principal diagnosis or arose during the treatment. An additional diagnosis is reported if the condition affects patient management.

The most common additional diagnoses for Aboriginal and Torres Strait Islander peoples admitted to hospital with a principal diagnosis of cancer were endocrine, nutritional and metabolic diseases (Table 7.3). Comparison of the age-standardised hospitalisation rate showed that, compared to other Australians, Indigenous Australians were:

- 1.5 times as likely to have an additional diagnosis of mental and behavioural disorders
- 1.4 times as likely to have an additional diagnosis of endocrine, nutritional and metabolic diseases and disease of the respiratory system.

Table 7.3: Hospitalisations for all cancers combined[(a)] by additional diagnosis groups and Indigenous status, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

	Indigenous Australians			Other Australians		
Additional diagnosis (ICD-10-AM codes)	**No[(b)(c)]**	**Per cent**	**ASR[(d)]**	**No[(b)(c)]**	**Per cent**	**ASR[(d)]**
Endocrine, nutritional and metabolic diseases (E00–E89)	3,045	21.6	26.4	204,953	10.8	18.3
Diseases of the circulatory system (I00–I99)	2,372	16.8	22.2	201,147	10.6	17.9
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50–D89)	2,055	14.6	15.5	192,216	10.1	17.3
Diseases of the digestive system (K00–K93)	1,977	14.0	15.8	189,140	10.0	16.9
Diseases of the genitourinary system (N00–N99)	1,455	10.3	13.2	124,352	6.6	11.1
Diseases of the respiratory system (J00–J99)	1,452	10.3	12.5	97,180	5.1	8.7
Certain infectious and parasitic diseases (A00–B99)	1,425	10.1	10.6	91,419	4.8	8.2
Mental and behavioural disorders (F00–F99)	891	6.3	7.1	52,426	2.8	4.7
Injury, poisoning and certain other consequences of external causes (S00–T98)	846	6.0	6.3	74,707	3.9	6.7
Diseases of the nervous system (G00–G99)	711	5.0	5.4	51,280	2.7	4.6
Total hospitalisations for principal diagnosis of cancer	**14,086**	**100.0**	**113.0**	**1,895,294**	**100.0**	**170.1**

(a) All cancers combined pertain to ICD-10-AM codes of C00–C97, D45, D46, D47.1 and D47.3.

(b) A hospitalisation can have more than one additional diagnosis or can have no additional diagnosis, hence the numbers do not add up to the total number of hospitalisations where cancer is the principal diagnosis.

(c) If more than one additional diagnosis on the 4-digit level in each group (3-digit level) is listed to a principal diagnosis of cancer, then only one is counted.

(d) Rates are standardised to the Australian population as at 30 June 2001 and expressed per 10,000 population.

Source: AIHW National Hospital Morbidity Database.

8 Expenditure on cancer

Key findings

In the 2010–11 financial year:

- Total expenditure on cancer and cancer-related hospitalisations for Aboriginal and Torres Strait Islander peoples was estimated to be $58 million.
- Hospital expenditure per person for Indigenous Australians was about half that of non-Indigenous Australians for all cancers combined.
- Cancer of a secondary (metastatic) site accounted for the highest proportion of the total hospital expenditure on cancer for Indigenous Australians.
- Hospital expenditure per person was higher for Indigenous Australians than non-Indigenous Australians for cervical cancer (ratio of 2.0), cancer of unknown primary site (1.4), oesophageal cancer (1.2) and liver cancer (1.2).

About expenditure

- The main data sources were the AIHW National Hospital Morbidity Database (NHMD), the AIHW Public Hospitals Establishments Database (PHED) and the National Hospital Costs Data Collection (NHCDC).
- Data provided are the estimated cost of hospital admitted patient services for cancer among Aboriginal and Torres Strait Islander peoples for 2010–11.
- Expenditure estimates are based on both public and private hospital admitted patient services.
- It is not possible to allocate all expenditure on health goods and services by disease. For some areas, expenditure is aimed at providing broad health infrastructure and/or services such as capital expenditure and general aids and appliances expenditure (where the costs are not part of hospital admitted patient services costs). For some other areas of expenditure, such as over-the-counter pharmaceuticals and non-admitted patient services, there is a lack of available data that would enable a link of the broad expenditure costs to a particular disease.
- Information on hospital admitted patient services relates to hospitalisations for which cancer was the primary, rather than an additional, diagnosis. Thus, the data provided give a conservative estimate of total admitted patient services expenditure on cancer patients.
- Data presented in this chapter have been adjusted for estimated Indigenous under-identification. Information on the adjustment method is provided in *Expenditure on health for Aboriginal and Torres Strait Islander people 2010–11* (AIHW 2013e).The level of under-identification of Indigenous peoples in the data set varied by jurisdiction and remoteness area.
- Due to the methodology used to estimate expenditure, the data apply to all states and territories, and comparisons have been made throughout with non-Indigenous Australians, unlike previous chapters.

All cancers combined

In 2010–11, the total expenditure on all cancer-related hospitalisations for Aboriginal and Torres Strait Islander peoples was estimated to be $58 million, which includes $53 million on hospitalisations where cancer was the principal diagnosis and $5 million on cancer-related treatment and services (Table 8.1). The total expenditure on all cancer-related hospitalisations for Indigenous Australians accounted for 1.4% of that for all Australians. Furthermore:

- hospital expenditure on all cancer-related hospitalisations as a proportion of hospital expenditure on all diseases was 3.2% for Indigenous Australians, compared with 9.1% for non-Indigenous Australians
- hospital expenditure per person for Indigenous Australians was about half that of non-Indigenous Australians for all cancers combined (ratio of 0.5)
- hospital expenditure per person on cancer-related treatment and services (such as special screening examinations, chemotherapy and follow-up after treatment) for Indigenous Australians was less than one-third of that for non-Indigenous Australians (ratio of 0.3).

Cancer type

Hospital expenditure was calculated for the top 10 cancers for incidence, mortality and hospitalisation for Aboriginal and Torres Strait Islander peoples (see chapters 3, 4 and 7). Compared with non-Indigenous Australians, per person hospital expenditure on Indigenous Australians for individual cancers was:

- higher for cervical cancer (ratio of 2.0), cancer of unknown primary site (1.4), oesophageal cancer (1.2) and liver cancer (1.2)
- lower for non-melanoma skin cancer (ratio 0.1), prostate cancer (0.2), bowel cancer (0.3), non-Hodgkin lymphoma (0.3), pancreatic cancer (0.4), cancer of secondary site (0.5), stomach cancer (0.5), breast cancer in females (0.6), lung cancer (0.8) and acute lymphoblastic leukaemia (0.9).

Table 8.1: Estimated expenditure on hospitalisations[a][b], by principal diagnosis and Indigenous status[c], in public and private hospitals, 2010–11

	Expenditure ($ million)				Expenditure ($) per person[d]		
Principal diagnosis	**Indigenous**	**Non-Indigenous**	**Total**	**Indigenous share (%)[e]**	**Indigenous**	**Non-Indigenous**	**Ratio**
Cancer of secondary site (C77–C79)	7.8	531.0	538.7	1.4	13.6	26.9	0.5
Lung cancer (C33–C34)	4.8	197.4	202.2	2.4	8.5	10.0	0.8
Bowel cancer (C18–C20)	3.5	424.6	428.1	0.8	6.1	21.5	0.3
Breast cancer in females (C50)	2.6	160.3	162.9	1.6	4.5	8.1	0.6
Acute lymphoblastic leukaemia (C91.0)	1.7	68.6	70.3	2.4	3.0	3.5	0.9
Liver cancer (C22)	1.6	47.6	49.2	3.3	2.9	2.4	1.2
Oesophageal cancer (C15)	1.7	48.7	50.5	3.4	3.0	2.5	1.2
Prostate cancer (C61)	1.4	211.2	212.7	0.7	2.5	10.7	0.2
Uterine cancer (C54–C55)	1.1	37.7	38.8	2.9	2.0	1.9	1.0
Stomach cancer (C16)	1.0	72.0	73.1	1.4	1.8	3.7	0.5
Cervical cancer (C53)	0.9	14.6	15.5	5.5	1.5	0.7	2.0
Non-melanoma skin cancer (C44)	0.8	276.6	277.5	0.3	1.5	14.0	0.1
Pancreatic cancer (C25)	0.8	74.1	74.9	1.1	1.4	3.8	0.4
Non-Hodgkin lymphoma (C82–C85)	0.5	54.8	55.4	0.9	0.9	2.8	0.3
Cancer of unknown primary site (C80)	0.5	11.9	12.3	3.9	0.8	0.6	1.4
All other malignant neoplasms	22.5	1,207.4	1,229.9	1.8	39.6	61.2	0.6
All cancers combined[f]	*53.3*	*3,438.6*	*3,491.9*	*1.5*	*93.7*	*174.4*	*0.5*
Cancer-related treatment and services[g]	4.5	524.7	529.2	0.9	7.9	26.6	0.3
All cancer-related hospitalisations	*57.8*	*3,963.3*	*4,021.1*	*1.4*	*101.6*	*201.0*	*0.5*
All diseases	**1,798.3**	**43,735.5**	**45,533.8**	**3.9**	**3,160.0**	**2,218.5**	**1.4**

(a) Includes hospitalisation data for all states/territories.

(b) Hospitalisations for which care type was reported as Newborn with no qualified days, and records for Hospital boarders and Posthumous organ procurement have been excluded.

(c) Admitted patient rates have been adjusted for Indigenous under-identification.

(d) Expenditure per person estimates are calculated using the Australia-wide population for all expenditure areas.

(e) Indigenous share is the expenditure on Indigenous Australians divided by the total expenditure.

(f) Includes hospitalisations in which the principal diagnosis is cancer (ICD-10-AM codes of C00–C97, D45, D46, D47.1 and D47.3).

(g) Includes hospitalisations in which the principal diagnosis is a cancer-specific health service or treatment (ICD-10-AM codes of Z08, Z12, Z40.0, Z51.0, Z51.1, Z54.1, Z54.2, Z80 and Z85).

Source: AIHW National Hospital Morbidity Database, AIHW Public Hospitals Establishments Database and National Hospital Costs Data Collection.

9 National cancer screening programs

Key findings

BreastScreen Australia:

Over the two years 2010–2011 for women age 50–69:

- 11,971 Aboriginal and Torres Strait Islander women participated in BreastScreen Australia.
- The participation rate for Indigenous women in BreastScreen Australia was lower than the non-Indigenous participation rate (36% compared with 54%).
- 53% of breast cancers diagnosed in BreastScreen in Indigenous women were small (≤15 mm). Comparatively, the proportion of small breast cancers detected in non-Indigenous women was significantly higher at 61%.

National Cervical Screening Program

Participation in cervical screening cannot be measured nationally by Indigenous status through national cytology data as there is currently no national mechanism for collecting Indigenous status in relation to these data.

National Bowel Cancer Screening Program

Between July 2011 and June 2012:

- 1,919 Aboriginal and Torres Strait Islander peoples participated in the National Bowel Cancer Screening Program (NBCSP), representing 0.6% of all participants.
- Indigenous participants had a slightly higher positivity faecal occult blood test (FOBT) rate than non-Indigenous participants (10% compared with 7%).
- Indigenous males were more likely to have a positive FOBT result than Indigenous females (11% compared with 9%).

About national population screening programs

- Australia has three national population screening programs: BreastScreen Australia, the National Cervical Screening Program (NCSP) and the NBCSP.
- The aim of the programs is to reduce illness and death through early detection of pre-cancerous abnormalities and cancer and effective follow-up and treatment. Screening services are free to individuals in the target population (for breast and bowel screening) or they are covered by a Medicare rebate (for cervical screening).
- Note that, except where otherwise specified, rates are expressed per 100 people (not per 100,000 people as used in other chapters) and are often referred to as a percentage.
- Note, that the data presented may underestimate the level of screening occurring in Australia due to screening outside the program. For more information on cancer screening see *Cancer in Australia 2012* (AIHW 2012f).

BreastScreen Australia

About BreastScreen Australia

- Information on BreastScreen Australia was extracted from the AIHW web release of participation data (AIHW 2013b).
- BreastScreen Australia was established in 1991 and operates as a joint program of the Australian, state and territory governments.
- Women undergo routine mammographic screening to detect unsuspected breast cancer. If screening identifies suspicious signs then investigation occurs.
- BreastScreen Australia focuses on women aged 50–69 for 2-yearly screening mammograms, although women aged 40 and older are also eligible for testing under the program.
- Information on Indigenous status is collected on the BreastScreen Australia form. While self-reported data (in this instance, Indigenous status) are generally reliable (AIHW 2010b), there could be some Indigenous women who are incorrectly assigned to non-Indigenous status.
- Participation is measured over 2 years to align with the recommended screening interval (time between screening mammograms) of BreastScreen Australia.
- The participation rate is based on the number of women screened (not the number of screening mammograms performed) as a proportion of the target population.

Participation

Over 2010 and 2011, 36% of Aboriginal and Torres Strait Islander women in the target age group (50–69 years) participated in screening through BreastScreen Australia. This participation rate was lower than their non-Indigenous counterparts (54%) (Table 9.1). Participation rates for Indigenous women in BreastScreen Australia have historically been lower than for non-Indigenous women (Table D9.1). Sociodemographic factors including remoteness area, socioeconomic status and differences in age distribution and screening period can partly explain this (CA 2012).

Table 9.1: Participation in BreastScreen Australia by Indigenous status, females aged 50–69, 2010–2011

Indigenous status	Number[(a)]	ASR[(b)]
Indigenous	11,971	36.2
Non-Indigenous	1,341,869	53.9
Not stated	19,891	. .
Australia[(c)]	**1,373,731**	**54.6**

(a) The numbers of females aged 50–69 screened in the reporting period covering 1 January 2010 to 31 December 2011.

(b) Rates are the number of females screened as a percentage of the eligible female population calculated as the average of the ABS's estimated resident population and age-standardised to the Australian population at 30 June 2001 and are expressed per 100 population.

(c) Includes females screened for whom information on Indigenous status was not available.

Source: AIHW 2013b.

Many of the state and territory BreastScreen programs have developed, and continue to develop, strategies and initiatives to encourage greater participation by Aboriginal and Torres Strait Islander women (see BreastScreen Queensland 2009; BreastScreen SA 2003; BreastScreen WA 2008). Strategies include dedicated and appropriate communication resources, and block and group bookings for breast cancer screening for Aboriginal and Torres Strait Islander women. BreastScreen programs also liaise closely with Aboriginal and Torres Strait Islander health practitioners and Aboriginal and Torres Strait Islander community groups to increase the acceptance of screening.

Breast cancer detection following screening

The data in this section are for women who participated in breast cancer screening over 2010 and 2011. Reference to detection relates to screen-detected cancers and is reported by the number of all-size cancers and small (≤15 mm) cancers detected per 10,000 women screened. Detection of breast cancer is routinely disaggregated into first and subsequent screening rounds, as women are more likely to have a breast cancer detected at the first visit than in subsequent visits. This is because the first visit may result in the detection of prevalent cancers that have been present for some time, while subsequent visits pick up incident cancers that have grown between screens (Kavanagh et al. 1999). However, as a result of the relatively small numbers, cancer detection by Indigenous status is presented for all screening rounds combined.

All-size cancer detection

In 2010 and 2011, 73 Aboriginal and Torres Strait Islander women had a breast cancer detected through BreastScreen Australia (Table 9.2).

Table 9.2: All-size and small (≤15 mm) breast cancer detection by Indigenous status, females aged 50–69, 2010–2011

	Indigenous			Non-Indigenous		
Cancer size	Number[(a)]	AS Rate[(b)]	95% CI	Number[(a)]	AS Rate[(b)]	95% CI
Small (≤15 mm)	39	32.6	23.1–44.8	4,073	28.8	28.0–29.7
All-size	73	60.1	46.9–75.7	6,697	47.5	46.4–48.7

(a) The number of females aged 50–69 screened in the reporting period covering 1 January 2010 to 31 December 2011.

(b) Rates are the number of women with breast cancer detected per 10,000 women screened and directly age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Small-size cancer detection

Of the 73 Aboriginal and Torres Strait Islander women diagnosed with breast cancer, 39 were diagnosed with a breast cancer that was classified as small (≤15 mm) breast cancer. This represents 53% of all-size breast cancers diagnosed in Aboriginal and Torres Strait Islander women, which was significantly lower than the proportion of small breast cancers detected in non-Indigenous women (61%) (Table 9.3). This finding is in line with research that suggests that breast cancer in Indigenous women are diagnosed at a more advanced stage (Condon et al. 2003).

Small cancers are associated with increased treatment options (NBOCC 2009) and improved survival (AIHW & NBCC 2007).

Table 9.3: Proportion of breast cancers detected through BreastScreen Australia in women aged 50–69 that were small (≤15 mm), 2010–2011[a]

Indigenous status	Per cent[b]	95% CI[c]
Indigenous	53.4	52.3–54.6
Non-Indigenous	60.8	60.7–60.9

(a) The numbers of females aged 50–69 screened in the reporting period covering 1 January 2010 to 31 December 2011.

(b) Refers to the number of small (≤15 mm) invasive breast cancers detected as a proportion of all-size invasive breast cancers detected.

(c) Details of the method for calculating the 95% CI around the proportion are in Appendix B.

Source: AIHW analysis of BreastScreen Australia data.

National Cervical Screening Program

About the National Cervical Screening Program (NCSP)

- Information on the NCSP are sourced from *Cervical screening in Australia 2010–2011 (*AIHW 2013d).
- The NCSP was established in 1991.
- Women aged 20–69 are recommended to receive Papanicolaou smears (or Pap tests) every 2 years. Women should begin screening between 18 and 20 years or within 1 or 2 years of becoming sexually active, whichever is the later. Pap tests may cease at the age of 70 for women who have had two normal results within the last 5 years (DoHA 2012).
- These recommendations apply to women who have received the HPV vaccine as well as unvaccinated women.

Participation

Participation in NCSP by Indigenous status cannot be measured nationally as there is currently no mechanism for collecting Indigenous status in cervical cytology registries (AIHW 2013d). Currently the cytology and pathology tests do not contain questions on Indigenous status. While there are no national data on participation of Indigenous women in the NCSP, some research indicates that these women are under-screened (Coory et al. 2002, Binns & Condon 2006).

Queensland research found that for the period March 1999 to February 2001 the Indigenous participation rate was 30 percentage points lower than the non-Indigenous rate (Coory et al. 2002); while Northern Territory research found that between 1997 and 2004 the participation of Indigenous women in the NCSP was about half the national rate (Binns & Condon 2006). Both studies found that Indigenous women from rural and remote areas participated at lower rates than those from urban regions.

It has been recognised that Aboriginal and Torres Strait Islander women face cultural, linguistic and geographic barriers to cervical screening (DoHA 2004, Kirk et al. 1998). State and territory cervical screening programs have developed initiatives to increase participation of Indigenous women in cervical screening such as the employment of Aboriginal and Torres Strait Islander health practitioners and the development of principles, standards and guidelines for screening Aboriginal and Torres Strait Islander women (DoHA 2004). However, without being able to measure participation in cervical screening by Indigenous status, the overall effectiveness of these initiatives is not known.

National Bowel Cancer Screening Program

About the National Bowel Cancer Screening Program (NBCSP)

- Information on the NBCSP are sourced from *National Bowel Cancer Screening Program monitoring report*: *July 2011–June 2012* (AIHW 2013f).
- The NBCSP was implemented in 2006.
- Invitation packs are mailed out to eligible people. These packs include a free faecal occult blood test (FOBT) kit that enables a person to take a sample of their faeces for mailing to the program's pathology laboratory to be tested for traces of blood.
- The NBCSP targets men and women aged 50, 55 and 65, with 60 years being added in July 2013. By 2017–18, the NBCSP will move toward biennial screening for all Australians aged between 50 and 74 years.
- Identification of participants as Indigenous is not known at the time of invitation, and is only collected once a person becomes a participant. Therefore it is not possible to accurately determine the participation rate for this population group, as the number of Aboriginal and Torres Strait Islander people invited to participate is unknown.
- The pathologist classifies an FOBT as positive if blood is detected in the sample.
- Participants who have a positive FOBT test are recommended to have a colonoscopy procedure to look for polyps or cancerous growths in the bowel.
- A colonoscopy is considered the most accurate method to investigate the colon and rectum, as it enables biopsy and subsequent histopathological diagnosis and can be used for identification and removal of polyps and adenomas (ACN 2005).
- Removal of polyps at colonoscopy is a preventive measure that lowers the risk of future bowel cancers, as bowel cancers can initiate from polyps (Cappell 2005).

Participation

Between July 2011 and June 2012, 1,919 Aboriginal and Torres Strait Islander peoples participated in the NBCSP, representing 0.6% of all participants in this program (Table 9.4).

Table 9.4: National Bowel Cancer Screening Program participants, by Indigenous status and age, July 2011–June 2012

Indigenous status	50 years	55 years	65 years	Total
Indigenous	773	653	493	1,919
Non-Indigenous	98,904	103,676	110,307	312,887
Not stated	3,278	3,407	3,785	10,470
Australia	**102,955**	**107,736**	**114,585**	**325,276**

Note: NBCSP Indigenous status was reported by the participant on the returned Participant Details Form. Participants who did not indicate Indigenous status were included in the 'Not stated' column.

Source: AIHW 2013f.

It is not possible to determine participation rates by Indigenous status using the NBCSP data. However, the proportion of participants who identified as Indigenous in the NBCSP can be compared with the corresponding proportion from the 2011 Census. Comparison of the proportion of participants who identified as Indigenous in the NBCSP was lower than the comparable proportion identifying as Indigenous in the 2011 Census, indicating that not all eligible Indigenous Australians participated in this program (or choose not to identify) (Table 9.5). For Indigenous participants:

- a similar proportion of males and females participated in the NBCSP (0.6)
- the proportion who participated fell with increasing age. This pattern was evident for both males and females. This trend differed for non-Indigenous Australians where participation rates were relatively constant across age groups.

Table 9.5: Proportion of National Bowel Cancer Screening Program participants, compared with corresponding proportions from the 2011 Census, by Indigenous status, July 2011–June 2012

	NBCSP participants			2011 Census		
Age	**Indigenous**	**Non-Indigenous**	**Not stated**	**Indigenous**	**Non-Indigenous**	**Not stated**
			Males			
50 years	0.8	95.4	3.8	1.7	93.1	5.2
55 years	0.6	95.6	3.8	1.5	93.4	5.1
65 years	0.4	95.9	3.7	1.0	94.2	4.9
Total	**0.6**	**95.6**	**3.8**	**1.5**	**93.5**	**5.1**
			Females			
50 years	0.7	96.6	2.6	1.9	94.2	3.9
55 years	0.6	96.7	2.7	1.6	94.5	4.0
65 years	0.5	96.6	2.9	1.1	94.7	4.2
Total	**0.6**	**96.7**	**2.7**	**1.6**	**94.4**	**4.0**
			Persons			
50 years	0.8	96.1	3.2	1.8	93.7	4.5
55 years	0.6	96.2	3.2	1.5	93.9	4.5
65 years	0.4	96.3	3.3	1.0	94.4	4.5
Total[(a)]	**0.6**	**96.2**	**3.2**	**1.5**	**93.9**	**4.5**

(a) Total includes people aged 50, 55 and 65 years.

Notes

1. NBCSP percentages equal the number of people returning a completed FOBT who indicated their Aboriginal and Torres Strait Islander status as a proportion of all people returning an FOBT (regardless of whether they were correctly completed).
2. NBCSP Indigenous status was reported by the participant on the returned participant details form. Participants who did not indicate Indigenous status were included in the 'Not stated' column.
3. Indigenous status proportions as recorded at the 2011 Australian Census of Population and Housing are included for comparative purposes.

Source: AIHW 2013f.

Faecal occult blood test positivity rates

Overall, Indigenous participants had a higher proportion of positive faecal occult blood tests (FOBT) than non-Indigenous participants (10% compared with 7%); this pattern occurred for each age group and by sex, except for Indigenous females aged 65 years who had a lower positivity rate (Table 9.6). Participants who receive a positive FOBT result are encouraged to discuss this result with their doctor, who can refer them for a colonoscopy, if appropriate. For Indigenous participants:

- males were more likely to have a positive FOBT than females (11% compared with 9%).
- people aged 55 were more likely to have a positive FOBT result (12%), compared with those aged 50 (9%) and those aged 65 (9%).

Table 9.6: Faecal occult blood test positivity rates (%), by Indigenous status, July 2011–June 2012

Age	Indigenous	Non-Indigenous	Not stated	Total
		Males		
50 years	7.7	6.0	8.0	6.1
55 years	14.8[(a)]	7.1	9.9	7.2
65 years	11.0[(a)]	9.3	11.7	9.4
Total	**10.9**	**7.6**	**9.9**	**7.7**
		Females		
50 years	9.8	5.4	6.1	5.5
55 years	9.4	6.1	5.8	6.1
65 years	6.6[(a)]	7.5	8.3	7.6
Total	**8.8**	**6.4**	**6.8**	**6.4**
		Persons		
50 years	8.8	5.7	7.1	5.8
55 years	11.9	6.5	8.0	6.6
65 years	8.6	8.4	10.2	8.5
Total	**9.8**	**6.9**	**8.5**	**7.0**

(a) Based on numerator < 20 or denominator < 300; interpret with caution.

Notes

1. Positivity equals the number of participants with positive FOBT results as a percentage of the total number of participants with valid results. A valid result was either positive or negative; inconclusive results were excluded.
2. NBCSP Indigenous status was reported by the participant on the returned participant details form. Participants who did not indicate Indigenous status were included in the 'Not stated' column.

Source: AIHW 2013f.

Follow-up colonoscopy following a positive FOBT test

Of those Indigenous participants whose FOBT result was positive, over half (61%) were reported to have received a follow-up colonoscopy (Table 9.7). This was lower than the non-Indigenous follow-up colonoscopy rate (73%) but the reporting of colonoscopy procedures to the NBCSP register is not mandatory. Further, reporting of colonoscopies may differ between the public and private health-care sectors, which may affect comparisons if Indigenous and non-Indigenous groups use these services at different rates. Therefore this comparison should be interpreted with caution.

Table 9.7: Crude follow-up colonoscopy following a positive FOBT result, by Indigenous status, July 2011–June 2012

	Indigenous	Non-Indigenous	Not stated	Total
50 years	n.p.	70.8	45.7[(a)]	69.7
55 years	n.p.	72.7	53.9[(a)]	71.9
65 years	n.p.	74.3	57.5	73.6
Total	**60.7[(a)]**	**72.9**	**53.3**	**72.0**

(a) Based on numerator <20 or denominator <300; interpret with caution.

Notes

1. Percentages of colonoscopies performed equal the number of people who have had a colonoscopy recorded after a positive FOBT as a proportion of the total number of people with positive FOBT results.
2. Reporting of colonoscopy follow-up is not mandatory. Therefore, actual numbers of participant colonoscopies may be underestimated.
3. NBCSP Aboriginal and Torres Strait Islander status was reported by the participant on the returned participant details form. Participants who did not indicate Aboriginal and Torres Strait Islander status were included in the 'Not stated' column.

Source: AIHW 2013f.

10 Burden of disease due to cancer

Key findings

In 2003 in Australia, according to *The burden of disease and injury in Aboriginal and Torres Strait Islander Peoples 2003* report (Vos et al. 2007) which is the most recent Australian study looking at the burden of disease among Aboriginal and Torres Strait Islander peoples:

- 3.6% of total disease burden was in Aboriginal and Torres Strait Islander peoples, despite only comprising approximately 2.4% of the total Australian population.
- Cancer, as a group, accounted for 8% of all Aboriginal and Torres Strait Islander peoples disability-adjusted life years (DALYs).
- The rate of burden due to cancer in the Aboriginal and Torres Strait Islander population was 1.7 times the rate for the total Australian population.
- Indigenous females had a greater proportion of the cancer burden compared with Indigenous males (54% compared with 46%).
- Among individual cancer types, lung cancer was responsible for the greatest burden of disease for both Indigenous and the total Australian population.

The latest global burden of disease study was for 2010, but this did not include separate results for Indigenous Australians (Murray et al. 2012). The AIHW is currently undertaking a project funded by the Department of Health and Ageing (DoHA) and the Australian National Preventive Health Agency, which will deliver new burden of disease results for Indigenous and all Australians (AIHW 2013c).

About burden of disease

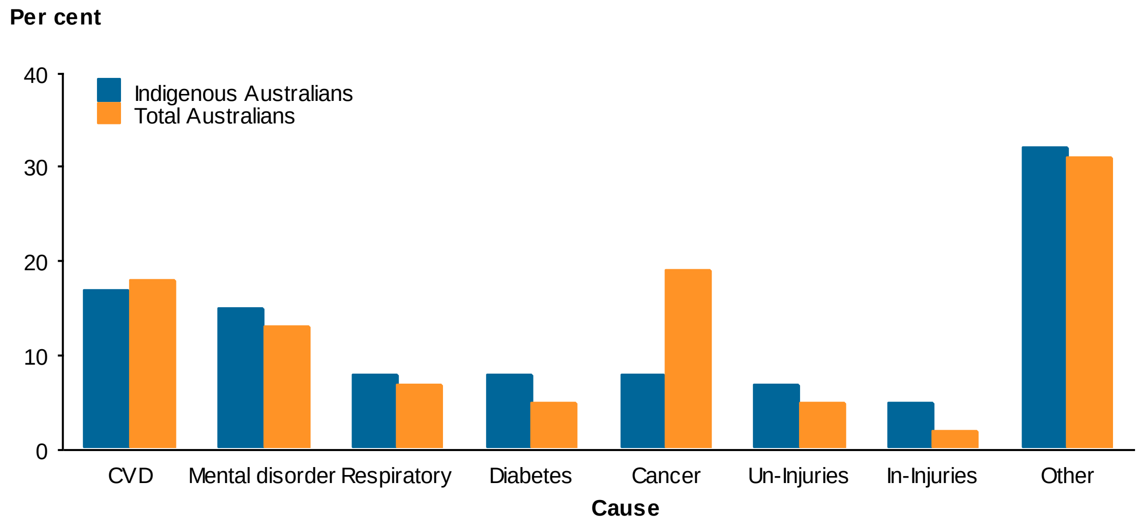
- Data were sourced from *The burden of disease and injury in Aboriginal and Torres Strait Islander Peoples 2003* report (Vos et al. 2007).
- One measure of burden of disease is DALYs, which estimate years of life lost due to premature death (YLL), as well as years of healthy life lost due to disability (YLD) from disease and injury. The more DALYs that are associated with a disease, the greater the burden.
- To illustrate this concept, a person who has been healthy throughout their life but who dies suddenly 20 years earlier than expected would be regarded as having lost 20 years of healthy life—20 DALYs, while a person who lives to an old age but has been only 'half-well' for 30 years, have 15 DALYs lost. See Appendix C for more information.
- Comparisons have been made throughout with the total Australian population (including Indigenous, non-Indigenous and those whose Indigenous identification was not stated). Data on DALYs have been adjusted for Indigenous under-identification.
- Data presented in this chapter are for disease burden in 2003. Although advanced statistical methods were used to produce the results, caution should be taken when interpreting these results, in part because of uncertainties about how incidence, mortality and other factors might be changing over time (AIHW 2012b).
- The global burden of disease for cancer in 2010 was 188,487 DALYs, which is a rate of 2,736 DALYs per 100,000 population. Cancer accounted for 7.6% of global DALYs, with the three most common cancers being trachea, bronchus and lung (accounting for 1.3%), liver (0.8%) and stomach (0.7%) (Murray et al. 2012).

All cancers combined

In 2003, the total disease burden in Aboriginal and Torres Strait Islander peoples accounted for 3.6% of the total burden of disease for Australians, despite representing only 2.4% of the Australian population.

Cancer contributed the equal third highest disease burden for Aboriginal and Torres Strait Islander peoples, accounting for 8% of all DALYs (Figure 10.1). In comparison, cancer was the leading cause of disease burden in the total Australian population, accounting for 19% of DALYs.

While cancer was responsible for a lower proportion of disease burden for Indigenous Australians than the total Australian population, the burden due to cancer in the Indigenous population was 1.7 times the burden in the total Australian population (Table 10.1).



Notes

1. Un-Injuries refers to unintentional injuries, In-Injuries refers to intentional injuries.
2 Total Australians includes Indigenous, non-Indigenous and Indigenous status not stated populations.
3. CVD stands for cardiovascular disease.
4. Data for this figure are shown in Table D10.1.

Source: Vos et al. 2007.

Figure 10.1: Leading causes of burden of disease, by Indigenous status, Australia, 2003

Sex

Aboriginal and Torres Strait Islander females experienced a greater proportion of the cancer burden than their male counterparts (54% compared with 46%) (Figure 10.2). Further, Indigenous females had a greater proportion of the cancer burden compared with females in the total Australian population (54% compared with 47%).

Burden due to YLL and YLD

The relatively poor prognosis from many cancers compared with other diseases generally means that most cancers are expected to contribute more YLL than YLD. For Indigenous Australians and the total Australian population, most of the burden due to cancer was due to premature death (94% and 82%, respectively).

Cancer type

The DALY rates for some cancers in the Indigenous population were higher than those in the total Australian population (Table 10.1). This applied to:

- mouth and oropharyngeal cancers (rate ratio 3.8)
- lung cancer (2.7)
- leukaemia (1.4).

The higher disease burden for mouth, oropharyngeal and lung cancers among Aboriginal and Torres Strait Islander peoples can largely be explained by the higher prevalence of risk factors such as smoking (Cunningham et al. 2008).

Table 10.1: Cancer DALYs for selected causes, Indigenous Australians and the total Australian population, 2003

	Indigenous Australians			Total Australians[(a)]			
Cancer type	**DALY**	**Per cent of total DALY**	**DALY rate per 1,000[(b)]**	**DALY**	**Per cent of total DALY**	**DALY rate per 1,000[(b)]**	**Rate ratio[(c)]**
Lung cancer	1,940	2.0	4.1	88,904	3.4	1.5	2.7
Breast cancer	725	0.8	1.5	60,654	2.3	1.4	1.1
Colorectal cancer	601	0.6	1.3	63,605	2.4	1.1	1.1
Mouth & oropharyngeal cancers	530	0.6	1.1	13,464	0.5	0.3	3.8
Leukaemia	358	0.4	0.8	19,956	0.8	0.5	1.4
Total cancer burden	**7,817**	**8.1**	**16.4**	**499,416**	**19.0**	**9.8**	**1.7**

(a) Includes Indigenous, non-Indigenous and Indigenous status not stated populations.

(b) Age-standardised to the total Indigenous Australian population, 2003.

(c) Indigenous Australians to total Australians rate ratio.

Source: Vos et al. 2007.

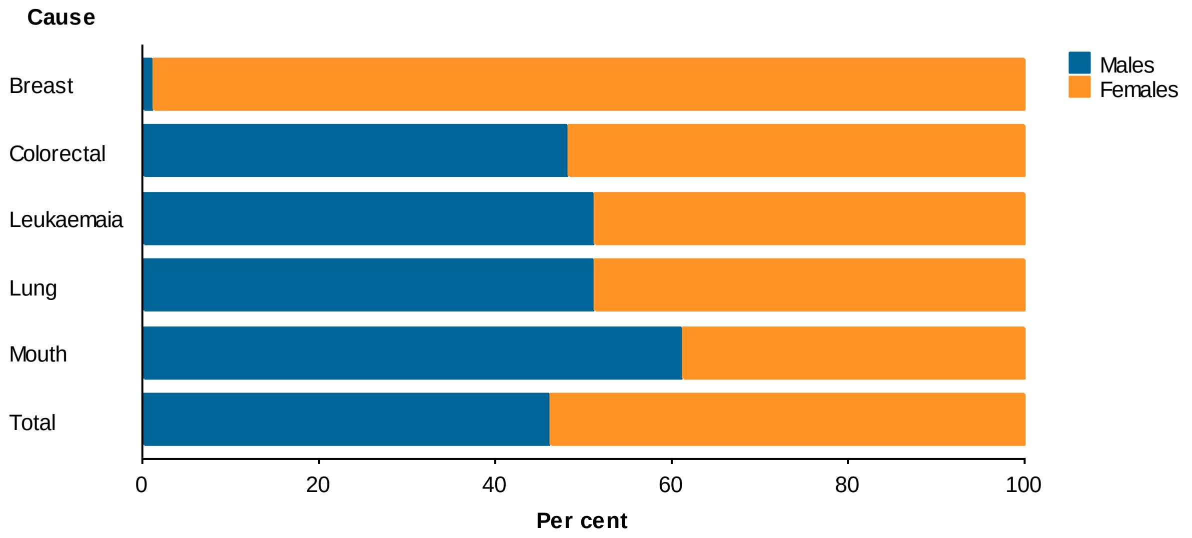
Sex

The top 20 causes of overall burden in Indigenous Australians differed from the total Australian population. Cancer types that were ranked differently in the Indigenous population than in the total Australian population (Table D10.2) include:

- lung cancer for Indigenous males (ranked twelfth compared with fourth)
- breast cancer for Indigenous females (ranked fourteenth compared with sixth).

When comparing within Indigenous Australians:

- Indigenous males experienced a greater proportion of the burden for mouth cancer (61% compared with 39%), lung cancer and leukaemia (both 51% compared with 49%) than Indigenous females. A similar pattern was found for lung cancer in total Australians (Begg et al. 2007)
- Indigenous females experienced a greater proportion of the burden for colorectal cancer (52% compared with 48%) compared with Indigenous males, which was the opposite pattern to what was found in total Australians (Begg et al. 2007).



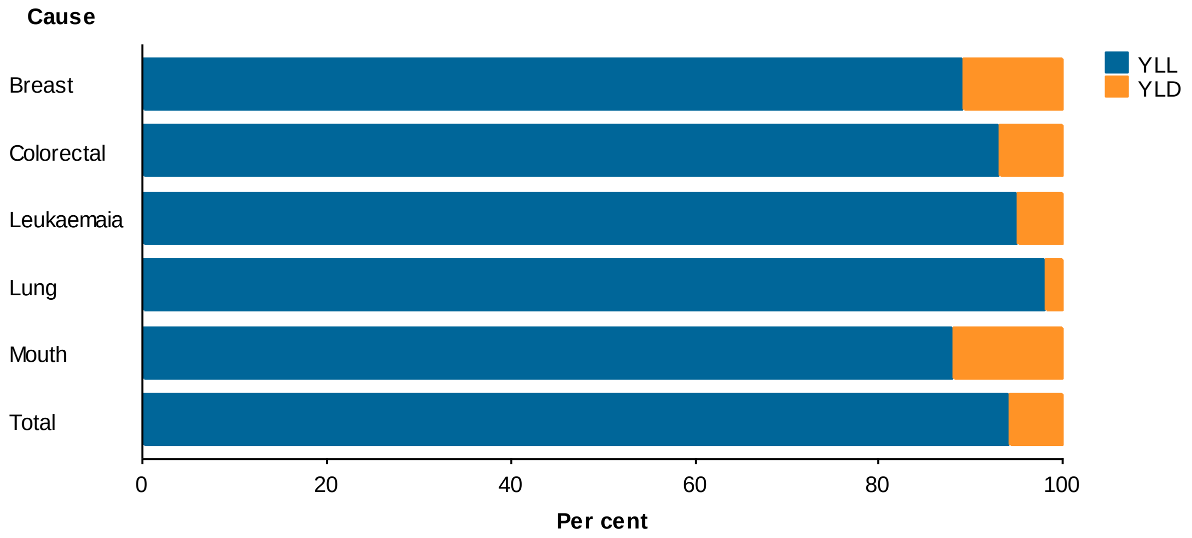
Note: Data for this figure are shown in Table D10.3.

Source: Vos T et al. 2007.

Figure 10.2: Contribution (%) of leading causes of cancer burden of disease, by sex, Aboriginal and Torres Strait Islander peoples, Australia, 2003

Burden due to YLL and YLD

For all leading individual cancers, most of the burden due to cancer was due to premature death (Figure 10.3). Note that the Vos et al. 2007 study did not provide a comparison with total Australians for individual cancer types. However, data analysis in Begg et al. 2007 found that most of the burden for total Australian population for individual cancer types was also due to premature death.



Note: Data for this figure are shown in Table D10.4.

Source: Vos et al. 2007.

Figure 10.3: Leading cancer causes of burden of disease, by fatal (YLL) and non-fatal (YLD) components, Aboriginal and Torres Strait Islander peoples, Australia, 2003

Appendix A: Classifications

Health classifications

International Statistical Classification of Diseases and Related Health Problems

The International Statistical Classification of Diseases and Related Health Problems (ICD) is used to classify diseases and other health problems (including symptoms and injuries) in clinical and administrative records. Mortality data in this report used the Tenth Revision (ICD-10). Cancers coded under the ICD classification system provide information on primary site or, for haematological cancers, histology.

International Statistical Classification of Diseases and Related Health Problems, Australian modification

The ICD-10 was modified for the Australian setting by the National Centre for Classification in Health (NCCH) with assistance from clinicians and clinical coders (referred to as the ICD-10-AM) (NCCH 2010). The ICD-10-AM has been used for classifying diagnoses in hospital records in all states and territories since 1999–00 (AIHW 2000) and is comparable with the ICD-10 at the higher levels.

Area-based classifications

Australian Standard Geographical Classification Remoteness Area

The Australian Standard Geographical Classification Remoteness Area (ASGC RA) was used to assign areas across Australia to a remoteness category (ABS 2006). This classification divides all areas into five categories: *Major cities*, *Inner regional*, *Outer regional*, *Remote* and *Very remote* (AIHW 2004). For this report, some of these categories were collapsed due to the small number of cases in these subgroups.

Appendix B: Statistical methods and technical notes

Age-specific rates

Age-specific rates provide information on the incidence of a particular event in an age group relative to the total number of people at risk of that event in the same age group. It is calculated by dividing the number of cases occurring in each specified age group by the corresponding population in the same age group, expressed as a rate (for example, number per 100,000 population).

Age-standardised rates

Age-standardisation is a method used to eliminate the effect of differences in population age structures when comparing populations with different age structures, and where age affects the variable being compared. This is the case with cancer, which occurs more often among older Australians. Age-standardisation is used in this report when comparing rates across different periods of time, different geographical areas, different socioeconomic groups or other different populations, including Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians.

Calculating age-standardised rates

There are two methods commonly used to adjust for age: direct and indirect standardisation. In this report, age-standardised rates are calculated using the direct standardisation approach presented by Jensen and colleagues (1991). To age-standardise using the direct method, the first step is to get population numbers and numbers of cases (or deaths) in age ranges—typically 5-year age ranges. The next step is to multiply the age-specific population numbers for the standard population (in this case the Australian population as at 30 June 2001) by the age-specific incidence rates (or death rates) for the population of interest (such as those who lived in *Major cities*). The next step is to sum across the age groups and divide this sum by the total of the standard population to give an age-standardised rate for the population of interest. Finally, this is expressed per 1,000 or 100,000 as appropriate.

The indirect standardisation approach is used to calculate expected number of cancer cases, deaths and hospitalisations in Aboriginal and Torres Strait Islander peoples in Australia. See *Observed and expected numbers*.

Calculating age-standardised average length of stay (ALOS)

Calculating age-standardised ALOS is a three-step process. Within each population of interest, the crude ALOS for each age category is derived first by dividing the number of patient days for each age category by the corresponding number of hospitalisations. The second step is to calculate the weights using the selected standard population. The weights are derived by dividing the number of hospitalisations for each age category by the overall total of the standard population. The standard population chosen is the Australian overnight hospitalisations population in 2006–07 to 2010–11 where the principal diagnosis was cancer (ICD-10-AM codes of C00–C97, D45, D47.1 and D47.3). The third step is to multiply the crude ALOS with the corresponding weights and then sum up to get the total age-standardised ALOS.

Confidence intervals

The observed value of a rate may vary because of the influence of chance and natural variation. Therefore to provide an approximate indication of whether two rates are statistically different, 95% confidence intervals (CIs) or prediction interval can be calculated, and significant differences highlighted.

A 95% CI describes a span of numbers around the estimate which has a 95% chance of including the true value. A narrow CI indicates good precision or little random error and, conversely, a wider CI indicates poorer precision.

When comparing two groups, if the two CIs do not overlap, the reader can be confident that the difference between the groups is probably real, and not due to chance. Note, however, that overlapping CIs do not necessarily mean that the difference between two rates is definitely due to chance. Instead, an overlapping CI represents a difference in rates that is too small to allow differentiation between a real difference and one which is due to chance variation. It can, therefore, only be stated that no statistically significant differences were found, and not that no differences exist. Note that, while rates for Indigenous Australians often differ from those for non-Indigenous Australians, the smaller population of Aboriginal and Torres Strait Islander peoples in Australia has led to broader CIs that may overlap the CIs for non-Indigenous rates.

The variances of the age-specific rates were calculated by assuming that the counts follow a Poisson distribution, as recommended in Jensen et al. (1991) and Breslow and Day (1987). When the age-specific rates are low relative to the population at risk, the variability in the observed counts is accepted to be Poisson. However, even if the age-specific rates are not low, Poisson distribution is still generally assumed (Brillinger 1986; Eayres et al. 2008).

With one exception as mentioned in details below, the CIs of the age-standardised rates in this report were calculated using a method developed by Dobson et al. (1991). This method calculates approximate CIs for a weighted sum of Poisson parameters.

Note that statistical independence of observations is assumed in the calculations of the CIs for this report. This assumption may not always be valid for episode-based data (such as data from the NHMD).

Calculating CIs around the proportion of cancers detected through BreastScreen Australia that were small (≤15 mm) compared with all size

Relative standard error of estimates (number and ratio)

The relative standard error (RSE) of an estimate is a measure of the percentage errors likely to have occurred due to sampling. The RSE of an estimate is calculated as follows:

$$\mathrm{RSE(X)\%} = \left(\frac{\mathrm{SE}}{\mathrm{Estimate}}\right) \times 100$$

Caution should be used when a RSE is between 25% and 50% and estimates with a RSE above 50% are considered unreliable.

The RSE for the proportion was derived from the standard error of both the estimate for the numerator (X) and the denominator (Y) as follows:

$$\mathrm{RSE}\left(\frac{\mathrm{X}}{\mathrm{Y}}\right) = \sqrt{\mathrm{RSE(X)}^2 - \mathrm{RSE(Y)}^2}$$

where X is a subset of Y and Y is an estimate of the number of people in a group.

CI for estimates (number and ratio)

The 95% CI around the proportion estimates (P) or number estimates was derived as follows:

$$\mathrm{UCL} = \mathrm{X} + 1.96 \times \mathrm{SE}(\mathrm{X})$$

$$\mathrm{LCL} = \mathrm{X} - 1.96 \times \mathrm{SE}(\mathrm{X})$$

$$\mathrm{UCL} = \mathrm{P} + 1.96 \times \mathrm{SE}\left(\frac{\mathrm{X}}{\mathrm{Y}}\right)$$

$$\mathrm{LCL} = \mathrm{P} - 1.96 \times \mathrm{SE}\left(\frac{\mathrm{X}}{\mathrm{Y}}\right)$$

where UCL = upper confidence limit

LCL = lower confidence limit

As with all statistical comparisons, care should be exercised in interpreting the results. A non-significant difference between two rates may indicate no true difference, or could indicate that numbers of observations are too small to detect a true statistically significant difference. Judgment should be exercised in deciding whether the size of the difference observed is of practical importance.

Hazard ratio

Hazard ratios are generated from the Cox proportional hazards regression that is used for person-time data multivariable modelling, although they are essentially the same as rate ratios (see *Cox proportional hazards regression analysis* and *Rate ratio*). A hazard ratio indicates how many times higher the probability of a condition or event is in one group of people exposed to the factor of interest than in another group of people who are not exposed to the same factor, after adjusting for other factors in the model. This gives an indication of the strength of the association and can help decide whether the factor of interest could be a cause of a condition or event.

In this report, hazard ratios are presented in the multivariate survival analysis section. Individuals diagnosed with cancer between 2003 and 2007 were followed to date of death or to the 31 December 2010, whichever came first. Hazard ratios were calculated using the Cox proportional hazards regression model, adjusting for other factors which are highly correlated with Indigenous status such as age, sex and residential remoteness. A hazard ratio exceeding 1 suggests that people with that factor have worse survival compared with the reference group. Ninety-five per cent CIs are presented as an indication of accuracy. If the interval for a factor does not cross the value 1 then it can be safely interpreted as being of significant impact (Kalbfleisch & Prentice 1980).

Mortality-to-incidence ratio

Mortality-to-incidence ratios (MIRs) can be used to estimate survival from a particular disease for a population. The MIR is defined as the age-standardised mortality rate divided by the age-standardised incidence rate. For example, an MIR of 0.42 in a given year for all types of cancers means that for every 100 new cancer cases diagnosed that year, there were 42 deaths due to cancer in the same year (though the deaths need not be of the same people as the cases). If people generally die from their cancer, and do so relatively soon after diagnosis (that is, the death rate is nearly as high as the incidence rate for that cancer), then the MIR will be closer to 1.00. In contrast, if people tend to survive a long time after being diagnosed, then the MIR will be closer to zero.

The MIR only gives a valid measure of the survival experience in a population if:

- cancer registration and death registration are complete or nearly so, and
- the incidence rate, mortality rate and survival proportion are not undergoing rapid changes that affect the MIR.

Note that, in Chapter 5, the age-standardised mortality rate and incidence rate used for calculating MIR are different from the rates reported in incidence and mortality chapters, which derived from data with different inclusions. The MIR for Aboriginal and Torres Strait Islander peoples was calculated using the age-standardised mortality rate and incidence rate for all cancers combined between 2004 and 2008, derived from the NMD and ACD. Data are restricted to New South Wales, Queensland, Western Australia and the Northern Territory, which are considered to be of sufficient completeness and quality for reporting in both the NMD and the ACD. MIRs for countries and regions including Australia were calculated using data from GLOBOCAN database (Ferlay et al. 2010). Caution must be taken when interpreting these data from different sources.

All the mortality and incidence rates used for calculating MIRs were age-standardised to the Doll et al. (1966) World Standard Population. The data for all cancers combined pertain to cancers coded in ICD-10 as C00–C97, excluding C44 (that is, non-melanoma skin cancer), and therefore encompass a narrower range of cancers than is generally considered in this report (see Appendix C).

When comparing data from different countries use caution since a number of factors may influence observed differences. These factors include the underlying number of cancer cases or deaths, differences in the composition of the populations, cancer detection and screening, types of treatment provided and access to treatment services, and cancer coding and registration practices. In Australia, all states and territories have legislation that makes cancer a notifiable disease (see Appendix C) and the completeness of cancer data is relatively high in comparison to a number of countries or regions (Curado et al. 2007).

Observed and expected numbers

Another way to express the differences in cancer statistics between Aboriginal and Torres Strait Islander peoples in Australia and other population groups is to compare the observed numbers and expected numbers, which shows the differences according to the age distribution of Aboriginal and Torres Strait Islander peoples. A positive number of the difference between observed and expected numbers indicates an excess, while a negative number indicates that there were lower numbers than expected. In this report, comparisons of observed and expected numbers are made for cancer cases, cancer deaths and hospitalisations due to cancer.

The expected numbers are equivalent to those used in indirect age-standardisation method, which are derived from age-specific rates from a standard population to the age distribution of the study population. In this report, the study population is Aboriginal and Torres Strait Islander peoples in Australia, and the standard population is another population group—namely, non-Indigenous Australians for cancer cases and cancer deaths and other Australians for hospitalisations due to cancer (see Box 1.2 in Chapter 1 for more information on population groups used throughout this report).

For example, to calculate the expected number of cancer cases in Aboriginal and Torres Strait Islander peoples in Australia, the first step is to obtain age-specific cancer incidence rates in the standard population (in this case, non-Indigenous Australians). The second step is to obtain the population in each age group in the study population (in this case the population of Aboriginal and Torres Strait Islander peoples in Australia). The third step is to calculate the expected number of cases in each age group by multiplying each age-specific incidence rate in the age group in non-Indigenous Australians by the population in each corresponding age group in Indigenous Australians. The final step is to sum across the expected number of cases in each age group.

Prevalence

In this report, limited-duration prevalence for 5, 10 and 26 years is presented. The main prevalence measure is 5-year prevalence and this refers to the number of persons alive at the end of 2007 that had been diagnosed with the cancer type under consideration in Australia during the 5-year period from 2003 to the end of 2007.

In this report, 26-year prevalence is the longest duration that can be calculated based on the earliest (1982) and latest (2007) years of available incidence data. People who were diagnosed with cancer between 1982 and 2007 and who were alive on 31 December 2007 would be counted in 26-year prevalence. It is presented in this report as an approximation of the number of people alive who have ever been diagnosed with cancer, known as *complete prevalence*. Limited-duration prevalence was selected given its advantages in the ease of interpretation and calculation. Given that most cancers are diagnosed in the later years of life, 26 years was deemed a sufficiently long period for approximating complete prevalence.

Note that prevalence is measured by the number of people diagnosed with cancer, not the number of cancer cases. An individual who was diagnosed with two separate cancers will contribute separately to the prevalence of each cancer. Yet this individual will contribute only once to prevalence of all cancers combined. For this reason, the sum of prevalence for individual cancers will not equal the prevalence of all cancers combined.

Rate ratio

The rate ratio measures the relative difference between two population groups (for example, Indigenous and non-Indigenous Australians). It can be calculated based on crude rates, age-standardised rates and cumulative rates. Ratios greater than 1 indicate an excess in population group A, while ratios less than 1 indicate an excess in population group B.

Survival

All survival statistics in this report were produced using SAS statistical software.

Relative survival

Relative survival is a measure of the survival of people with cancer compared with survival in the general population. It is calculated by dividing observed survival by expected survival which refers to the proportion of people in the general population alive for a given amount of time and is calculated from life tables of the entire Australian population, assumed to be cancer-free. The numerator and denominator have been matched for age, sex, calendar year, and where applicable, remoteness and socioeconomic status.

Crude survival

Crude survival (CS) is simply observed survival which refers to the proportion of people alive for a given amount of time after a diagnosis of cancer and is calculated from population-based cancer data. CS was used because the Indigenous life tables are currently unavailable, which prevents the calculation of expected survival for the general Indigenous population (which serves as the denominator for relative survival estimates). Crude survival statistics are calculated using software written by Dickman (2004).

The cohort and period methods of survival analysis

CS estimates have traditionally been calculated using the cohort method and this was chosen as the primary method for this report. In this method, a cohort of patients diagnosed with cancer is followed over time to estimate the proportion surviving for a selected time frame (e.g. 1, 5 or 10 years).

An alternative approach to calculating survival estimates is the period method, developed by Brenner and Gefeller in 1996. This method calculates survival using a given follow-up or at-risk period. Survival estimates are based on the survival experience of people who were diagnosed before or during this period, and who were at risk of dying during this period. By its nature the period method is likely to produce more up-to-date estimates of survival than the cohort method.

Multivariate survival analysis: Cox proportional hazards regression analysis

Multivariable modelling is used to estimate the strength of the relationship of the factor of interest and a condition or event, while controlling for potential confounders. One of the common statistical modelling techniques of multivariate survival analysis is Cox proportional hazards regression analysis, which is used to assess the importance of various covariates in the survival times of individuals. The survival statistics generated from the model are presented as hazard ratios (see *Hazard ratio*).

In this report, a Cox proportional hazards regression analysis model was used to compare the risk of death (from any cause) of Indigenous Australians diagnosed with cancer with that for non-Indigenous Australians. The modelling was performed using SAS statistical software. This model controlled for the effect of factors which are highly correlated with Indigenous status and were available in the database, such as age, sex and residential remoteness. However, it should be noted that individual screening or testing behaviours which might confound the survival analyses could not be considered (for example, participating in breast, cervical or bowel screening programs, or undergoing PSA testing for prostate cancer) due to these variables not being available in the data set analysed.

Appendix C: Data sources

To provide a comprehensive picture of national cancer statistics in this report, a range of data sources were used, including AIHW and external data sources. These data sources are described in this appendix.

Australian Cancer Database

The Australian Cancer Database (ACD) contains information on Australians who were diagnosed with cancer (other than basal cell and squamous cell carcinomas of the skin) between 1982 and 2009. The AIHW compiles and maintains the ACD, in partnership with the Australasian Association of Cancer Registries. Data from this source are used in chapters 3, 5 and 6.

Cancer is a notifiable disease, meaning that each Australian state and territory has legislation that makes the reporting of all cancers (excluding basal cell and squamous cell carcinomas of the skin) mandatory. The registration of cases of cancer is a dynamic process such that records in the state and territory cancer registries may be modified if new information is received. Thus, records in the cancer registries are always open and they are updated as required. As a result, the number of cancer cases reported by the AIHW for any particular year may change slightly over time (AIHW 2012f).

The data in the ACD are protected physically, electronically with built-in computer security systems and legislatively under the *Australian Institute of Health and Welfare Act 1987* as well as under agreements with the state and territory cancer registries. More information about physical security and legislative protection of the ACD is in the National Cancer Statistics Clearing House protocol (AIHW 2010c).

The Data Quality Statement for the Australian Cancer database 2009 can be found on the AIHW website at <http://meteor.aihw.gov.au/content/index.phtml/itemId/500417>.

BreastScreen Australia data

Data from BreastScreen Australia were used in Chapter 9 to indicate the number of Aboriginal and Torres Strait Islander women and non-Indigenous women who had a screening mammogram and the number of cancers detected through BreastScreen Australia. These data are supplied annually to the AIHW by state and territory BreastScreen programs for monitoring purposes. They are compiled by the AIHW and reports are produced annually (AIHW 2012e).

The Data Quality Statement for the BreastScreen Australian data 2010–2011 can be found on the AIHW website at < http://meteor.aihw.gov.au/content/index.phtml/itemId/510961>.

Burden of disease data

Disability-adjusted life year, or DALY, quantifies the gap between a population’s actual health status and some ‘ideal’ or reference status, with time (either lived in health states or lost through premature death and illness) being the unifying ‘currency’ for combining the impact of mortality and non-fatal health outcomes.

A DALY for a disease or health condition is calculated as the sum of the years of life lost due to premature mortality (YLL) in the population and the equivalent 'healthy' years lost due to disability (YLD) for incident cases of the health condition. For example, if a person who has been healthy all their life suddenly dies of a heart attack 20 years early than expected, there is 20 years of healthy life lost—20 DALYs. For a person who lives to a normal old age but has been only 'half-well' for 30 years, there are 15 DALYs lost.

Estimates on DALYs for the Australian population can be found in *The burden of disease and injury in Australia* report (Begg et al. 2007). The *Global Burden of Disease Study 2010* (Murray et al. 2012) provides more recent estimates on DALYs. However, neither of these two studies provides information on burden of disease for Indigenous Australians. The AIHW is currently undertaking a project to revise and update Australia's burden of disease estimates, which will deliver new burden of disease results for Indigenous and non-indigenous Australians (AIHW 2013c).

The burden of disease data in this report were sourced from the most recent Australian study looking at the burden of disease in Aboriginal and Torres Strait Islander peoples — *The burden of disease and injury in Aboriginal and Torres Strait Islander Peoples 2003* report (Vos et al. 2007), which provides 2003 data. Data on the burden of disease in Aboriginal and Torres Strait Islander peoples due to cancer are in Chapter 10 of this report.

Disease expenditure database

The disease expenditure database provides costs that are derived by combining information from the AIHW National Hospital Morbidity Database (NHMD), the AIHW Public Hospitals Establishments Database (PHED) and an external data source, the National Hospital Costs Data Collection. The methodologies used to derive the estimated costs in Chapter 8 are similar but are not the same as those used to derive the estimates in the AIHW Disease expenditure database. For this report, it was necessary to adjust the estimates for Indigenous under-identification. In addition, the AIHW Disease expenditure database has been designed to cover whole health system costs of which hospitalisation costs are one component.

Further information on the Disease expenditure database including its limitations can be found in the Data Quality Statement <http://meteor.aihw.gov.au/content/index.phtml/itemId/512599>.

GLOBOCAN

The GLOBOCAN database, which is prepared by the International Agency for Research on Cancer (IARC), contains cancer incidence and mortality data from cancer registries around the world (Ferlay et al. 2010). The IARC uses these data to produce estimates for a 'common year'. The most recent GLOBOCAN estimates for which data could be obtained are for 2008, with these estimates based on incidence data from about 3–5 years earlier. GLOBOCAN data are presented in Chapter 5 of this report for all cancers combined.

For the GLOBOCAN data, all cancers combined were defined as those coded as 'C00 to C97' in ICD-10, with the exception of code C44 which indicates non-melanoma skin cancer. Thus the definition used in those data is different from that used in most other sections of this report.

In the GLOBOCAN database, age-standardised incidence and mortality rates are provided, with the data standardised to the 1966 WHO World Standard Population.

National Bowel Cancer Screening Program data

Data from the National Bowel Cancer Screening Register were used in Chapter 9 to indicate the number of Indigenous and non-Indigenous Australians who participated in the National Bowel Cancer Screening Program (NBCSP) as well as to indicate the number of positive screening results. These data are supplied twice a year to the AIHW by the Department of Human Services (formerly Medicare Australia) for monitoring purposes. They are compiled by the AIHW and reports are produced annually (AIHW 2013f).

The Data Quality Statement for the Australian Cancer database 2009 can be found on the AIHW website at <http://meteor.aihw.gov.au/content/index.phtml/itemId/500678>.

National Death Index

Cancer incidence data were linked to the National Death Index (NDI) to provide survival and prevalence information (chapters 5 and 6). The NDI is a database that is maintained by the AIHW; it contains information on all deaths in Australia since 1980. This database exists solely for linkage purposes for health and medical research, such as to gain mortality information on individuals in a particular cohort, or with a known disease state. Ethics approval is required for the NDI to be used for any particular research project.

The Data Quality Statement for the NDI can be found on the AIHW website at <http://meteor.aihw.gov.au/content/index.phtml/itemId/480010>.

National Hospital Morbidity Database

Chapter 7 of this report used data from the National Hospital Morbidity Database (NHMD) to examine the number of cancer-related hospitalisations. The NHMD is compiled from data supplied by the state and territory health authorities. It is a collection of electronic confidentialised summary records for hospitalisations (that is, episodes of admitted patient care) in essentially all public and private hospitals in Australia. The data include demographic, administrative and clinical information, including patient diagnoses and other procedures

Information on the NHMD on Indigenous status is considered of sufficient quality for analysis purposes for New South Wales, Victoria, Queensland, South Australia, Western Australia and the Northern Territory (public hospitals only). National totals include these six jurisdictions only.

The hospitalisations data in this report exclude those hospitalisations for which the care type was reported as newborn (unqualified days only), or records for hospital boarder or posthumous organ procurement. Thus, it includes all other admitted care hospitalisations, including those with a care type of acute care, rehabilitation care and palliative care.

The Data Quality Statement for the NHMD can be found on the AIHW website at <http://meteor.aihw.gov.au/content/index.phtml/itemId/511338>.

National Mortality Database

Registration of deaths is the responsibility of the state and territory Registrars of Births, Deaths and Marriages. The ABS then collates and codes these data. The mortality data used in this report were provided by the Registries of Births, Deaths and Marriages, the ABS and the National Coroners Information System. These data are maintained at the AIHW in the National Mortality Database (NMD).

Data from the NMD are used in Chapter 4 to provide statistical information on mortality in Indigenous and non-Indigenous Australians due to cancer.

In the NMD, both the year of *occurrence* of the death and the year in which the death was *registered* are provided. For this report, mortality data are shown based on the year of *occurrence*, except for the most recent year (namely, 2011) where the number of people whose death was *registered* is used. This is because in some instances, deaths may not be registered in the same year in which they occur.

The Data Quality Statement for the NMD can be found here: <http://www.abs.gov.au/Ausstats/abs@.nsf/0/D4A300EE1E04AA43CA2576E800156A24?OpenDocument>.

Population data

The ABS estimated (mid-year) resident population data were used to calculate rates throughout this report. These data were sourced from *ABS Australian demographic statistics* (cat. No. 3101.0) (ABS 2012a) as at 27 September 2012. Relevant years and states were selected based on numerator data availability.

For the Indigenous comparisons, the ABS Indigenous experimental estimated (mid-year) resident populations were used (ABS 2009a). Those estimates were based on the 2006 Census of Population and Housing. Relevant years and states were selected based on numerator data availability.

Appendix D: Additional tables

Additional tables for Chapter 3: Incidence of cancer

Table D3.1: The 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

	Indigenous				Non-Indigenous			
Cancer site/type	**Number**	**Ranking**	**ASR**	**95% CI**	**Number**	**Ranking**	**ASR**	**95% CI**
Lung (C33–C34)	603	1	79.8	72.7–87.2	28,998	4	43.0	42.5–43.5
Breast in females(C50)	438	2	82.1	73.8–91.0	35,851	3	103.6	102.5–104.7
Bowel (C18–C20)	348	3	47.8	42.1–53.9	39,725	2	58.8	58.2–59.4
Prostate (C61)	291	4	105.2	91.5–120.2	47,404	1	147.6	146.2–148.9
Unknown primary site (C77–C80)	167	5	23.6	19.6–28.2	8,329	7	12.2	12.0–12.5
Non-Hodgkin lymphoma (C82–C85)	125	6	14.2	11.3–17.5	10,945	6	16.3	16.0–16.6
Cervix (C53)	121	7	18.0	14.5–22.0	2,185	22	6.5	6.3–6.8
Uterus (C54–C55)	120	8	24.4	19.8–29.7	5,243	13	14.9	14.5–15.3
Liver (C22)	118	9	15.3	12.3–18.9	3,429	18	5.1	4.9–5.3
Pancreas (C25)	110	10	15.2	12.1–18.8	7,046	8	10.4	10.1–10.6
All cancers combined[(a)]	**3,875**	**. .**	**460.8**	**443.8–478.2**	**292,949**	**. .**	**434.4**	**432.8–436.0**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Notes

1. Full list of cancer types can be found in online supplementary Table G3.1.
2. Top 10 rankings of Indigenous, non-Indigenous and All Australians can be found in online supplementary Table G3.2.
3. Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

Source: AIHW Australian Cancer Database 2009.

Table D3.2: Age-specific incidence rates for the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

	Indigenous			Non-Indigenous		
Age group	**Number**	**Age-specific rate**	**95% CI**	**Number**	**Age-specific rate**	**95% CI**
			Lung (C33–C34)			
<45	31	1.7	1.2–2.4	535	1.3	1.2–1.5
45–54	123	65.8	54.7–78.5	2,113	23.7	22.7–24.8
55–64	198	196.7	170.3–226.1	6,108	86.5	84.3–88.7
65–74	168	375.9	321.2–437.2	9,132	207.1	202.9–211.4
75+	83	406.5	323.8–503.9	11,109	285.5	280.2–290.8
			Breast in females (C50)			
<45	92	10.3	8.3–12.6	4,909	25.1	24.4–25.8
45–54	128	131.9	110.0–156.8	8,746	195.6	191.6–199.8
55–64	113	212.2	174.9–255.2	9,552	273.1	267.6–278.6
65–74	80	320.9	254.4–399.4	6,637	296.4	289.3–303.6
75+	25	199.8	129.3–294.9	6,007	262.2	255.6–268.9
			Bowel (C18–C20)			
<45	42	2.3	1.7–3.1	1,441	3.6	3.4–3.8
45–54	62	33.2	25.4–42.5	3,553	39.9	38.6–41.3
55–64	90	89.4	71.9–109.9	8,285	117.3	114.8–119.8
65–74	91	203.6	163.9–250.0	11,747	266.4	261.6–271.3
75+	63	308.6	237.1–394.8	14,699	377.7	371.6–383.9
			Prostate (C61)			
<45	. .	. .	. .	195	1.0	0.8–1.1
45–54	25	27.8	18.0–41.0	3,335	75.3	72.8–77.9
55–64	104	219.4	179.2–265.8	14,357	402.6	396.0–409.2
65–74	107	541.4	443.7–654.2	16,643	767.0	755.4–778.8
75+	55	695.9	524.3–905.9	12,874	804.4	790.5–818.4
			Unknown primary site (C77–C80)			
<45	20	1.1	0.7–1.7	234	0.6	0.5–0.7
45–54	30	16.0	10.8–22.9	571	6.4	5.9–7.0
55–64	40	39.7	28.4–54.1	1,193	16.9	15.9–17.9
65–74	43	96.2	69.6–129.6	1,886	42.8	40.9–44.8
75+	34	166.5	115.3–232.7	4,445	114.2	110.9–117.6
			Non-Hodgkin lymphoma (C82–C85)			
<45	37	2.0	1.4–2.8	1,162	2.9	2.8–3.1
45–54	22	11.8	7.4–17.8	1,388	15.6	14.8–16.4
55–64	26	25.8	16.9–37.8	2,292	32.4	31.1–33.8
65–74	24	53.7	34.4–79.9	2,580	58.5	56.3–60.8
75+	16	78.4	44.8–127.3	3,523	90.5	87.6–93.6

(continued)

Table D3.2 (continued): Age-specific incidence rates for the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

	Indigenous			Non-Indigenous		
Age group	**Number**	**Age-specific rate**	**95% CI**	**Number**	**Age-specific rate**	**95% CI**
Cervix (C53)						
<45	64	7.1	5.5–9.1	876	4.5	4.2–4.8
45–54	31	31.9	21.7–45.3	438	9.8	8.9–10.8
55–64	12	22.5	11.6–39.4	316	9.0	8.1–10.1
65–74	9	36.1	16.5–68.5	247	11.0	9.7–12.5
75+	5	40.0	13.0–93.2	308	13.4	12.0–15.0
Uterus (C54–C55)						
<45	20	2.2	1.4–3.4	288	1.5	1.3–1.7
45–54	33	34.0	23.4–47.8	832	18.6	17.4–19.9
55–64	35	65.7	45.8–91.4	1,578	45.1	42.9–47.4
65–74	22	88.2	55.3–133.6	1,317	58.8	55.7–62.1
75+	10	79.9	38.3–146.9	1,228	53.6	50.6–56.7
Liver (C22)						
<45	15	0.8	0.5–1.4	164	0.4	0.4–0.5
45–54	25	13.4	8.7–19.7	538	6.0	5.5–6.6
55–64	30	29.8	20.1–42.5	722	10.2	9.5–11.0
65–74	31	69.4	47.1–98.4	846	19.2	17.9–20.5
75+	17	83.3	48.5–133.3	1,159	29.8	28.1–31.5
Pancreas (C25)						
<45	6	0.3	0.1–0.7	160	0.4	0.3–0.5
45–54	24	12.8	8.2–19.1	503	5.7	5.2–6.2
55–64	35	34.8	24.2–48.4	1,317	18.6	17.7–19.7
65–74	24	53.7	34.4–79.9	1,897	43.0	41.1–45.0
75+	21	102.9	63.7–157.2	3,169	81.4	78.6–84.3
All cancers combined[(a)]						
<45	763	42.2	39.2–45.3	24,793	62.5	61.7–63.3
45–54	815	435.8	406.4–466.8	35,028	393.6	389.5–397.7
55–64	975	968.7	908.8–1031.4	65,690	929.9	922.8–937.1
65–74	836	1,870.4	1,745.8–2,001.6	75,797	1,719.2	1,707.0–1,731.5
75+	486	2,380.3	2,173.3–2,601.6	91,640	2,354.9	2,339.7–2,370.2

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Note: The rates are expressed per 100,000 population.

Source: AIHW Australian Cancer Database 2009.

Table D3.3: Age-standardised incidence rates for the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, by sex, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

	Indigenous			Non-Indigenous		
Sex	**Number**	**ASR**	**95% CI**	**Number**	**ASR**	**95% CI**
			Lung (C33–C34)			
Males	341	109.4	96.0–123.9	18,186	58.6	57.7–59.5
Females	262	58.8	51.3–67.1	10,812	30.1	29.6–30.7
			Breast in females (C50)			
Males	. .	. .	. .	. .	. .	. .
Females	438	82.1	73.8–91.0	35,851	103.6	102.5–104.7
			Bowel (C18–C20)			
Males	188	55.5	46.2–65.8	21,988	70.0	69.1–71.0
Females	160	41.3	34.4–49.1	17,737	48.9	48.2–49.7
			Prostate cancer (C61)			
Males	291	105.2	91.5–120.2	47,404	147.6	146.2–148.9
Females	. .	. .	. .	. .	. .	. .
			Unknown primary site (C77–C80)			
Males	81	26.4	19.8–34.2	4,447	14.8	14.3–15.2
Females	86	21.5	16.6–27.3	3,882	10.1	9.8–10.5
			Non-Hodgkin lymphoma (C82-C85)			
Males	75	19.1	13.8–25.5	6,056	19.2	18.7–19.7
Females	50	10.4	7.3–14.3	4,889	13.7	13.3–14.1
			Cervix (C53)			
Males	. .	. .	. .	. .	. .	. .
Females	121	18.0	14.5–22.0	2,185	6.5	6.3–6.8
			Uterus (C54–C55)			
Males	. .	. .	. .	. .	. .	. .
Females	120	24.4	19.8–29.7	5,243	14.9	14.5–15.3
			Liver (C22)			
Males	76	21.3	15.9–27.8	2,431	7.7	7.4–8.0
Females	42	10.4	7.1–14.5	998	2.7	2.6–2.9
			Pancreas (C25)			
Males	60	16.3	11.7–21.8	3,655	11.8	11.4–12.2
Females	50	13.8	9.9–18.6	3,391	9.1	8.8–9.4
			All cancers combined(a)			
Males	1,931	549.1	519.1–580.1	165,103	524.7	522.2–527.3
Females	1,944	399.9	379.8–420.8	127,846	361.0	359.0–363.0

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Note: Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

Source: AIHW Australian Cancer Database 2009.

Table D3.4: Age-standardised incidence rates for the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, by remoteness area, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

	Indigenous			Non-Indigenous		
Remoteness area	**Number**	**ASR**	**95% CI**	**Number**	**ASR**	**95% CI**
Lung (C33–C34)						
Major cities	160	40.4	34.1–47.4	18,583	20.4	20.0–20.7
Inner regional	106	39.9	32.4–48.5	6,524	21.2	20.6–21.8
Outer regional	151	48.7	41.0–57.5	3,100	22.2	21.3–23.1
Remote and very remote	182	45.2	38.6–52.6	647	26.1	24.0–28.4
Breast in females (C50)						
Major cities	145	66.7	55.9–79.0	24,579	80.2	79.1–81.3
Inner regional	91	62.5	49.9–77.2	7,527	77.1	75.2–79.1
Outer regional	110	66.4	54.2–80.4	3,304	71.5	68.8–74.2
Remote and very remote	94	43.3	34.6–53.4	607	73.7	67.7–80.0
Bowel (C18–C20)						
Major cities	123	29.6	24.4–35.5	25,482	29.5	29.0–29.9
Inner regional	78	28.3	22.2–35.6	9,304	31.8	31.0–32.6
Outer regional	81	25.7	20.2–32.1	4,108	30.4	29.4–31.5
Remote and very remote	62	14.7	11.1–19.1	722	30.9	28.5–33.4
Prostate (C61)						
Major cities	98	57.6	46.5–70.6	29,922	76.8	75.8–77.8
Inner regional	81	62.2	49.1–77.7	11,571	81.3	79.6–83.1
Outer regional	66	48.4	37.0–62.0	4,781	67.5	65.4–69.7
Remote and very remote	44	22.7	16.2–30.7	892	67.1	62.5–71.9
Unknown primary site (C77–C80)						
Major cities	36	8.5	5.9–11.9	5,382	5.4	5.2–5.6
Inner regional	18	7.1	4.1–11.3	1,902	5.8	5.5–6.1
Outer regional	37	11.3	7.9–15.7	849	5.7	5.3–6.2
Remote and very remote	75	17.1	13.3–21.6	151	6.0	5.0–7.1
Non-Hodgkin lymphoma (C82-C85)						
Major cities	44	9.6	6.8–13.1	7,289	9.7	9.5–10.0
Inner regional	25	8.6	5.5–13.0	2,395	9.8	9.4–10.3
Outer regional	29	8.3	5.3–12.1	1,012	9.0	8.3–9.6
Remote and very remote	28	5.6	3.6–8.3	206	9.5	8.2–11.0
Cervix (C53)						
Major cities	24	9.9	6.1–15.0	1,523	5.5	5.2–5.8
Inner regional	19	13.2	7.8–20.7	391	5.2	4.6–5.8
Outer regional	34	18.4	12.7–25.9	207	5.3	4.5–6.2
Remote and very remote	44	17.4	12.4–23.5	49	6.3	4.6–8.4

(continued)

Table D3.4 (continued): Age-standardised incidence rates for the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, by remoteness area, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

	Indigenous			Non-Indigenous		
Remoteness area	**Number**	**ASR**	**95% CI**	**Number**	**ASR**	**95% CI**
			Uterus (C54–C55)			
Major cities	32	14.2	9.6–20.2	3,510	9.8	9.5–10.2
Inner regional	15	11.9	6.5–19.7	1,130	9.5	8.8–10.1
Outer regional	29	18.5	12.2–26.8	502	9.4	8.4–10.3
Remote and very remote	43	20.2	14.4–27.5	91	10.3	8.1–12.7
			Liver (C22)			
Major cities	37	9.1	6.3–12.7	2,520	3.2	3.1–3.4
Inner regional	10	3.8	1.7–7.2	550	2.2	2.0–2.4
Outer regional	28	8.7	5.7–12.7	295	2.4	2.1–2.8
Remote and very remote	41	8.9	6.3–12.3	46	1.9	1.3–2.5
			Pancreas (C25)			
Major cities	34	8.5	5.8–12.0	4,699	5.0	4.9–5.2
Inner regional	19	7.1	4.2–11.3	1,502	4.8	4.5–5.1
Outer regional	30	9.8	6.5–14.1	676	4.5	4.1–4.9
Remote and very remote	26	6.4	4.1–9.4	133	5.4	4.5–6.5
			All cancers combined(a)			
Major cities	1,139	269.3	253.2–286.1	191,504	252.5	251.2–253.8
Inner regional	734	258.5	239.3–278.7	65,285	256.7	254.3–259.1
Outer regional	924	284.6	265.9–304.3	29,175	243.0	239.7–246.2
Remote and very remote	1,059	245.3	230.1–261.3	5,662	260.0	252.8–267.3

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Note: Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

Source: AIHW Australian Cancer Database 2009.

Table D3.5: Number of observed, expected and excess new cases of the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008

Cancer site/type	Observed number	Expected number	Excess cases[(a)]
Lung (C33–C34)	603	288	315
Breast in females(C50)	438	574	–136
Bowel (C18–C20)	348	419	–71
Prostate (C61)	291	462	–171
Unknown primary site (C77–C80)	167	76	91
Non-Hodgkin lymphoma (C82–C85)	125	144	–19
Cervix (C53)	121	46	75
Uterus (C54–C55)	120	70	50
Liver (C22)	118	41	77
Pancreas (C25)	110	68	42
All cancers combined[(b)]	**3,875**	**3,662**	**213**

(a) Excess new cases are the observed new cases minus the expected new cases.

(b) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Note: The expected numbers are based on the indirect age-standardisation method.

Source: AIHW Australian Cancer Database 2009.

Additional tables for Chapter 4: Mortality from cancer

Table D4.1: Age-standardised mortality rates of the 10 leading causes of cancer deaths among Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

	Indigenous				Non-Indigenous			
Cancer site/type	**Number**	**Ranking**	**ASR**	**95% CI**	**Number**	**Ranking**	**ASR**	**95% CI**
Lung (C33–C34)	549	1	63.6	57.5–70.0	27,678	1	33.2	32.8–33.6
Liver (C22)	145	2	17.2	14.0–20.8	4,289	9	5.2	5.0–5.3
Breast in females (C50)	140	3	27.5	22.5–33.1	9,586	4	21.4	21.0–21.9
Unknown primary site (C77–C80)	131	4	15.7	12.6–19.1	8,119	5	9.6	9.4–9.8
Bowel (C18–C20)	118	5	13.4	10.7–16.5	13,644	2	16.2	15.9–16.5
Pancreas (C25)	112	6	12.9	10.3–16.0	7,938	6	9.4	9.2–9.7
Oesophagus (C15)	106	7	10.8	8.5–13.4	4,020	12	4.8	4.6–4.9
Prostate (C61)	72	8	30.6	22.8–39.9	10,754	3	29.9	29.3–30.5
Stomach (C16)	65	9	7.4	5.4–9.9	3,674	13	4.4	4.2–4.5
Cervix (C53)	52	10	7.1	5.2–9.5	793	27	1.8	1.7–2.0
All cancers combined[(a)]	**2,197**	. .	**251.7**	**239.4–264.4**	**144,791**	. .	**172.4**	**171.5–173.3**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.

Notes

1. Full list of cancer types can be found in online supplementary Table D4.2.
2. Top 10 rankings of Indigenous, non-Indigenous and All Australians can be found in online supplementary Table G4.3.
3. Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.
4. Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.

Source: AIHW National Mortality Database.

Table D4.2: Age-specific mortality rates for the 10 leading causes of cancer deaths among Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

	Indigenous			Non-Indigenous		
Age group	**Number**	**Age-specific rate**	**95% CI**	**Number**	**Age-specific rate**	**95% CI**
Lung (C33–C34)						
<45	34	1.7	1.2–2.3	345	0.8	0.7–0.8
45–54	101	45.4	36.9–55.1	1,693	16.2	15.4–16.9
55–64	147	115.5	97.6–135.7	5,045	58.0	56.4–59.6
65–74	175	315.9	270.8–366.3	8,162	148.5	145.3–151.7
75+	92	458.7	369.8–562.5	12,433	360.5	354.2–366.9
Liver (C22)						
<45	11	0.5	0.3–1.0	108	0.2	0.2–0.3
45–54	27	12.1	8.0–17.6	452	4.3	3.9–4.7
55–64	42	33.0	23.8–44.6	825	9.5	8.8–10.1
65–74	39	70.4	50.1–96.2	1,093	19.9	18.7–21.1
75+	26	129.6	84.7–189.9	1,811	52.5	50.1–55.0
Breast in females (C50)						
<45	23	2.3	1.5–3.4	572	2.5	2.3–2.7
45–54	29	24.9	16.7–35.8	1,372	26.0	24.6–27.4
55–64	33	48.9	33.6–68.6	2,038	46.8	44.8–48.9
65–74	25	81.1	52.5–119.8	1,954	70.0	66.9–73.2
75+	30	249.4	168.3–356.1	3,650	191.7	185.5–198.0
Unknown primary site (C77–C80)						
<45	12	0.6	0.3–1.0	141	0.3	0.3–0.4
45–54	19	8.5	5.1–13.3	446	4.3	3.9–4.7
55–64	35	27.5	19.2–38.2	1,004	11.5	10.8–12.3
65–74	43	77.6	56.2–104.6	1,792	32.6	31.1–34.1
75+	22	109.7	68.7–166.1	4,736	137.3	133.4–141.3
Bowel (C18–C20)						
<45	16	0.8	0.5–1.3	358	0.8	0.7–0.9
45–54	15	6.7	3.8–11.1	856	8.2	7.6–8.7
55–64	34	26.7	18.5–37.3	2,158	24.8	23.8–25.9
65–74	33	59.6	41.0–83.7	3,330	60.6	58.5–62.7
75+	20	99.7	60.9–154.0	6,942	201.3	196.6–206.1
Pancreas (C25)						
<45	3	0.2	0.0–0.4	126	0.3	0.2–0.3
45–54	26	11.7	7.6–17.1	499	4.8	4.4–5.2
55–64	31	24.4	16.5–34.6	1,340	15.4	14.6–16.2
65–74	31	56.0	38.0–79.4	2,105	38.3	36.7–40.0
75+	21	104.7	64.8–160.0	3,868	112.2	108.6–115.7

(continued)

Table D4.2 (continued): Age-specific mortality rates for the 10 leading causes of cancer deaths among Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

	Indigenous			Non-Indigenous		
Age group	Number	Age-specific rate	95% CI	Number	Age-specific rate	95% CI
Oesophagus (C15)						
<45	6	0.3	0.1–0.6	78	0.2	0.1–0.2
45–54	27	12.1	8.0–17.6	312	3.0	2.7–3.3
55–64	39	30.6	21.8–41.9	773	8.9	8.3–9.5
65–74	22	39.7	24.9–60.1	1,070	19.5	18.3–20.7
75+	12	59.8	30.9–104.5	1,787	51.8	49.4–54.3
Prostate (C61)						
<45	n.p.	n.p.	n.p.	4	0.0	0.0–0.0
45–54	n.p.	n.p.	n.p.	82	1.6	1.3–2.0
55–64	13	21.8	11.6–37.2	692	15.9	14.7–17.1
65–74	22	89.5	56.1–135.5	2,052	75.9	72.6–79.2
75+	34	423.4	293.2–591.7	7,924	513.1	501.8–524.5
Stomach (C16)						
<45	11	0.5	0.3–1.0	146	0.3	0.3–0.4
45–54	8	3.6	1.6–7.1	300	2.9	2.5–3.2
55–64	21	16.5	10.2–25.2	577	6.6	6.1–7.2
65–74	13	23.5	12.5–40.1	804	14.6	13.6–15.7
75+	12	59.8	30.9–104.5	1,847	53.6	51.1–56.1
Cervix (C53)						
<45	20	2.0	1.2–3.1	120	0.5	0.4–0.6
45–54	10	8.6	4.1–15.8	135	2.6	2.1–3.0
55–64	12	17.8	9.2–31.0	167	3.8	3.3–4.5
65–74	n.p.	n.p.	n.p.	122	4.4	3.6–5.2
75+	n.p.	n.p.	n.p.	249	13.1	11.5–14.8
All cancers combined[(a)]						
<45	248	12.3	10.8–13.9	4,392	9.5	9.3–9.8
45–54	394	176.9	159.9–195.3	9,630	91.9	90.0–93.7
55–64	570	447.8	411.8–486.1	22,779	261.7	258.3–265.1
65–74	588	1,061.5	977.4–1150.8	34,890	634.6	628.0–641.3
75+	397	1,979.3	1789.3–2183.9	73,096	2,119.5	2104.2–2134.9

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.

Notes

1. The rates are expressed per 100,000 population.
2. Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.

Source: AIHW National Mortality Database.

Table D4.3: Age-standardised mortality rates for the 10 leading causes of cancer deaths among Aboriginal and Torres Strait Islander peoples, by sex, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

	Indigenous			Non-Indigenous		
Sex	**Number**	**ASR**	**95% CI**	**Number**	**ASR**	**95% CI**
			Lung (C33–C34)			
Males	312	89.7	77.8–102.7	17,160	45.1	44.5–45.8
Females	237	45.8	39.5–52.7	10,518	23.5	23.1–24.0
			Liver (C22)			
Males	95	23.1	17.6–29.5	2,890	7.5	7.2–7.8
Females	50	12.4	8.8–16.9	1,399	3.0	2.9–3.2
			Breast in females (C50)			
Males	. .	. .	. .	. .	. .	. .
Females	140	27.5	22.5–33.1	9,586	21.4	21.0–21.9
			Unknown primary site (C77–C80)			
Males	67	18.2	13.0–24.3	4,257	11.4	11.1–11.7
Females	64	13.8	10.2–18.2	3,862	8.0	7.8–8.3
			Bowel (C18–C20)			
Males	60	15.3	10.9–20.8	7,568	20.0	19.6–20.5
Females	58	12.0	8.7–16.0	6,076	13.0	12.7–13.3
			Pancreas (C25)			
Males	55	12.3	8.6–16.8	4,129	10.8	10.4–11.1
Females	57	13.0	9.5–17.3	3,809	8.2	7.9–8.5
			Oesophagus (C15)			
Males	73	17.1	12.4–22.7	2,912	7.6	7.3–7.8
Females	33	6.0	4.0–8.7	1,108	2.3	2.2–2.5
			Prostate (C61)			
Males	72	30.6	22.8–39.9	10,754	29.9	29.3–30.5
Females	. .	. .	. .	. .	. .	. .
			Stomach (C16)			
Males	39	10.4	6.5–15.4	2,310	6.1	5.9–6.4
Females	26	5.2	3.1–8.1	1,364	2.9	2.8–3.1
			Cervix (C53)			
Males	. .	. .	. .	. .	. .	. .
Females	52	7.1	5.2–9.5	793	1.8	1.7–2.0
			All cancers combined[(a)]			
Males	1,137	305.2	283.3–328.1	82,591	220.0	218.5–221.5
Females	1,060	214.4	199.8–229.6	62,200	135.4	134.3–136.5

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.

Notes

1. Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.
2. Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.

Source: AIHW National Mortality Database.

Table D4.4: Number of observed, expected and excess cancer deaths of the 10 leading causes of cancer deaths among Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2007–2011

Cancer site/type	Observed number	Expected number	Excess deaths[(a)]
Lung (C33–C34)	549	106	443
Liver (C22)	145	14	131
Breast in females (C50)	140	127	13
Unknown primary site (C77–C80)	131	34	97
Bowel (C18–C20)	118	58	60
Pancreas (C25)	112	34	78
Oesophagus (C15)	106	9	97
Prostate (C61)	72	5	67
Stomach (C16)	65	14	51
Cervix (C53)	52	12	40
All cancers combined[(b)]	**2,197**	**1,459**	**738**

(a) Excess deaths are the observed deaths minus the expected deaths.

(b) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.

Notes

1. Mortality data for 2007–2009 are final, 2010 are revised and 2011 are preliminary. Data for 2010 and 2011 are subject to revision.
2. The expected deaths are based on the indirect age-standardisation method.

Source: AIHW National Mortality Database.

Additional tables for Chapter 5: Survival after a diagnosis of cancer

Table D5.1: One-year and five-year crude survival for the 10 most commonly diagnosed cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

	Indigenous		Non-Indigenous	
Cancer site/type	**CS (%)**	**95% CI**	**CS (%)**	**95% CI**
		1-year crude survival		
Lung (C33–C34)	26.8	24.0–29.6	35.6	35.2–36.0
Breast in females (C50)	91.6	89.2–93.5	96.0	95.8–96.1
Bowel (C18–C20)	75.0	71.0–78.6	78.9	78.5–79.2
Prostate (C61)	86.2	81.9–89.6	92.5	92.3–92.7
Unknown primary site (C77–C80)	14.1	11.3–17.2	17.2	16.7–17.7
Non-Hodgkin lymphoma (C82–C85)	65.2	57.5–71.9	76.2	75.6–76.8
Cervix (C53)	72.7	66.0–78.4	85.7	84.5–86.8
Uterus (C54–C55)	85.1	78.8–89.7	90.0	89.3–90.6
Liver (C22)	21.1	15.9–26.9	32.9	31.7–34.1
Pancreas (C25)	11.0	7.6–15.3	19.7	19.0–20.3
All cancers combined[(a)]	**60.8**	**59.6–62.0**	**74.0**	**73.8–74.1**
		5-year crude survival		
Lung (C33–C34)	7.4	5.8–9.2	10.7	10.4–11.0
Breast in females (C50)	69.9	66.1–73.3	81.3	81.0–81.6
Bowel (C18–C20)	46.8	42.3–51.2	52.9	52.5–53.2
Prostate (C61)	62.5	56.7–67.7	72.0	71.6–72.4
Unknown primary site (C77–C80)	6.6	4.6–9.0	8.3	7.9–8.6
Non-Hodgkin lymphoma (C82–C85)	49.2	41.2–56.7	55.4	54.6–56.1
Cervix (C53)	51.2	44.1–57.9	67.2	65.7–68.7
Uterus (C54–C55)	66.3	58.4–73.1	72.2	71.2–73.1
Liver (C22)	n.p.	n.p.	12.1	11.3–13.0
Pancreas (C25)	n.p.	n.p.	4.1	3.8–4.5
All cancers combined[(a)]	**40.2**	**38.9–41.5**	**51.9**	**51.7–52.0**

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Note: Survival for liver and pancreatic cancer are not shown due to data quality issues.

Source: AIHW Australian Cancer Database 2007.

Table D5.2: Five-year crude survival for the 10 most commonly diagnosed cancers among Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

Age group (years)	Indigenous		Non-Indigenous	
	CS (%)	95% CI	CS (%)	95% CI
Lung (C33–C34)				
<50	n.p.	n.p.	20.9	19.2–22.6
50–59	9.9	6.6–13.9	16.2	15.3–17.1
60–69	6.9	4.4–10.2	13.9	13.3–14.5
70+	5.5	3.1–8.7	7.0	6.7–7.3
Breast in females (C50)				
<50	74.9	68.7–80.2	88.3	87.7–88.8
50–59	71.5	64.2–77.5	88.3	87.8–88.8
60–69	74.4	65.9–81.1	86.7	86.1–87.3
70+	48.8	38.5–58.3	62.1	61.3–62.9
Bowel (C18–C20)				
<50	44.0	34.7–53.0	66.9	65.5–68.3
50–59	48.1	38.3–57.3	65.6	64.6–66.5
60–69	55.8	46.6–63.9	61.9	61.2–62.7
70+	39.5	31.2–47.6	42.7	42.2–43.2
Prostate (C61)				
<50	n.p.	n.p.	91.6	89.7–93.1
50–59	74.1	59.8–83.9	91.5	90.9–92.1
60–69	77.2	68.6–83.7	85.9	85.4–86.4
70+	41.4	32.3–50.3	55.1	54.5–55.7
Unknown primary site (C77–C80)				
<50	n.p.	n.p.	30.6	27.8–33.4
50–59	n.p.	n.p.	20.3	18.5–22.1
60–69	n.p.	n.p.	12.8	11.8–13.9
70+	n.p.	n.p.	3.6	3.4–3.9
Non-Hodgkin lymphoma (C82–C85)				
<50	66.7	53.9–76.8	80.6	79.1–82.0
50–59	50.5	32.6–66.0	74.9	73.3–76.4
60–69	46.6	30.1–61.6	63.2	61.7–64.8
70+	n.p.	n.p.	33.8	32.8–34.9
Cervix (C53)				
<50	60.4	51.4–68.2	82.5	80.8–84.2
50–59	48.6	31.8–63.5	67.2	63.3–70.8
60–69	n.p.	n.p.	58.5	54.1–62.6
70+	n.p.	n.p.	34.1	30.8–37.6

(continued)

Table D5.2 (continued): Five-year crude survival for the 10 most commonly diagnosed cancers among Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

Age group (years)	Indigenous		Non-Indigenous	
	CS (%)	95% CI	CS (%)	95% CI
		Uterus (C54–C55)		
<50	76.6	59.4–87.3	87.3	84.9–89.3
50–59	83.8	69.0–91.9	86.5	85.0–88.0
60–69	61.2	45.3–73.7	77.5	75.7–79.2
70+	n.p.	n.p.	53.4	51.5–55.2
		Liver (C22)		
<50	n.p.	n.p.	28.3	24.7–32.1
50–59	n.p.	n.p.	21.2	18.6–23.9
60–69	n.p.	n.p.	12.8	11.0–14.7
70+	n.p.	n.p.	5.1	4.3–6.0
		Pancreas (C25)		
<50	n.p.	n.p.	17	14.1–20.2
50–59	n.p.	n.p.	7.4	6.1–8.9
60–69	n.p.	n.p.	5.8	4.9–6.7
70+	n.p.	n.p.	1.9	1.7–2.2
		All cancers combined(a)		
<50	57.3	54.9–59.6	78.1	77.8–78.4
50–59	38.5	35.9–41.1	67.6	67.2–67.9
60–69	36.7	34.2–39.3	58.9	58.6–59.2
70+	22.5	20.3–24.8	33.7	33.5–33.9

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin

Source: AIHW Australian Cancer Database 2007.

Table D5.3: Five-year crude survival for the 10 most commonly diagnosed cancers among Aboriginal and Torres Strait Islander peoples, by sex, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

	Indigenous		Non-Indigenous	
Sex	**CS (%)**	**95% CI**	**CS (%)**	**95% CI**
		Lung (C33–C34)		
Males	8.0	5.9–10.5	9.5	9.1–9.8
Females	6.5	4.2–9.3	13.1	12.6–13.6
		Breast in females (C50)		
Males	. .	. .	. .	. .
Females	69.9	66.1–73.3	81.3	81.0–81.6
		Bowel (C18–C20)		
Males	44.7	38.3–50.8	51.8	51.3–52.3
Females	49.1	42.5–55.4	54.2	53.6–54.7
		Prostate (C61)		
Males	62.5	56.7–67.7	72.0	71.6–72.4
Females	. .	. .	. .	. .
		Unknown primary site (C77–C80)		
Males	n.p.	n.p.	9.5	9.0–10.1
Females	n.p.	n.p.	6.9	6.5–7.4
		Non-Hodgkin lymphoma (C82–C85)		
Males	50.7	40.4–60.2	54.6	53.6–55.6
Females	47.0	34.3–58.8	56.4	55.3–57.4
		Cervix (C53)		
Males	. .	. .	. .	. .
Females	51.2	44.1–57.9	67.2	65.7–68.7
		Uterus (C54–C55)		
Males	. .	. .	. .	. .
Females	66.3	58.4–73.1	72.2	71.2–73.1
		Liver (C22)		
Males	n.p.	n.p.	12.3	11.3–13.4
Females	n.p.	n.p.	11.6	10.0–13.2
		Pancreas (C25)		
Males	n.p.	n.p.	3.9	3.5–4.4
Females	n.p.	n.p.	4.3	3.9–4.9
		All cancers combined(a)		
Males	34.3	32.5–36.0	48.2	48.0–48.4
Females	45.8	44.0–47.6	56.4	56.2–56.6

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Source: AIHW Australian Cancer Database 2007.

Table D5.4: Five-year crude survival for the 10 most commonly diagnosed cancers among Aboriginal and Torres Strait Islander peoples, by remoteness area, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

	Indigenous		Non-Indigenous	
Remoteness area	**CS (%)**	**95% CI**	**CS (%)**	**95% CI**
		Lung (C33–C34)		
Major cities	7.7	4.7–11.6	11.2	10.9–11.6
Inner regional	n.p.	n.p.	10.4	9.8–10.9
Outer regional	7.2	4.5–10.8	8.2	7.5–9.0
Remote and very remote	8.8	5.7–12.6	10.8	8.9–12.9
		Breast in females (C50)		
Major cities	77.3	70.9–82.4	81.8	81.4–82.2
Inner regional	70.2	61.3–77.5	80.5	79.8–81.2
Outer regional	66.0	57.3–73.3	78.9	77.8–80.0
Remote and very remote	63.8	55.9–70.6	80.7	77.9–83.2
		Bowel (C18–C20)		
Major cities	53.9	45.7–61.4	53.8	53.4–54.3
Inner regional	51.9	41.2–61.5	51.5	50.7–52.3
Outer regional	46.7	37.7–55.1	49.6	48.4–50.8
Remote and very remote	32.7	23.9–41.8	52.0	48.8–55.1
		Prostate (C61)		
Major cities	74.4	65.1–81.6	73.4	72.9–73.8
Inner regional	49.7	36.6–61.6	70.0	69.3–70.8
Outer regional	60.2	48.3–70.2	68.6	67.4–69.7
Remote and very remote	57.8	43.2–69.9	73.8	71.0–76.4
		Unknown primary site (C77–C80)		
Major cities	n.p.	n.p.	7.9	7.5–8.3
Inner regional	n.p.	n.p.	8.9	8.1–9.7
Outer regional	n.p.	n.p.	8.5	7.4–9.7
Remote and very remote	6.2	3.8–9.4	10.2	7.4–13.5
		Non-Hodgkin lymphoma (C82–C85)		
Major cities	51.4	36.6–64.3	55.5	54.6–56.4
Inner regional	n.p.	n.p.	54.9	53.3–56.4
Outer regional	51.9	33.2–67.7	54.5	52.0–56.9
Remote and very remote	35.4	22.9–48.1	61.3	55.0–67.0
		Cervix (C53)		
Major cities	58.3	42.1–71.4	67.5	65.6–69.2
Inner regional	54.5	35.8–69.9	65.3	61.6–68.6
Outer regional	56.5	43.5–67.5	66.1	61.1–70.6
Remote and very remote	37.2	25.2–49.1	76.8	65.7–84.7

(continued)

Table D5.4 (continued): Five-year crude survival for the 10 most commonly diagnosed cancers among Aboriginal and Torres Strait Islander peoples, by remoteness area, New South Wales, Queensland, Western Australia and the Northern Territory, 1999–2007

	Indigenous		Non-Indigenous	
Remoteness area	**CS (%)**	**95% CI**	**CS (%)**	**95% CI**
		Uterus (C54–C55)		
Major cities	61.5	43.3–75.4	72.6	71.3–73.8
Inner regional	77.7	54.9–89.9	70.5	68.3–72.5
Outer regional	61.0	46.2–72.9	72.8	69.4–75.8
Remote and very remote	69.8	55.3–80.4	76.2	67.4–83.0
		Liver (C22)		
Major cities	n.p.	n.p.	13.4	12.4–14.5
Inner regional	n.p.	n.p.	9.1	7.3–11.2
Outer regional	n.p.	n.p.	6.3	4.4–8.8
Remote and very remote	n.p.	n.p.	11.8	5.5–20.7
		Pancreas (C25)		
Major cities	n.p.	n.p.	4.6	4.2–5.1
Inner regional	n.p.	n.p.	3.1	2.5–3.8
Outer regional	n.p.	n.p.	3.3	2.4–4.3
Remote and very remote	n.p.	n.p.	n.p.	n.p.
		All cancers combined[(a)]		
Major cities	49.4	47.0-51.9	52.5	52.4-52.7
Inner regional	44.5	41.3-47.6	50.8	50.5-51.1
Outer regional	35.5	33.0-38.0	49.4	48.9-49.9
Remote and very remote	32.2	30.0-34.5	54.4	53.3-55.5

(a) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Source: AIHW Australian Cancer Database 2007.

Table D5.5: Cox proportional hazards regression analysis, hazard ratio of death from any cause, all persons diagnosed with lung cancer, diagnosed between 2003 and 2007 and followed until death or 31 December 2010 (whichever came first), New South Wales, Queensland, Western Australia and the Northern Territory

Factors	Number	Hazard ratio	95% CI
Indigenous status			
Non-Indigenous (reference group)	27,288	1.00	
Indigenous	488	1.24	1.13–1.37
Sex			
Female (reference group)	10,122	1.00	
Male	17,654	1.13	1.10–1.16
Age			
Increase in relative risk			
for each year after age 50		1.024	1.022–1.025
Remoteness area			
Major cities (reference group)	18,114	1.00	
Inner regional	6,115	1.10	1.06–1.13
Outer regional	2,882	1.17	1.13–1.23
Remote and very remote	665	1.16	1.06–1.26

Note: Analysis excludes people who did not state their Indigenous status.

Source: AIHW Australian Cancer Database 2007.

Table D5.6: Cox proportional hazards regression analysis, hazard ratio of death from any cause, females diagnosed with breast cancer, diagnosed between 2003 and 2007 and followed until death or 31 December 2010 (whichever came first), New South Wales, Queensland, Western Australia and the Northern Territory

Factors	Number	Hazard ratio	95% CI
Indigenous status			
Non-Indigenous (reference group)	34,125	1.00	
Indigenous	377	2.00	1.63–2.44
Age			
Increase in relative risk			
for each year after age 50		1.058	1.056–1.060
Remoteness area			
Major cities (reference group)	23,826	1.00	
Inner regional	7,071	1.02	0.96–1.09
Outer regional	3,021	1.19	1.10–1.30
Remote and very remote	584	1.48	1.23–1.78

Note: Analysis excludes people who did not state their Indigenous status.

Source: AIHW Australian Cancer Database 2007.

Table D5.7: Cox proportional hazards regression analysis, hazard ratio of death from any cause, all persons diagnosed with bowel cancer, diagnosed between 2003 and 2007 and followed until death or 31 December 2010 (whichever came first), New South Wales, Queensland, Western Australia and the Northern Territory

Factors	Number	Hazard ratio	95% CI
Indigenous status			
Non-Indigenous (reference group)	37,909	1.00	
Indigenous	294	1.43	1.22–1.68
Sex			
Female (reference group)	17,094	1.00	
Male	21,109	1.12	1.09–1.16
Age			
Increase in relative risk			
for each year after age 50		1.037	1.036–1.039
Remoteness area			
Major cities (reference group)	25,068	1.00	
Inner regional	8,818	1.07	1.04–1.11
Outer regional	3,700	1.18	1.12–1.23
Remote and very remote	617	1.26	1.12–1.41

Note: Analysis excludes people who did not state their Indigenous status.

Source: AIHW Australian Cancer Database 2007.

Table D5.8: Cox proportional hazards regression analysis, hazard ratio of death from any cause, males diagnosed with prostate cancer, diagnosed between 2003 and 2007 and followed until death or 31 December 2010 (whichever came first), New South Wales, Queensland, Western Australia and the Northern Territory

Factors	Number	Hazard ratio	95% CI
Indigenous status			
Non-Indigenous (reference group)	42,364	1.00	
Indigenous	206	1.83	1.44–2.32
Age			
Increase in relative risk			
for each year after age 50		1.115	1.113–1.118
Remoteness area			
Major cities (reference group)	27,741	1.00	
Inner regional	10,099	1.11	1.06–1.16
Outer regional	4,027	1.29	1.22–1.38
Remote and very remote	703	1.29	1.11–1.50

Note: Analysis excludes people who did not state their Indigenous status.

Source: AIHW Australian Cancer Database 2007.

Table D5.9: Cox proportional hazards regression analysis, hazard ratio of death from any cause, all persons diagnosed with cancer of unknown primary site, diagnosed between 2003 and 2007 and followed until death or 31 December 2010 (whichever came first), New South Wales, Queensland, Western Australia and the Northern Territory

Factors	Number	Hazard ratio	95% CI
Indigenous status			
Non-Indigenous (reference group)	8,330	1.00	
Indigenous	151	1.31	1.08–1.59
Sex			
Female (reference group)	3,981	1.00	
Male	4,500	0.95	0.90–0.99
Age			
Increase in relative risk			
for each year after age 50		1.029	1.027–1.031
Remoteness area			
Major cities (reference group)	5,514	1.00	
Inner regional	1,911	0.94	0.89–1.00
Outer regional	856	0.98	0.90–1.06
Remote and very remote	200	1.13	0.95–1.34

Note: Analysis excludes people who did not state their Indigenous status.

Source: AIHW Australian Cancer Database 2007.

Additional tables for Chapter 6: Prevalence of cancer

Table D6.1: Five-year prevalence of the 10 most prevalent cancers in Aboriginal and Torres Strait Islander peoples, New South Wales, Queensland, Western Australia and the Northern Territory, as at the end of 2007

	Indigenous				Non-Indigenous			
Cancer site/type	**No.**	**Ranking**	**ASR[(a)]**	**95% CI**	**No.**	**Ranking**	**ASR[(a)]**	**95% CI**
Breast in females (C50)	325	1	166.2	145.9–188.2	30,810	2	220.2	217.7–222.7
Melanoma of the skin (C43)	203	2	114.5	95.8–135.3	17,724	4	127.8	125.9–129.7
Bowel (C18–C20)	185	3	121.4	101.8–143.2	25,859	3	184.4	182.1–186.7
Prostate (C61)	156	4	114.1	95.0–135.5	36,450	1	258.3	255.6–261.0
Lung (C33–C34)	124	5	78.6	63.6–95.6	7,395	5	52.9	51.7–54.1
Uterus (C54–C55)	81	6	43.7	33.6–55.8	4,083	10	28.8	28.0–29.7
Thyroid (C73)	79	7	26.9	20.6–34.4	4,826	7	35.7	34.7–36.8
Cervix (C53)	72	8	25.9	19.4–33.8	1,655	17	12.4	11.8–13.0
Non-Hodgkin lymphoma (C82–C85)	68	9	30.8	22.4–40.7	7,329	6	52.7	51.5–53.9
Kidney (C64)	51	10	22.8	16.0–31.2	4,667	8	33.5	32.5–34.5
All cancers combined[(b)]	**1,882**	**. .**	**991.2**	**938.2–1046.1**	**177,092**	**. .**	**1,269.5**	**1,263.5–1,275.4**

(a) Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

(b) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Source: AIHW Australian Cancer Database 2007.

Table D6.2: Five-year prevalence of the 10 most prevalent cancers among Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Queensland, Western Australia and the Northern Territory, as at the end of 2007

	Indigenous			Non-Indigenous		
Age group (years)	**Number**	**Age-specific rate[(a)]**	**95% CI**	**Number**	**Age-specific rate[(a)]**	**95% CI**
Breast in females (C50)						
<45	53	28.8	21.6–37.7	3,119	78.5	75.8–81.3
45–54	97	470.7	381.7–574.3	7,372	801.0	782.8–819.5
55–64	83	712.3	567.4–883.0	8,686	1,177.6	1,152.9–1,202.6
65–74	64	1,202.9	926.4–1,536.1	6,501	1,399.8	1,366.0–1,434.2
75+	28	1,074.9	714.2–1,553.5	5,132	1,089.1	1,059.5–1,119.3
Melanoma of the skin (C43)						
<45	69	18.6	14.5–23.5	2,742	34.0	32.8–35.3
45–54	32	80.7	55.2–113.9	2,724	148.9	143.4–154.6
55–64	35	159.3	110.9–221.5	3,864	260.3	252.1–268.6
65–74	30	314.5	212.2–449.0	3,733	407.6	394.6–420.8
75+	37	864.5	608.7–1,191.6	4,661	577.8	561.4–594.7
Bowel (C18–C20)						
<45	27	7.3	4.8–10.6	831	10.3	9.6–11.0
45–54	24	60.5	38.8–90.1	2,097	114.6	109.8–119.6
55–64	44	200.2	145.5–268.8	5,402	363.8	354.2–373.7
65–74	53	555.6	416.2–726.8	7,901	862.6	843.7–881.8
75+	37	864.5	608.7–1,191.6	9,628	1,193.6	1,169.9–1,217.7
Prostate (C61)						
<45	. .	. .	. .	73	1.8	1.4–2.2
45–54	9	47.3	21.6–89.7	1,749	192.4	183.5–201.6
55–64	48	465.0	342.9–616.6	10,024	1,341.7	1,315.6–1,368.2
65–74	69	1,635.9	1,272.8–2,070.3	14,000	3,100.6	3,049.5–3,152.4
75+	30	1,791.0	1,208.4–2,556.8	10,604	3,161.4	3,101.5–3,222.2
Lung (C33–C34)						
<45	7	1.9	0.8–3.9	177	2.2	1.9–2.5
45–54	27	68.1	44.9–99.1	559	30.6	28.1–33.2
55–64	33	150.2	103.4–210.9	1,723	116.0	110.6–121.7
65–74	43	450.8	326.2–607.2	2,501	273.1	262.5–284.0
75+	14	327.1	178.8–548.8	2,435	301.9	290.0–314.1
Uterus (C54–C55)						
<45	7	3.8	1.5–7.8	196	4.9	4.3–5.7
45–54	24	116.5	74.6–173.3	529	57.5	52.7–62.6
55–64	24	206.0	132.0–306.5	1,331	180.4	170.9–190.4
65–74	18	338.3	200.5–534.7	1,093	235.3	221.6–249.7
75+	8	307.1	132.6–605.1	934	198.2	185.7–211.3

(continued)

Table D6.2 (continued): Five-year prevalence of the 10 most prevalent cancers among Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Queensland, Western Australia and the Northern Territory, as at the end of 2007

Age group (years)	Indigenous			Non-Indigenous		
	Number	Age-specific rate[(a)]	95% CI	Number	Age-specific rate[(a)]	95% CI
			Thyroid (C73)			
<45	44	11.9	8.6–15.9	1,603	19.9	18.9–20.9
45–54	14	35.3	19.3–59.2	1,296	70.8	67.0–74.8
55–64	16	72.8	41.6–118.2	977	65.8	61.7–70.1
65–74	4	41.9	11.4–107.4	587	64.1	59.0–69.5
75+	. .	. .	. .	363	45.0	40.5–49.9
			Cervix (C53)			
<45	38	20.7	14.6–28.4	649	16.3	15.1–17.6
45–54	20	97.1	59.3–149.9	388	42.2	38.1–46.6
55–64	8	68.7	29.6–135.3	260	35.2	31.1–39.8
65–74	3	56.4	11.6–164.8	188	40.5	34.9–46.7
75+	3	115.2	23.7–336.6	170	36.1	30.9–41.9
			Non-Hodgkin lymphoma (C82–C85)			
<45	26	7.0	4.6–10.3	839	10.4	9.7–11.1
45–54	9	22.7	10.4–43.1	1,014	55.4	52.1–58.9
55–64	14	63.7	34.8–106.9	1,717	115.6	110.2–121.2
65–74	13	136.3	72.6–233.1	1,793	195.8	186.8–205.0
75+	6	140.2	51.4–305.1	1,966	243.7	233.1–254.7
			Kidney (C64)			
<45	14	3.8	2.1–6.3	443	5.5	5.0–6.0
45–54	10	25.2	12.1–46.4	661	36.1	33.4–39.0
55–64	16	72.8	41.6–118.2	1,199	80.8	76.2–85.5
65–74	10	104.8	50.3–192.8	1,205	131.6	124.2–139.2
75+	. .	. .	. .	1,159	143.7	135.5–152.2
			All cancers combined[(b)]			
<45	471	127.0	115.8–139.0	17,385	215.7	212.5–219.0
45–54	393	991.3	895.7–1094.3	23,164	1,266.2	1250.0–1282.7
55–64	429	1,952.4	1,772.0–2,146.1	42,519	2,863.8	2,836.6–2,891.1
65–74	383	4,015.3	3,623.2–4,438.3	47,095	5,141.7	5,095.3–5,188.3
75+	206	4,813.1	4,178.2–5,517.1	46,929	5,817.8	5,765.3–5,870.7

(a) Rates are expressed per 10,000 population.

(b) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Note: The rates are expressed per 100,000 population.

Source: AIHW Australian Cancer Database 2007.

Table D6.3: Five-year prevalence of the 10 most prevalent cancers among Aboriginal and Torres Strait Islander peoples, by sex, New South Wales, Queensland, Western Australia and the Northern Territory, as at the end of 2007

	Indigenous			Non-Indigenous		
Sex	Number	ASR[(a)]	95% CI	Number	ASR[(a)]	95% CI
			Breast in females (C50)			
Males	. .	. .	. .	. .	. .	. .
Females	325	302.3	266.6–341.0	30,810	429.4	424.6–434.2
			Melanoma of the skin (C43)			
Males	110	163.7	126.9–206.1	10,245	156.0	152.9–159.0
Females	93	80.5	61.7–102.3	7,479	104.8	102.4–107.2
			Bowel (C18–C20)			
Males	91	132.2	100.7–169.0	14,256	218.2	214.6–221.9
Females	94	113.3	88.7–141.8	11,603	155.0	152.2–157.9
			Prostate (C61)			
Males	156	268.6	221.6–321.5	36,450	546.6	541.0–552.3
Females	. .	. .	. .	. .	. .	. .
			Lung (C33–C34)			
Males	75	119.9	88.8–156.8	4,418	67.5	65.5–69.6
Females	49	50.7	36.6–68.0	2,977	40.7	39.2–42.2
			Uterus (C54–C55)			
Males	. .	. .	. .	. .	. .	. .
Females	81	79.5	61.5–100.7	4,083	55.8	54.1–57.5
			Thyroid (C73)			
Males	18	13.8	7.5–22.8	1,120	16.7	15.8–17.8
Females	61	38.7	28.6–50.8	3,706	54.5	52.8–56.3
			Cervix (C53)			
Males	. .	. .	. .	. .	. .	. .
Females	72	48.7	36.8–62.9	1,655	24.3	23.2–25.5
			Non-Hodgkin lymphoma (C82–C85)			
Males	40	33.6	21.1–49.5	4,043	61.2	59.3–63.1
Females	28	27.9	17.3–41.9	3,286	45.0	43.5–46.6
			Kidney (C64)			
Males	30	32.7	19.1–50.7	3,069	45.9	44.3–47.6
Females	21	15.7	9.1–24.8	1,598	22.2	21.1–23.3
			All cancers combined[(b)]			
Males	849	1,091.0	999.5–1,187.3	95,379	1,444.3	1,435.1–1,453.6
Females	1,033	937.6	872.7–1,005.5	81,713	1,131.9	1,124.1–1,139.8

(a) Rates were directly age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 population.

(b) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, with the exception of those C44 codes that indicate basal cell and squamous cell carcinoma of the skin.

Source: AIHW Australian Cancer Database 2007.

Additional tables for Chapter 7: Hospitalisations for cancer

Table D7.1: Hospitalisations for the 10 most common principal diagnoses of cancer in Aboriginal and Torres Strait Islander peoples, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

	Indigenous Australians				Other Australians			
Cancer site/type	**Number**	**Ranking**	**ASR[(a)]**	**ALOS[(b)(c)]**	**Number**	**Ranking**	**ASR[(a)]**	**ALOS[(b)(c)]**
Secondary site (C77–C79)	1,741	1	14.3	9.5	187,251	2	16.8	8.9
Lung (C33–C34)	1,335	2	12.3	10.1	89,504	7	7.9	9.2
Breast in females (C50)	963	3	13.7	6.4	115,089	5	20.4	4.4
Bowel (C18–C20)	882	4	7.8	11.0	143,069	4	12.7	9.5
Non-melanoma of skin (C44)	867	5	9.7	9.8	418,092	1	37.4	3.8
Non-Hodgkin lymphoma (C82–C85)	475	6	3.3	11.5	93,030	6	8.4	8.7
Prostate (C61)	470	7	11.8	7.4	157,690	3	29.1	5.2
Acute lymphoblastic leukaemia (C91.0)	425	8	1.1	4.0	19,938	18	2.0	14.1
Cervix (C53)	417	9	4.8	8.2	8,436	28	1.6	7.7
Liver (C22)	384	10	3.1	8.9	16,762	22	1.5	7.7
All cancers combined[(d)]	**14,086**	**. .**	**113.0**	**9.6**	**1,895,294**	**. .**	**170.1**	**7.7**

(a) Rates were standardised to the Australian population as at 30 June 2001 and are expressed per 10,000 population.

(b) Directly age-standardised to the hospitalisation population in 2006–07 to 2010–11.

(c) ALOS excludes same-day hospitalisations.

(d) Pertain to hospitalisations in which the principal diagnosis is cancer (ICD-10-AM codes C00–C97, D45, D46, D47.1 and D47.3.

Source: AIHW National Hospital Morbidity Database.

Table D7.2: Hospitalisations for the 10 most common principal diagnoses of cancer in Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

	Indigenous Australians		Other Australians	
Age group (years)	Number	Age-specific rate[(a)]	Number	Age-specific rate[(a)]
Secondary site (C77–C79)				
<45	257	1.2	14,267	2.3
45–54	486	20.3	24,916	17.6
55–64	501	36.5	45,124	38.6
65–74	378	63.0	49,286	66.3
75+	119	45.0	53,658	82.2
Lung (C33–C34)				
<45	108	0.5	2,004	0.3
45–54	274	11.5	7,065	5.0
55–64	486	35.4	20,607	17.6
65–74	330	55.0	29,244	39.3
75+	137	51.8	30,584	46.8
Breast cancer in females (C50)				
<45	179	1.7	15,854	5.1
45–54	289	23.2	29,032	40.7
55–64	272	37.4	31,609	53.8
65–74	165	49.5	22,470	59.3
75+	58	36.0	16,124	42.4
Bowel (C18–C20)				
<45	167	0.8	5,915	0.9
45–54	174	7.3	13,954	9.9
55–64	273	19.9	31,582	27.0
65–74	159	26.5	42,228	56.8
75+	109	41.2	49,390	75.6
Non-melanoma of skin (C44)				
<45	109	0.5	23,852	3.8
45–54	158	6.6	45,568	32.2
55–64	199	14.5	78,670	67.2
65–74	179	29.8	94,531	127.1
75+	222	83.9	175,471	268.7
Non-Hodgkin lymphoma (C82–C85)				
<45	202	0.9	10,877	1.7
45–54	62	2.6	13,343	9.4
55–64	97	7.1	23,288	19.9
65–74	87	14.5	22,560	30.3
75+	27	10.2	22,962	35.2

(continued)

Table D7.2 (continued): Hospitalisations for the 10 most common principal diagnoses of cancer in Aboriginal and Torres Strait Islander peoples, by age group, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

	Indigenous Australians		Other Australians	
Age group (years)	**Number**	**Age-specific rate[(a)]**	**Number**	**Age-specific rate[(a)]**
		Prostate (C61)		
<45	0	0.0	780	0.2
45–54	50	4.4	12,201	17.4
55–64	186	28.8	50,347	86.4
65–74	157	58.8	55,473	152.2
75+	77	74.4	38,889	142.7
		Acute lymphoblastic leukaemia (C91.0)		
<45	411	1.9	16,099	2.6
45–54	7	0.3	1,308	0.9
55–64	1	0.1	1,329	1.1
65–74	0	0.0	829	1.1
75+	6	2.3	373	0.6
		Cervix (C53)		
<45	233	2.2	3,022	1.0
45–54	92	7.4	1,857	2.6
55–64	40	5.5	1,522	2.6
65–74	43	12.9	1,045	2.8
75+	9	5.6	990	2.6
		Liver (C22)		
<45	56	0.3	1,463	0.2
45–54	111	4.6	2,453	1.7
55–64	99	7.2	4,140	3.5
65–74	100	16.7	4,443	6.0
75+	18	6.8	4,263	6.5
		All cancers combined[(b)]		
<45	3,642	16.8	172,239	27.5
45–54	3,087	129.2	219,679	155.3
55–64	3,564	259.5	418,147	357.3
65–74	2,491	414.9	480,914	646.7
75+	1,302	491.9	604,315	925.4

(a) Rates are expressed per 10,000 population.

(b) All cancers combined pertain to ICD-10-AM codes of C00–C97, D45, D46, D47.1 and D47.3.

Source: AIHW National Hospital Morbidity Database.

Table D7.3: Hospitalisations for the 10 most common principal diagnoses of cancer in Aboriginal and Torres Strait Islander peoples, by sex, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

	Indigenous Australians		Other Australians	
Sex	**Number**	**ASR[(a)]**	**Number**	**ASR[(a)]**
		Secondary site (C77–C79)		
Males	784	14.9	95,171	18.2
Females	957	14.0	92,080	15.9
		Lung (C33–C34)		
Males	653	14.1	54,126	10.4
Females	682	11.0	35,377	5.9
		Breast in females (C50)		
Males	. .	. .	. .	. .
Females	963	13.7	115,089	20.4
		Bowel (C18–C20)		
Males	486	9.2	79,854	15.2
Females	396	6.6	63,215	10.6
		Non-melanoma of skin (C44)		
Males	507	13.2	248,424	48.2
Females	360	7.1	169,668	28.5
		Non-Hodgkin lymphoma (C82–C85)		
Males	294	3.5	54,121	10.3
Females	181	3.0	38,909	6.7
		Prostate (C61)		
Males	470	11.8	157,687	29.1
Females	. .	. .	. .	. .
		Acute lymphoblastic leukaemia (C91.0)		
Males	255	1.2	11,720	2.3
Females	170	1.0	8,218	1.7
		Cervix (C53)		
Male	. .	. .	. .	. .
Female	417	4.8	8,436	1.6
		Liver (C22)		
Males	247	4.4	12,144	2.3
Females	137	2.0	4,618	0.8
		All cancers combined[(b)]		
Males	7,024	129.0	1,092,663	209.1
Females	7,062	101.5	802,629	137.9

(a) Rates were standardised to the Australian population as at 30 June 2001 and are expressed per 10,000 population.

(b) All cancers combined pertain to ICD-10-AM codes of C00–C97, D45, D46, D47.1 and D47.3.

Source: AIHW National Hospital Morbidity Database.

Table D7.4: Hospitalisations for the 10 most common principal diagnoses of cancer in Aboriginal and Torres Strait Islander peoples, by remoteness area[a], New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

	Indigenous Australians		Other Australians	
Remoteness area	**Number**	**ASR[b][c]**	**Number**	**ASR[b][c]**
		Secondary site (C77–C79)		
Major cities	502	16.3	126,273	18.0
Inner regional	364	17.7	41,454	18.9
Outer regional	448	19.2	16,584	17.1
Remote and very remote	425	14.4	2,449	15.0
		Lung (C33–C34)		
Major cities	264	9.4	57,783	8.2
Inner regional	314	16.2	20,359	9.1
Outer regional	351	17.0	9,555	9.7
Remote and very remote	405	15.6	1,621	10.5
		Breast in females (C50)		
Major cities	272	14.2	82,057	22.4
Inner regional	230	19.2	22,584	20.7
Outer regional	221	16.6	8,874	18.7
Remote and very remote	237	15.2	1,407	17.9
		Bowel (C18–C20)		
Major cities	295	9.6	93,401	13.3
Inner regional	205	10.2	33,540	15.1
Outer regional	229	10.2	13,837	14.2
Remote and very remote	152	5.0	2,030	13.0
		Non-melanoma of skin (C44)		
Major cities	430	16.9	282,922	40.4
Inner regional	244	14.0	90,739	41.2
Outer regional	113	5.3	37,860	39.2
Remote and very remote	79	2.8	6,280	39.1
		Non-Hodgkin lymphoma (C85–C85)		
Major cities	163	4.3	64,178	9.2
Inner regional	83	3.6	19,075	8.8
Outer regional	104	3.8	8,138	8.4
Remote and very remote	125	3.3	1,313	7.8

(continued)

Table D7.4 (continued): Hospitalisations for the 10 most common principal diagnoses of cancer in Aboriginal and Torres Strait Islander peoples, by remoteness area[a], New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

	Indigenous Australians		Other Australians	
Remoteness area	**Number**	**ASR[b][c]**	**Number**	**ASR[b][c]**
Prostate (C61)				
Major city	150	13.2	105,423	32.3
Inner regional	145	19.8	35,941	33.1
Outer regional	98	12.9	13,658	27.6
Remote and very remote	76	8.0	2,340	27.0
Acute lymphoblastic leukaemia (91.0)				
Major city	191	1.5	14,202	2.2
Inner regional	63	1.2	3,912	2.2
Outer regional	56	0.7	1,348	1.6
Remote and very remote	114	1.1	268	1.7
Cervix (C53)				
Major city	105	3.8	5, 985	1.7
Inner regional	62	4.1	1,492	1.5
Outer regional	111	6.4	748	1.7
Remote and very remote	138	7.2	121	1.5
Liver (C22)				
Major city	86	2.5	12,432	1.8
Inner regional	37	2.3	2,852	1.3
Outer regional	96	4.4	1,192	1.2
Remote and very remote	165	5.5	211	1.3
All cancers combined[d][e]				
Major city	4,268	125.6	1,286,313	183.7
Inner regional	2,879	137.4	408,687	186.9
Outer regional	3,195	127.0	169,255	175.4
Remote and very remote	3,721	119.0	26,607	165.8

(a) Classified using the ASGC RA (see Appendix A).

(b) Rates were calculated using 2006 estimated residential population due to data availability. This assumes that the population in each remoteness area has remained constant over the 5 years. New estimated residential population by Indigenous status and remoteness areas will be released by June 2014 (see Chapter 1) and may impact on the ASR presented here.

(c) Rates were directly age-standardised to the Australian population as at 30 June 2001 and are expressed per 10,000 population.

(d) All cancers combined pertain to ICD-10-AM codes of C00–C97, D45, D46, D47.1 and D47.3.

(e) There were 23 Indigenous hospitalisations and 4,432 other Australian hospitalisations that could not be ascribed to a remoteness area.

Source: AIHW National Hospital Morbidity Database.

Table D7.5: Observed, expected and excess number of hospitalisations for the 10 most common principal diagnoses of cancer in Aboriginal and Torres Strait Islander peoples, New South Wales, Victoria, Queensland, Western Australia, South Australia and public hospitals in the Northern Territory, 2006–07 to 2010–11

Cancer site/type	Observed number	Expected number	Excess hospitalisations[(a)]
Secondary site (C77–C79)	1,741	1,898	–157
Lung (C33–C34)	1,335	757	578
Breast in females (C50)	963	1,523	–560
Bowel (C18–C20)	882	1,266	–384
Non-melanoma of skin (C44)	867	3,675	–2,808
Non-Hodgkin lymphoma (C82–C85)	475	1,081	–606
Prostate (C61)	470	1,306	–836
Acute lymphoblastic leukaemia (C91.0)	425	744	–319
Cervix (C53)	417	138	279
Liver (C22)	384	195	189
All cancers combined[(b)]	**14,086**	**19,800**	**–5,714**

(a) Excess hospitalisations are the observed number of hospitalisations minus the expected number of hospitalisations.

(b) Pertain to hospitalisations in which the principal diagnosis is cancer (ICD-10-AM codes C00–C97, D45, D46, D47.1 and D47.3),

Note: The expected numbers are based on the indirect age-standardisation method.

Source: AIHW National Hospital Morbidity Database.

Additional tables for Chapter 9: National cancer screening programs

Table D9.1: Participation rate of women aged 50–69 in BreastScreen Australia, by Aboriginal and Torres Strait Islander status, 1996–1997 to 2010–2011

Reporting period	Indigenous	Non-Indigenous
1996–1997	28.9	39.5
1997–1998	32.0	42.4
1998–1999	33.7	43.1
1999–2000	34.9	43.2
2000–2001	35.9	44.0
2001–2002	36.4	44.5
2002–2003	36.7	50.0
2003–2004	35.4	55.7
2004–2005	35.2	56.1
2005–2006	36.4	56.9
2006–2007	36.2	56.1
2007–2008	36.4	54.8
2008–2009	36.5	55.2
2009–2010	36.2	54.9
2010–2011	36.2	54.6

Notes

1. Some jurisdictions do not use the ‘not stated’ category. Therefore there are likely to be some Aboriginal and Torres Strait Islander women incorrectly assigned to non-Indigenous status. Limitations of Aboriginal and Torres Strait Islander data are detailed in Appendix B.
2. Rates are the number of women screened as a percentage of the eligible female population calculated as the average of the ABS’s estimated resident population and age-standardised to the Australian population at 30 June 2001.
3. Each reporting period covers 2 years. For example, 1996–1997 covers 1 January 1996 to 31 December 1997.
4. BreastScreen is a dynamic database, with new records added and the quality of existing records improved over time. For this reason, there is the potential for revisions of these data.

Source: AIHW analysis of BreastScreen Australia data.

Additional tables for Chapter 10: Burden of disease due to cancer

Table D10.1: Leading causes of burden of disease, by Indigenous status, per cent, Australia, 2003

Cause	Indigenous Australians (%)	Total Australians (%)
Cardiovascular disease	17	18
Mental disorders	15	13
Chronic respiratory disease	8	7
Diabetes	8	5
Cancer	8	19
Unintentional injuries	7	5
Intentional injuries	5	2
Other	32	31

Note: Total Australians includes Indigenous, non-Indigenous and Indigenous status not stated populations.

Source: Vos et al. 2007.

Table D10.2: Rank of leading causes of DALYs, by sex and Indigenous status, 2003

Males			Females		
Condition	Indigenous Australians	Total Australians	Condition	Indigenous Australians	Total Australians
Ischaemic heart disease	1	1	Anxiety and depression	1	1
Type 2 diabetes	2	2	Type 2 diabetes	2	4
Anxiety and depression	3	3	Ischaemic heart disease	3	2
Suicide	4	8	Asthma	4	9
Road traffic accidents	5	12	COPD	5	7
COPD	6	6	Stroke	6	3
Alcohol dependence and harmful use	7	14	Road traffic accident	7	22
Asthma	8	13	Alcohol dependence and harmful use	8	34
Stroke	9	5	Lung cancer	9	8
Homicide and violence	10	46	Homicide and violence	10	75
Low birthweight	11	37	Low birthweight	11	33
Lung cancer	12	4	Pneumonia	12	16
Pneumonia	13	21	Suicide	13	24
Inflammatory heart disease	14	32	Breast cancer	14	6
Heroin or polydrug dependence	15	24	Rheumatic heat disease	15	74
Schizophrenia	16	16	Deficiency anaemia	16	52
Epilepsy	17	36	Schizophrenia	17	19
Hepatitis	18	23	Otitis media	18	81
Birth trauma and asphyxia	19	54	Heroin or polydrug dependency	19	55
Otitis media	20	81	STD (not HIV/AIDS)	20	86

Note: Total Australians includes Indigenous, non-Indigenous and Indigenous status not stated populations.

Source: Vos et al. 2007.

Table D10.3: : Contribution (%) of leading causes of cancer burden of disease, by sex, Aboriginal and Torres Strait Islander peoples, Australia, 2003

Cause	Males (%)	Females (%)
Breast	1	99
Colorectal	48	52
Leukaemia	51	49
Lung	51	49
Mouth	61	39
Total	**46**	**54**

Source: Vos et al. 2007.

Table D10.4: Leading cancer causes of burden of disease, by fatal (YLL) and non-fatal (YLD) components, Aboriginal and Torres Strait Islander peoples, per cent, Australia, 2003

Cause	Years of life lost (YLL) (%)	Years of healthy life lost (YLD) (%)
Breast	89	11
Colorectal	93	7
Leukaemia	95	5
Lung	98	2
Mouth	88	12
Total	**94**	**6**

Source: Vos et al. 2007.

Appendix E: Clinical cancer groupings

This report provides incidence and mortality numbers based on clinical cancer groupings (that is, clinical categories). For example, prostate, testicular, bladder and kidney cancers are grouped into ‘urogenital cancers’ as these cancers are most often treated by an urologist. Similarly, all cancers of female genital organs are grouped into ‘gynaecological cancers’ as these cancers are most often treated by a gynaecologist or gynaecological oncologist. See Table E1 for classification of clinical cancer groupings.

Table E1: The corresponding ICD-10 codes for clinical cancer groupings

Clinical cancer grouping	Corresponding ICD-10 codes
Skin	C00, C43, C44, C46
Head and neck	C01–C14, C30–C32
Upper gastrointestinal	C15–C17, C22–C25
Colorectal	C18–C21
Respiratory	C33–C34, C37–C38, C45
Bone and other connective tissue	C40–C41, C47, C49
Breast	C50
Urogenital	C60–C68
Gynaecological	C51–C59
Eye	C69
Neurological	C70–C72
Thyroid and other endocrine	C73–C75
Lymphohaematopoietic	C81–C85, C88, C90–C96, D45, D46, D47.1, D47.3
Ill–defined and unknown primary sites	C26, C39, C48, C76–C79, C80
Multiple primary	C97

Appendix F: Definition of cancer-related hospitalisations

Data on hospitalisations include principal diagnosis—this is the reason determined to be chiefly responsible for the person's hospitalisation. The principal diagnosis recorded is usually a disease (or injury or poisoning), but can also be a specific treatment of an already diagnosed condition, such as chemotherapy for cancer. These treatments are usually coded using Z-codes defined in ICD-10-AM Chapter 21 'Factors influencing health status and contact with health services' (NCCH 2010).

Due to the method in which the principal diagnosis for hospitalisations of cancer patients is coded, it is insufficient to simply select those hospitalisations for which cancer was recorded as the principal diagnosis—it must also include those hospitalisations where a treatment relating to cancer was recorded as the principal diagnosis.

Many cancer–related interventions recorded as a principal diagnosis (such as Z51.1 Chemotherapy or Z12 Special screening examination for neoplasm) are specific only to the investigation for, or treatment of, cancer. However, some (Z45.1 and Z45.2 Adjustment and management of infusion pumps or vascular devices) apply to a number of disease types.

For some cancer–related interventions (such as same-day chemotherapy), the Australian Coding Standards (NCCH 2010) stipulate that the principal diagnosis is to be coded to reflect the treatment with the type(s) of cancer listed as an additional diagnosis. This standard does not apply, however, to all cancer–related interventions.

Thus, for the purposes of examining the number of admitted patient hospitalisations that arose due to invasive cancer or were directly related to the investigation, treatment or care for cancer, 'cancer–related hospitalisations' were identified in this report as those hospitalisations in which:

- the principal diagnosis was cancer (ICD-10-AM codes C00–C97, D45, D46, D47.1 and D47.3)

or

- the principal diagnosis was related to health services or treatment for cancer. This includes a principal diagnosis of one of the following cancer-specific ICD-10-AM Z-codes:
  - Z08 Follow-up examination after treatment for malignant neoplasms
  - Z12 Special screening examination for neoplasm
  - Z40.0 Prophylactic surgery
  - Z51.0 Radiotherapy session
  - Z51.1 Pharmacotherapy session for neoplasm
  - Z54.1 Convalescence following radiotherapy
  - Z54.2 Convalescence following chemotherapy
  - Z80 Family history of malignant neoplasm
  - Z85 Personal history of malignant neoplasm

or

- a principal diagnosis of one of the following non-cancer specific ICD-10-AM Z codes with an additional diagnosis of cancer (ICD-10-AM codes C00–C97, D45, D46, D47.1 and D47.3):
  - Z29.1 Prophylactic immunotherapy
  - Z29.2 Other prophylactic chemotherapy
  - Z42.0 Follow-up care involving plastic surgery of head and neck
  - Z42.1 Follow-up care involving plastic surgery of breast
  - Z45.1 Adjustment and management of infusion pump
  - Z45.2 Adjustment and management of vascular access device.

Appendix G: Guide to online supplementary tables

Additional tables are available as online Excel tables at <www.aihw.gov.au>. These tables contain detailed statistics, some of which are presented in summary form in the body of the report. Throughout the report, online additional tables are referred to with a 'G', for example, 'See online supplementary Table G3.1'.

There are eight Excel files, each representing a chapter from the report:

- Chapter 3—Incidence of cancer
- Chapter 4—Mortality from cancer
- Chapter 5—Survival after a diagnosis of cancer
- Chapter 6—Prevalence of cancer
- Chapter 7—Hospitalisations for cancer
- Chapter 8—Expenditure on cancer
- Chapter 9—National cancer screening programs
- Chapter 10—Burden of disease due to cancer.

Glossary

This section provides a general description of the terms used in this report. The terms are defined in the context of this report; some terms may have other meanings in other contexts.

Aboriginal or Torres Strait Islander: A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander. See also *Indigenous*.

Additional diagnosis: A condition or complaint either coexisting with the principal diagnosis or arising during the episode of care.

Administrative databases: Observations about events that are routinely recorded or required by law to be recorded. Such events include births, deaths, hospitalisations and cancer incidence. Administrative databases include the Australian Cancer Database, the National Mortality Database and the National Hospital Morbidity Database.

Admitted patient: A person who undergoes a hospital's formal admission process to receive treatment and/or care. Such treatment or care can occur in hospital and/or in the person's home (as a 'hospital-in-home' patient).

Age-specific rate: A rate for a specific age group. The numerator and denominator relate to the same age group.

Age-standardisation: A method of removing the influence of age when comparing populations with different age structures. This is usually necessary because the rates of many diseases vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same 'standard' structure; then the disease rates that would have occurred with that structure are calculated and compared.

Associated cause of death: Cause, other than the underlying cause, that was instrumental in causing death, including conditions that occurred immediately before death or close to the time of death or conditions that occurred between the underlying and immediate causes (also see *Underlying cause of death*).

Average length of stay (ALOS): The average (mean) number of patient days for admitted patient episodes. Patients admitted and separated on the same date are allocated a length of stay of 1 day.

Burden of disease and injury: Term referring to the quantified impact of a disease or injury on an individual or population, using the *disability-adjusted life year* (DALY) measure.

Cancer (malignant neoplasm): A large range of diseases in which some of the body's cells become defective, begin to multiply out of control, can invade and damage the area around them, and can also spread to other parts of the body to cause further damage.

Chemotherapy: The use of drugs (chemicals) to prevent or treat disease, with the term being applied for treatment of cancer rather than for other uses.

Cohort method: A method of calculating *survival* that is based on a cohort or group of people diagnosed with cancer in a previous time period and followed over time.

Comorbidity: When a person has two or more health problems at the same time.

Confidence interval (CI): A statistical term describing a range (interval) of values within which we can be 'confident' that the true value lies, usually because it has a 95% or higher chance of doing so.

Crude rate: The number of events in a given period divided by the size of the population at risk in a specified time period.

Crude survival (CS): The proportion of people alive at a specified point in time subsequent to the diagnosis of cancer.

Disability-adjusted life years (DALYs): A year of healthy life lost, either through premature death or equivalently through living with disability due to illness or injury. It is the basis unit used in *burden of disease and injury* estimates.

Death due to cancer: A death where the underlying cause is indicated as cancer.

Expected survival: A measure of *survival* that reflects the proportion of people in the general population alive for a given amount of time. Expected survival estimates are crude estimates calculated from *life tables* of the general population by age, sex and calendar year.

Heath expenditure: Includes expenditure on health goods and services (for example, medications, aids and appliances, medical treatment, public health, research) which collectively are termed current expenditure; and on health-related investment which is often referred to as capital expenditure.

Hospitalisation: See *Separation*.

Incidence: The number of new cases (of an illness or event, and so on) occurring during a given period.

Indigenous: A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander. See also *Aboriginal or Torres Strait Islander*.

International Statistical Classification of Diseases and Related Health Problems: The World Health Organization's internationally accepted classification of death and disease. The tenth revision (ICD-10) is currently in use. ICD-10-AM is the Australian modification of ICD-10; it is used for diagnoses and procedures recorded for patients admitted to hospitals (see Appendix A).

Invasive: See *Malignant*.

Length of stay: Duration of hospital stay, calculated by subtracting the date the patient was admitted from the day of separation. All leave days, including the day the patient went on leave, are excluded. A same-day patient is allocated a length of stay of 1 day.

Life tables: Tables of annual probabilities of death in the general population.

Limited-duration prevalence: The number of people alive at a specific time who have been diagnosed with cancer over a specified period (such as the previous 5 or 25 years).

Malignant: A tumour with the capacity to spread to surrounding tissue or to other sites in the body.

Metastasis: See *Secondary cancer*.

Mortality due to cancer: The number of deaths which occurred during a specified period (usually a year) for which the underlying cause of death was recorded as cancer.

Mortality-to-incidence ratio (MIR): The ratio of the age-standardised mortality rate for cancer to the age-standardised incidence rate for cancer.

New cancer case: See *Incidence*.

Neoplasm: An abnormal ('neo', new) growth of tissue. Can be 'benign' (not a cancer) or 'malignant' (a cancer). Also known as a tumour.

Non-Indigenous: People who have declared they are not of Aboriginal or Torres Strait Islander descent.

Observed survival: A measure of *survival* that reflects the proportion of people alive for a given amount of time after a diagnosis of cancer. Observed survival estimates are crude estimates calculated from population-based cancer data.

Other Australians: Includes people who have declared that they are not of Aboriginal or Torres Strait Islander descent as well as those who have not stated their Indigenous status.

Overnight patient: An admitted patient who receives hospital treatment for a minimum of 1 night (that is, is admitted to, and separates from, hospital on different dates).

Patient days: The number of full or partial days of stay for patients who were admitted for an episode of care and who underwent separation during the reporting period. A patient who is admitted and separated on the same day is allocated one patient day.

Period method: A method of calculating *survival* that is based on the survival experience during a recent *at-risk* or *follow-up* time period.

Population estimates: Official population numbers compiled by the ABS at both state and territory and statistical local area levels by age and sex, as at 30 June each year. These estimates allow comparisons to be made between geographical areas of differing population sizes and age structures (see Appendix A).

Prevalence (or complete prevalence): The total number of people alive at a specific date who have ever been diagnosed with a particular disease such as cancer.

Primary cancer: A tumour that is at the site where it first formed (also see *Secondary cancer*).

Principal diagnosis: The diagnosis listed in hospital records to describe the problem that was chiefly responsible for the patient's episode of care in hospital.

Procedure: A clinical intervention that is surgical in nature, carries a procedural risk, carries an anaesthetic risk, requires specialised training and/or requires special facilities or equipment available only in the acute care setting.

Relative survival: The ratio of observed survival of a group of persons diagnosed with cancer to expected survival of those in the corresponding general population after a specified interval following diagnosis (such as 5 or 10 years).

Risk factor: Any factor that represents a greater risk of a health disorder or other unwanted condition or event. Some risk factors are regarded as causes of disease, others are not necessarily so. Along with their opposites, namely protective factors, risk factors are also known as 'determinants'.

Same-day patient: A patient who is admitted to, and separates from, hospital on the same date.

Secondary cancer: A tumour that originated from a cancer elsewhere in the body. Also referred to as a metastasis.

Separation: An episode of care for an admitted patient which may include a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay that begins or ends in a change of type of care (for example, from acute to rehabilitation). In this report, separations are also referred to as hospitalisations.

Statistical significance: An indication from a statistical test that an observed difference or association may be significant or 'real' because it is unlikely to be due just to chance. A statistical result is usually said to be 'significant' if it would occur by chance only once in 20 times or less often (see Appendix F for more information about statistical significance).

Stage: The extent of a cancer in the body. Staging is usually based on the size of the tumour, whether lymph nodes contain cancer, and whether the cancer has spread from the original site to other parts of the body.

Survival: A general term indicating the probability of being alive for a given amount of time after a particular event, such as a diagnosis of cancer.

Symptom: Any indication of a disorder that is apparent to the person affected.

Underlying cause of death: The disease or injury that initiated the sequence of events leading directly to death.

Years of healthy life lost due to disability (YLD): For each new case of cancer, YLD equals the average duration of the cancer (to remission or death) multiplied by a severity weight for cancer (which depends upon its disabling effect over the disease duration).

Years of life lost (YLL): For each new case, YLL equals the number of years between premature death and the standard life expectancy for the individual.

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Related publications

This report, *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: an overview*, is part of the cancer series. A number of other cancer reports can be downloaded free from the AIHW website <http://www.aihw.gov.au/cancer-publications/>. The website also includes information on ordering printed copies.

The following AIHW products relating to cancer might also be of interest:

- AIHW 2012. Cancer in Australia: an overview, 2012. Cancer series no. 74. Cat. no. CAN 70. Canberra: AIHW.
- AIHW 2012. Cancer incidence projections, Australia 2011 to 2020. Cancer series no. 66. Cat no. CAN 62. Canberra: AIHW.
- AIHW 2012. Cancer survival and prevalence in Australia: period estimates from 1982 to 2010. Cancer Series no. 69. Cat no. CAN 65. Canberra: AIHW.
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Brings together the most up-to-date data available from a wide range of sources to describe the status of cancer in Aboriginal and Torres Strait Islander peoples of Australia. Information on difference across age, sex and remoteness areas are presented and key issues are highlighted. The report provides a comprehensive picture of cancer in Aboriginal and Torres Strait Islander peoples of Australia that should be useful to health professionals, policy makers and others with an interest in the health of Aboriginal and Torres Strait Islander peoples.