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Cancer Australia

# Breast cancer in Australia

## an overview

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# Breast cancer in Australia

## An overview

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# Foreword

*Breast cancer in Australia: an overview* presents the most up-to-date statistical information on breast cancer in Australia. The report documents key breast cancer statistics to provide researchers, health service providers and policy makers with the most relevant data to reduce the impact of breast cancer in Australia.

This report represents the significant contributions and the continuing partnership of Cancer Australia, the Australian Institute of Health and Welfare, and the Australasian Association of Cancer Registries. 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. The Australian Institute of Health and Welfare's work informs and supports the development of policy and programs on Australia's health and welfare through the provision of relevant, timely and high-quality information.

The current report provides a nationwide snapshot of a major condition affecting a substantial number of Australians. It identifies the relationship between breast cancer incidence and mortality and geographical remoteness, socioeconomic status, Aboriginal and Torres Strait Islander status, and country of birth. In addition, information on survival, prevalence, hospitalisations, expenditure, and the burden of disease from breast cancer indicates the impact of this disease on our population and health system. Importantly, the report identifies areas of significant change over time and provides projections for the future to assist in planning for services and patient needs.

We would like to thank the staff of the various cancer registries and data repositories for their efforts in making these data available. We anticipate that the information contained in *Breast cancer in Australia: an overview* will be used extensively to further our goal of reducing the mortality from breast cancer and improving the wellbeing of all Australians living with the disease.

**Mr David Kalisch**

Director

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# Contents

# Acknowledgments

This report was prepared by staff in the Cancer and Screening Unit of the Australian Institute of Health and Welfare (AIHW). The main authors were Ms Anne Ganner Bech, Ms Shubhada Shukla, Ms Wendy Ho and Ms Theresa Negrello. Other AIHW staff who made a substantial contribution were, in alphabetical order, Ms Chun Chen, Dr Brett Davis, Ms Melissa Goodwin, Mr Hao Min, Ms Galina Prosselkova, Ms Candice Rabusa and Ms Christine Sturrock. The authors would like to thank those AIHW staff who commented on earlier drafts of this report.

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

# Abbreviations

| | |
|---|---|
| AACR | Australasian Association of Cancer Registries |
| ABS | Australian Bureau of Statistics |
| ACD | Australian Cancer Database |
| ACS | American Cancer Society |
| ACHI | Australian Classification of Health Interventions |
| ACT | Australian Capital Territory |
| AICR | American Institute for Cancer Research |
| AIHW | Australian Institute of Health and Welfare |
| ALOS | average length of stay |
| ASGC | Australian Standard Geographical Classification |
| ASR | age-standardised rate |
| CA | Cancer Australia |
| CCS | Candadian Cancer Society |
| CCSSCCS | Canadian Cancer Society's Steering Committee on Cancer Statistics |
| CI | confidence interval |
| CS | crude survival |
| DALY | disability-adjusted life year |
| DCIS | ductal carcinoma in situ |
| DoHA | Department of Health and Ageing |
| EAC | Evaluation Advisory Committee |
| excl. | excluding |
| 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 |
| ICD-O | International Classification of Diseases for Oncology |
| ICD-O-3 | International Classification of Diseases for Oncology, third edition |
| IRSD | Index of Relative Socio-economic Disadvantage |
| MBS | Medicare Benefits Schedule |

| | |
|---|---|
| MIR | mortality-to-incidence ratio |
| NBCC | National Breast Cancer Centre |
| NBOCC | National Breast and Ovarian Cancer Centre |
| NCCH | National Centre for Classification in Health |
| NCIC | National Cancer Institute of Canada |
| NCSCH | National Cancer Statistics Clearing House |
| NDI | National Death Index |
| NHPA | National Health Priority Area |
| NHMD | National Hospital Morbidity Database |
| NMD | National Mortality Database |
| No. | number |
| NSW | New South Wales |
| NT | Northern Territory |
| NZ | New Zealand |
| Qld | Queensland |
| RS | relative survival |
| SA | South Australia |
| SACC | Standard Australian Classification of Countries |
| SEIFA | Socio-Economic Indexes for Areas |
| Tas | Tasmania |
| UK | United Kingdom |
| USA | United States of America |
| Vic | Victoria |
| WA | Western Australia |
| WCRF | World Cancer Research Fund |
| WHO | World Health Organization |
| 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

*Breast cancer in Australia: an overview* provides comprehensive national statistics on breast cancer in females, presenting the latest data and trends over time. Differences by remoteness area, socioeconomic status, Aboriginal and Torres Strait Islander status, country of birth and international comparisons are also discussed. Although breast cancer is very rare in males, some data on breast cancer in males are also presented.

### On average, 37 females were diagnosed with invasive breast cancer every day

In 2008, a total of 13,567 new invasive breast cancers were diagnosed in Australian females. Thus on average, 37 females were diagnosed with this disease every day. Breast cancer was the most common cancer in females, representing 28% of all reported cancers in females, with the majority (69%) of cases diagnosed in females aged 40–69.

The number of new breast cancers more than doubled between 1982 (5,310 cases) and 2008 (13,567). The sharp increase in age-standardised incidence rate between 1990 and 1995 is most likely due to the introduction of the national breast cancer screening program. The rate has remained fairly stable since 1995.

### Breast cancer mortality in females is decreasing and survival is improving

A total of 2,680 females died from breast cancer in 2007, making it the second most common cause of cancer-related death for Australian females after lung cancer (2,911 deaths). The age-standardised mortality rate for breast cancer decreased between 1994 and 2007 by 29%.

Between the periods 1982–1987 and 2006–2010, 5-year relative survival from breast cancer increased from 72% to 89%. These gains in survival from breast cancer may be due to a combination of earlier diagnosis associated with screening, and better treatments.

However, some sub-groups of the population have lower survival than others, for example, females living in *Remote and very remote* areas of Australia and Aboriginal and Torres Strait Islander females.

Australian females diagnosed with breast cancer had better survival prospects compared with their counterparts in other countries and regions.

### The number of screening mammograms and hospitalisations of females for breast cancer has increased

While the age-standardised participation rate in mammography screening through BreastScreen Australia remained steady in the 10 years from 1999–2000 to 2009–2010, the number of women aged 50–69 participating in this program increased by 34%.

In 2009–10, breast cancer was responsible for 27% of all cancer-related and 3% of all hospitalisations among females in Australia. In this period, there were just over 113,000 hospitalisations of females due to breast cancer, which was 72% higher than in 2000–01.

### The future

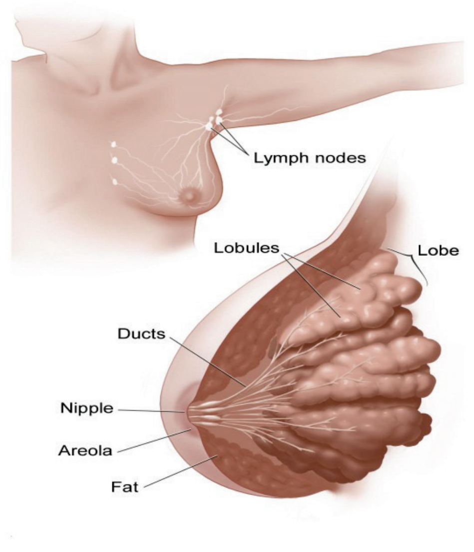
Given the ageing population, the number of females diagnosed with invasive breast cancer is expected to increase. Projections suggest that in 2020, the number of new breast cancer cases will be about 17,210. This would equate to 47 females being diagnosed with breast cancer every day in 2020.

# 1 Introduction

Breast cancer is a major cause of illness and death for females in Australia. On average, one in eight Australian females will develop breast cancer and one in 37 females will die from it before the age of 85 years. Although much less common, males also develop breast cancer. Because breast cancer affects so many people—either directly through developing the disease or indirectly by affecting family, community members and carers—breast cancer is an important topic of interest to many and a priority issue for the Australian health system.

## What is breast cancer?

Breast cancer is a disease in which abnormal cells in the breast tissues multiply and form an invasive (or malignant) tumour. Such tumours can invade and damage the tissue around them and spread to other parts of the body through the lymphatic or vascular systems. If the spread of these tumours is not controlled, they can result in death. Not all tumours are invasive; some are benign tumours that are not life-threatening, whereas others are called 'in situ' lesions because they are contained in the milk ducts and have not invaded the surrounding tissue.



*Source:* National Cancer Institute, 2009.

**Figure 1.1: Anatomy of the female breast**

Breast tissue consists mainly of fat, glandular tissue (arranged in lobes which, in women, can produce milk), ducts (the tubes that carry milk to the nipple) and connective tissue (see Figure 1.1). In the majority of invasive breast cancers, the abnormal cell growth begins in the ducts; this type of breast cancer is referred to as *infiltrating (or invasive) duct carcinoma*. *Invasive lobular carcinoma* is another type of invasive breast cancer which, as the name suggests, begins in the lobules. Other, less common types of breast cancers include *inflammatory breast cancer*, *medullary carcinoma* and *Paget disease.* A description of the various types of breast cancer can be found at <http://canceraustralia.nbocc.org.au/breast-cancer/about-breast-cancer/types-of-breast-cancer>.

An abnormal cell growth that begins and remains within the duct or the lobes of origin is referred to as 'ductal carcinoma in situ' (DCIS) and 'lobular carcinoma in situ' (LCIS), respectively. These forms of abnormal cell growth are not a type of invasive breast cancer and nearly all carcinomas at this stage can be cured. However, it is thought that invasive breast cancer often starts as DCIS (NBCC 2004) and having DCIS or LCIS is associated with an increased risk of developing invasive breast cancer (ACS 2012; NBOCC 2009a).

# What are the known risk factors for breast cancer?

A risk factor is any factor associated with an increased likelihood of a person developing a health disorder or health condition, such as breast cancer. There are different types of risk factors, some of which can be modified and some that cannot. While the cause of breast cancer is not fully understood, it is known that people with certain risk factors are more likely than others to develop this disease.

It should be noted that having a risk factor does not mean a person will develop breast cancer. Many people have at least one risk factor but will never develop the disease, while others with breast cancer may have had no known risk factors. Also, even if a person with breast cancer has a risk factor, it is often hard to know how much that risk factor contributed to the causation of the cancer.

Information on the major risk factors for breast cancer is summarised below, with the information obtained from the World Cancer Report 2008 (IARC 2008) and National Breast and Ovarian Cancer Centre's 2009 report on breast cancer risk factors (NBOCC 2009a).

For *females*, the main factors associated with an increased risk of breast cancer are:

- **Family history of breast cancer**—this is an important and well-established breast cancer risk factor. The significance of a family history of breast cancer increases with the number of relatives affected, the younger the age at which they were diagnosed and whether they were close relatives - first degree (such as mother, father, sibling, daughter), or second degree (such as aunt, grandmother, niece). Increased risk may be due to enviromental factors, lifestyle factors and/or genetic factors (for example BRCA1 and BRCA2 gene mutations).
- **Breast conditions**—females diagnosed with invasive breast cancer have an increased risk of developing a new cancer in the other breast or in another part of the same breast. Research has also shown that females diagnosed with certain pre-invasive breast conditions including DCIS and LCIS have an increased risk of developing invasive breast cancer. Further, females with a high degree of breast density have higher risk of invasive breast cancer compared with females with lower breast density.
- **Hormonal factors**—A number of factors affecting hormonal status have been associated with increased risk of breast cancer. These include early menarche (that is, age at first period), late menopause, use of a combined hormone replacement therapy and/or use of the oral contraceptive pill within the past 10 years. Postmenopausal females with high levels of circulating oestrogen have an increased risk of breast cancer compared with females with low levels of circulating oestrogens.
- **Child-bearing history**—females who have not had children or had their first birth at a late age have an increased risk of breast cancer. Breastfeeding has also been associated with a modest decrease in risk of breast cancer (at least 12 months' total duration of breastfeeding vs no breastfeeding).
- **Personal and lifestyle factors**—a number of personal and lifestyle factors have been associated with an increased risk of breast cancer, including increasing age, higher socioeconomic status, taller height, excess weight and obesity (particularly in postmenopausal females), low physical activity and alcohol consumption.

Although breast cancer affects both females and males, this disease is very rare in males. The main risk factors associated with breast cancer in males are genetic factors and conditions involving high levels of oestrogen, such as gonadal dysfunction and liver damage, alcohol abuse and obesity.

# Purpose and structure of this report

The purpose of this report is to provide a comprehensive overview of breast cancer in Australia. The aim is to increase levels of statistical understanding about this disease and to inform decision-making, resource allocation, breast cancer control programs and policies. The report is aimed at a wide audience, including health professionals, policy makers, health planners, educators, researchers, consumers and the general public.

As in the previous editions (AIHW & NBOCC 2006, 2009), this report brings together the latest available statistics and trend data on the:

- number of breast cancers diagnosed each year (Chapter 2)
- number of people who die from breast cancer each year (Chapter 3)
- survival prospect for those diagnosed with breast cancer (Chapter 4)
- number of people alive who have been diagnosed with breast cancer (Chapter 5)
- total burden of disease due to breast cancer (Chapter 6)
- number of women who have had a mammogram through BreastScreen Australia (Chapter 7)
- number of hospitalisations for breast cancer each year (Chapter 8)
- extent of health care spending on breast cancer (Chapter 9).

Given that the proportion of females who develop breast cancer is much greater than the proportion of males who do so, the emphasis in this report is on breast cancer in females. However, a range of statistics on breast cancer in males is also presented.

# Data interpretation

In this report, the term 'breast cancer' is used to refer to *primary* breast cancers which are *invasive* (that is, malignant). It does not encompass secondary breast cancers, nor does it include benign breast tumours or non-invasive breast cancers, such as DCIS. Nonetheless, given that invasive breast cancer may begin as DCIS and given the large number of cases of DCIS diagnosed each year, incidence data are provided for these lesions in Chapter 2.

A number of different classifications are referred to in this report, such as ICD (that is, International Statistical Classification of Diseases and Related Health Problems) and ICD-O (that is, International Classification of Diseases for Oncology). Information about these classifications is included in Appendix A.

Information on actual numbers of breast cancer cases and deaths is presented in this report, together with age-standardised rates. The use of age-standardised rates enables comparisons between groups and within groups over time that take into account differences in the age structure and size of the population. Rates have been standardised to the Australian population at 30 June 2001 and are generally expressed per 100,000 population. In addition, for international comparisons, age-standardised rates based on a World Standard Population enable comparisons of Australian data with those of other countries. Further information on age-standardisation and other technical matters is in Appendix B.

Confidence intervals (at the 95% level) are shown in graphs (as error bars) and tables. As explained more fully in Appendix B, confidence intervals can be used as a guide when considering whether differences in rates may be a result of chance variation. Where confidence intervals do not overlap, the difference between rates may be regarded as greater than would readily be attributable to chance. Although such differences may be regarded as 'significant' in statistical terms, they may or may not be 'significant' from a practical or clinical perspective. Note that the AIHW is currently reviewing the methods used to calculate confidence intervals to ensure that the statistical methods used in its reports are the most appropriate (see Appendix B for more detail).

In this report, comparisons are made with international and state or territory-based data. Caution should be taken when interpreting these since observed differences may be influenced not only by the underlying number of breast cancer cases (or number of breast cancer deaths when considering mortality data), but by differences between Australia and individual jurisdictions or countries in:

- methods of cancer detection
- types of treatment provided and access to treatment services
- characteristics of the cancer such as stage at diagnosis and histology type
- coding practices and cancer registration methods, as well as accuracy and completeness of recording of all breast cancer cases.

**Box 1.1: Terminology used in this report**

- **Incidence rate:** the number of new breast cancers diagnosed per 100,000 population during a specific time period, usually one year.
- **Mortality rate:** the number of deaths per 100,000 population for which the underlying cause was breast cancer.
- **Relative survival:** the average survival experience. It compares the survival of people diagnosed with breast cancer (that is, observed survival) with that experienced by people in the general population of equivalent age and sex in the same calendar year (that is, expected survival).
- **Prevalence:** the number of people alive who were diagnosed with breast cancer within a specified time period, such as the previous 5 years.
- **Burden of disease:** the quantified impact of breast cancer on an individual or population.
- **Hospitalisation rate:** the number of hospital admissions per 10,000 population due to breast cancer.

**Box 1.2: Statistically significant**

For the purpose of this report, the term 'statistically significant' has been used to refer to differences where 95% confidence intervals do not overlap and consequently where there are statistical grounds for suspecting that differences may not be chance occurrences.

# Data sources

A key data source for this report was the Australian Cancer Database (ACD). This contains information on all new cases of primary, invasive cancer (excluding basal cell and squamous cell carcinoma of the skin) diagnosed in Australia since 1982. Data are collected by state and territory cancer registries from a number of sources and are supplied annually to the AIHW. The AIHW is responsible for the compilation of the ACD through the National Cancer Statistics Clearing House, a collaboration with the Australasian Association of Cancer Registries (AACR).

Another key data source was the National Mortality Database (NMD). This is a national collection of information for all deaths in Australia from 1964 to 2007 and is maintained by the AIHW. Information on the characteristics and causes of death of the deceased is provided by the Registrars of Births, Deaths and Marriages and coded nationally by the ABS. Unless stated otherwise, death information in this report relates to the year of death, except for the most recent year (namely, 2007) where year of registration is used. Previous investigation has shown that, due to a lag in processing of deaths, year of death information for the latest available year generally underestimates the true number of deaths, whereas the number of deaths registered in that year is closer to the true value.

Several other data sources—including the National Death Index, the National Hospital Morbidity Database, BreastScreen Australia data, the Disease Expenditure Database and the 2008 GLOBOCAN database—have also been used to present a broad picture of breast cancer in Australia.

Additional information about each of the data sources used in this report is in Appendix C.

**Box 1.3: Why do some statistics in this report appear old?**

While this report is published in 2012, the statistics in the main chapters refer to 2010 or earlier. The reason is that whether data are collected recently or not, it often takes a year or more before the data are fully processed and released to the AIHW. Also, once the AIHW receives the data, some time is needed to load, clean and analyse them before release.

# 2 Incidence of breast cancer

**Key findings**

**Females**

In 2008 in Australia:

- Breast cancer was by far the most commonly diagnosed invasive cancer in females (excluding basal and squamous cell carcinoma of the skin), accounting for 28% of all cancers in females.
- A total of 13,567 breast cancers were diagnosed in Australian females.
- More than 69% of breast cancers were diagnosed in those aged 40–69.
- The risk that a female would be diagnosed with breast cancer before the age of 85 was 1 in 8.

Between 1982 and 2008:

- The number of new breast cancers in females more than doubled (from 5,310 to 13,567 new cases).
- The age-standardised incidence rate of breast cancer increased from 81 to 116 per 100,000 in the period 1982 to 1995, after which the rate was fairly stable ranging between 110 and 118 per 100,000.

In the 5 years from 2004 to 2008:

- The age-standardised incidence rate of breast cancer for females was highest in the Australian Capital Territory (124 per 100,000) and lowest in the Northern Territory (84 per 100,000).
- The incidence rate of breast cancer tended to decrease with remoteness (from 114 per 100,000 in *Major cities* to 94 per 100,000 in *Remote and very remote*).
- The incidence rate of breast cancer tended to increase with improving socioeconomic status (from 103 per 100,000 in the lowest socioeconomic status group to 122 per 100,000 in the highest socioeconomic status group).
- Aboriginal and Torres Strait Islander females were less likely to be diagnosed with breast cancer than their non-Indigenous counterparts (81 and 103 per 100,000, respectively).

**Males**

In 2008 in Australia:

- 113 breast cancers were diagnosed in Australian males.
- The risk of a male being diagnosed with breast cancer before the age of 85 years was 1 in 688.

Between 1982 and 2008:

- The number of new breast cancers diagnosed in males increased slightly (from 61 to 113 new cases).
- The age-standardised incidence rate of breast cancer in males remained relatively stable, at about 1 per 100,000.

# About incidence of breast cancer

Incidence data indicate the number of new cases of breast cancer diagnosed during a specified time period, usually one year. The number of new cases is largely determined by the risk profile of the population—that is, the types of risk factors for breast cancer that people have. In addition, for females, the number of new breast cancers diagnosed in any one year is affected by the extent of participation in screening mammography and advances in diagnostic technology.

As mentioned in Chapter 1, only those breast cancers that were primary and invasive are a focus of this report. Additionally, to be counted, they must be a 'new' primary cancer and not a reoccurrence of a previous primary cancer in the same site (IARC 2004).

Note that data on breast cancer incidence refer to the number of *cases* newly diagnosed and not to the number of *people* newly diagnosed with breast cancer. However, since it is rare that any one person would be diagnosed with more than one primary breast cancer during a 1-year period, the annual number of new breast cancer cases is practically the same as the annual number of people newly diagnosed with breast cancer.

Details on the incidence of breast cancer in females over time are provided in this chapter. In addition, this chapter provides information on the projected number of new breast cancers in females to 2020, the risk of being diagnosed with breast cancer by the age of 75 and 85 years, and disparities in the incidence of breast cancer among females according to age, state and territory, remoteness area, socioeconomic status, Aboriginal and Torres Strait Islander status and country of birth. Comparison between Australian and international rates are also presented, as are data on the incidence of ductal carcinoma in situ (DCIS) in females. For males, due to smaller case numbers, discussion is focused on incidence trends, differences by age, and the risk of being diagnosed with breast cancer.

The main data source for this chapter was the Australian Cancer Database (ACD), which consists of data provided to the AIHW by state and territory cancer registries through the National Cancer Statistics Clearing House. Further detail about the ACD is in Appendix C.

# Incidence of breast cancer in females

## How many females were newly diagnosed with breast cancer in 2008?

Breast cancer was the most commonly diagnosed cancer in females (excluding basal and squamous cell carcinoma of the skin), with a total of 13,567 new breast cancers diagnosed in 2008 (Table 2.1). This means that across Australia, on average, 37 females were diagnosed with breast cancer each day in 2008. Breast cancer accounted for 28% of all reported cancers in females and the age-standardised incidence rate was 115 per 100,000.

Note that bowel cancer was the second most commonly diagnosed cancer among females in 2008, but with only around half the number of cases (6,375 and 13% of all reported cancers in females).

**Table 2.1: The five most commonly diagnosed cancers[(a)], females, Australia, 2008**

| Cancer type (ICD-10 codes) | Number of cases | Percentage of all cancer cases in females | Age-standardised rate[(b)] | 95% confidence interval |
|---|---|---|---|---|
| Breast (C50) | 13,567 | 28.2 | 115.4 | 113.5–117.4 |
| Bowel (C18–C20) | 6,375 | 13.2 | 51.5 | 50.2–52.8 |
| Melanoma of skin (C43) | 4,581 | 9.5 | 39.3 | 38.1–40.4 |
| Lung (C33–C34) | 3,944 | 8.2 | 32.2 | 31.2–33.2 |
| Lymphoid cancers[(c)] | 3,181 | 6.6 | 26.4 | 25.5–27.3 |
| **All cancers[(d)]** | **48,180** | **100** | **400.5** | **396.9–404.1** |

(a) Excluding basal and squamous cell carcinomas of the skin (see Box 2.1).

(b) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

(c) Lymphoid cancers (ICD-10 codes of C81–C85, C88, C90 and C91) are cancers that start in lymphocytes of the immune system. The most common types are lymphomas, lymphoid leukaemia and myeloma.

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

*Source*: AIHW Australian Cancer Database 2008.

**Box 2.1: Cancer registration in Australia**

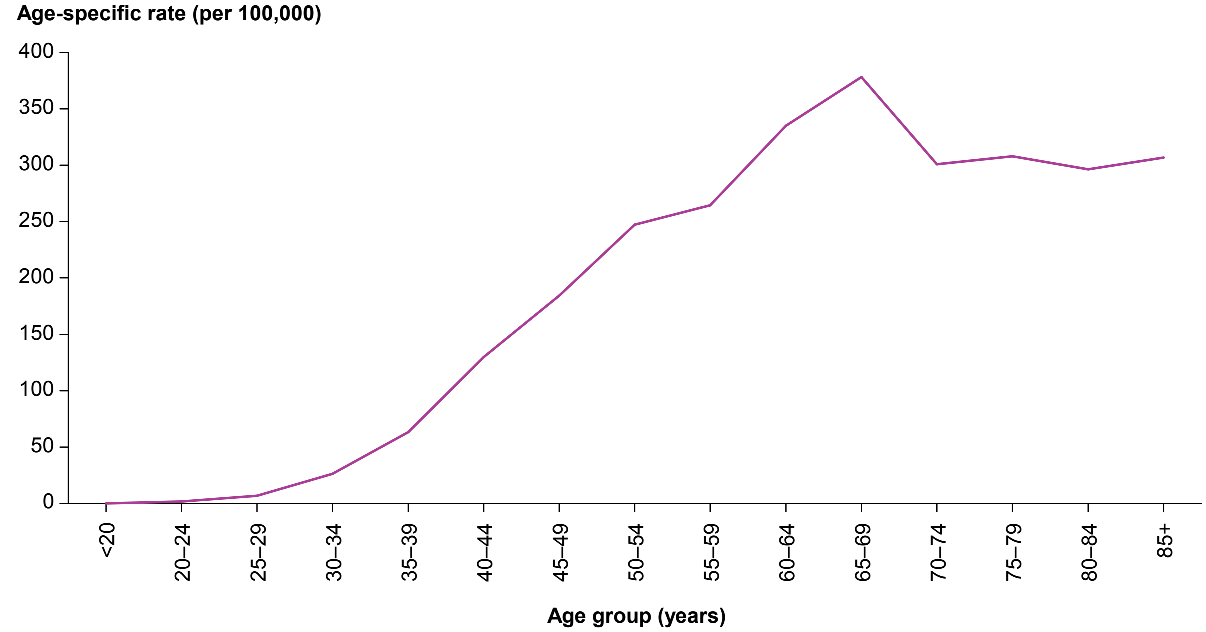
Registration of all cancers, excluding basal and squamous cell carcinomas of the skin, is required by law in each Australian state and territory. Information on newly diagnosed cancers are collected by each state and territory cancer registry. These registries provide data to the AIHW annually, encompassing all cancer cases notified between 1982 and the most recent completed year of data, for example 1982 to 2008. The data are compiled to form the Australian Cancer Database (ACD).

Since basal and squamous cell carcinomas of the skin are not notifiable, data on these cancers are not included in the ACD and therefore not included in this report. However, past research has shown that basal and squamous cell carcinomas of the skin are by far the most frequently diagnosed cancers in Australia (AIHW & CA 2008).

## Does incidence differ by age?

In 2008, more than two in three (69%) breast cancers in females were diagnosed in those aged 40–69, while one in four (25%) were diagnosed in those aged 70 and over (Appendix Table 2.1). The mean age at first diagnosis was 60 years.

Differences by age in breast cancer incidence rates for females are in Figure 2.1. In 2008, the breast cancer incidence rate increased steadily by age until the age of 65–69, where incidence was highest at 378 per 100,000. The incidence rates for all age groups aged 70 and over were significantly lower than for those aged 65–69. At least part of the reason for the lack of a further age-related increase in the diagnosis of breast cancers among females aged 70 and over would be their lower participation rate in the national breast cancer screening program, BreastScreen Australia, leading to lower cancer detection rates (see Chapter 7).



*Note:* The data for this figure are shown in Appendix Table D2.1.

*Source:* AIHW Australian Cancer Database 2008.

**Figure 2.1: Incidence of breast cancer, by age at diagnosis, females, Australia, 2008**

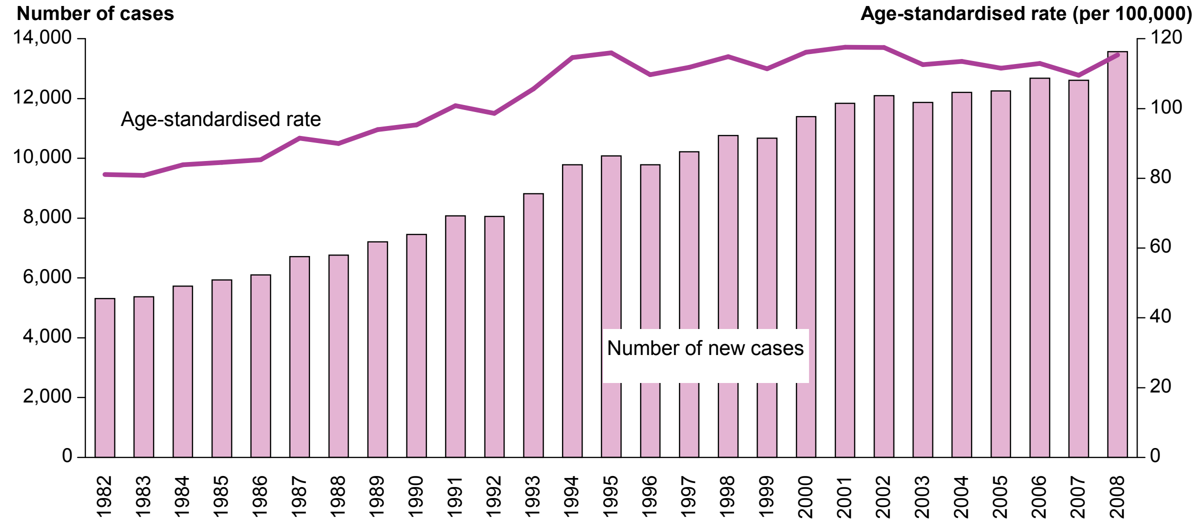
## Has the occurrence of breast cancer changed over time?

Figure 2.2 shows that the number of new breast cancers in females has more than doubled over the 27-year period from 1982 (the year in which national incidence data were first available) to 2008. In 1982, 5,310 new breast cancers were diagnosed among Australian females compared with 13,567 in 2008. The number of breast cancers diagnosed in 2008 was the largest number reported in any year to date.

Between 1982 and 2008, the proportion of all cancers (excluding basal and squamous cell carcinomas of the skin) that were breast cancers increased slightly in females—in 1982, 24% of reported cancers were breast cancers compared with 28% in 2008 (Appendix Table D2.2).

The age-standardised incidence rate of breast cancer was 81 per 100,000 in 1982. It increased in the following years with the sharpest increase between 1990 (95 per 100,000) and 1995 (116 per 100,000). After this time, the rates were fairly stable, ranging between 110 and 118 per 100,000, with the 2008 rate equalling 115 per 100,000.

The pronounced increase in the incidence of breast cancer between 1990 and 1995 is most likely due to the introduction of the national breast cancer screening program (known today as BreastScreen Australia), which aims to detect cases of unsuspected breast cancer in women aged 40 and over using screening mammography, with the target age range for screening being those aged 50–69 (see Chapter 7 for more information).



*Notes*

1. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
2. The data for this figure are shown in Appendix Table D2.2.

*Source:* AIHW Australian Cancer Database 2008.

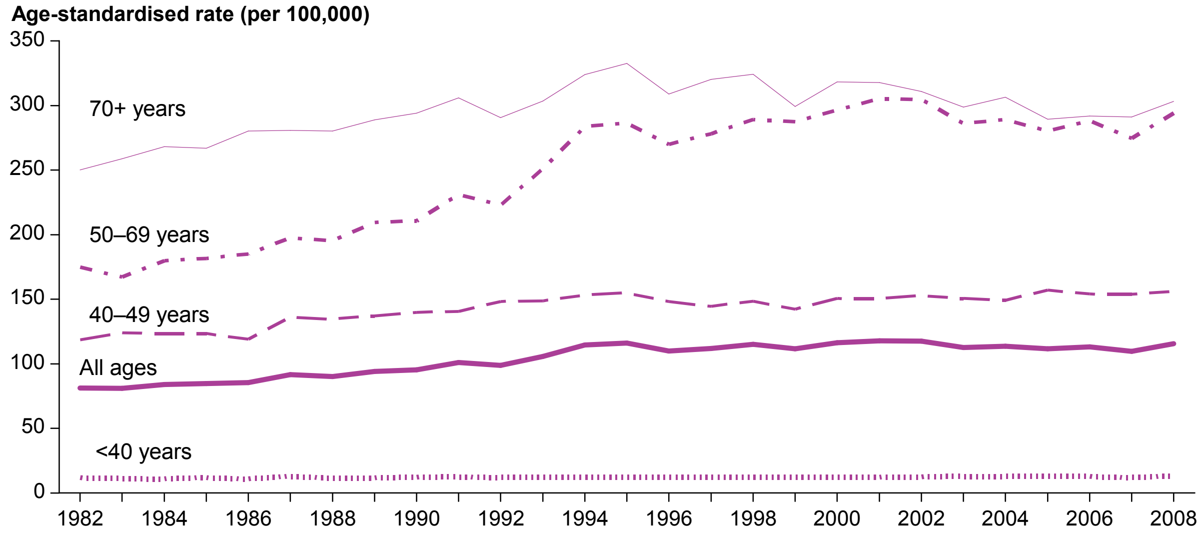
**Figure 2.2: Incidence of breast cancer, females, Australia, 1982 to 2008**

## Do trends in incidence differ by age at diagnosis?

Figure 2.3 shows trends in incidence rates of breast cancer in females by age group. For females aged 50–69 (the primary target group for BreastScreen Australia), a relatively small rise in incidence rates during the 1980s was followed by a much steeper rise between 1992 and 1995. The increase in incidence rates for this age category was less steep in the following years but reached a peak of 306 per 100,000 in 2001. After this time, the rates levelled off at a somewhat lower level, with the rates ranging between 275 and 305 per 100,000.

While the incidence rates for females aged 70 and over also increased from 1982 to the mid-1990s, this was followed by a slow decrease in rates in more recent years. In addition, from 2001 to 2008, the rates of breast cancer for females aged 70 and over were similar to those for females aged 50–69. This contrasts with the 1980s and early 1990s when the incidence rates of breast cancer for older females were substantially higher than for those aged 50–69.

For females under the age of 40, the incidence rate of breast cancer remained between 11 and 13 per 100,000 during the 27-year period considered. The incidence rate for those aged 40–49 increased relatively consistently, from 119 per 100,000 in 1982 to 156 per 100,000 in 2008.



*Notes*

1. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
2. The data for this figure are shown in Appendix Table D2.3.

*Source:* AIHW Australian Cancer Database 2008.

**Figure 2.3: Incidence of breast cancer, by age at diagnosis, females, Australia, 1982 to 2008**

## What is the risk of being diagnosed with breast cancer?

The risk of an Australian female being diagnosed with breast cancer by the age of 85 has increased between 1982 and 2008 (see Appendix B for an explanation of how these risks were calculated). In 1982, the risk of a diagnosis of breast cancer before the age of 85 was 1 in 12 compared with 1 in 8 in 2008 (Table 2.2).

## What is the average age at diagnosis?

Table 2.2 presents the mean and median age at first diagnosis of breast cancer. Throughout the 27-year period for which national data are available, the mean age at first diagnosis has been stable at about 60 years.

**Table 2.2: Risk and average age at diagnosis of breast cancer, females, Australia, 1982 to 2008**

| Year | Risk to age 75 years | Risk to age 85 years | Mean age at first diagnosis | Median age at first diagnosis |
|---|---|---|---|---|
| 1982 | 1 in 16 | 1 in 12 | 59.7 | 60.0 |
| 1983 | 1 in 16 | 1 in 12 | 59.9 | 60.0 |
| 1984 | 1 in 16 | 1 in 11 | 60.1 | 60.0 |
| 1985 | 1 in 15 | 1 in 11 | 60.1 | 61.0 |
| 1986 | 1 in 15 | 1 in 11 | 60.6 | 61.0 |
| 1987 | 1 in 14 | 1 in 10 | 60.0 | 60.0 |
| 1988 | 1 in 14 | 1 in 10 | 60.0 | 61.0 |
| 1989 | 1 in 14 | 1 in 10 | 60.1 | 61.0 |
| 1990 | 1 in 14 | 1 in 10 | 60.0 | 60.0 |
| 1991 | 1 in 13 | 1 in 9 | 60.1 | 60.0 |
| 1992 | 1 in 13 | 1 in 10 | 59.9 | 60.0 |
| 1993 | 1 in 12 | 1 in 9 | 59.8 | 60.0 |
| 1994 | 1 in 11 | 1 in 8 | 60.1 | 60.0 |
| 1995 | 1 in 11 | 1 in 8 | 60.1 | 59.0 |
| 1996 | 1 in 12 | 1 in 9 | 60.0 | 59.0 |
| 1997 | 1 in 11 | 1 in 9 | 60.2 | 59.0 |
| 1998 | 1 in 11 | 1 in 8 | 60.2 | 59.0 |
| 1999 | 1 in 11 | 1 in 9 | 60.0 | 59.0 |
| 2000 | 1 in 11 | 1 in 8 | 60.1 | 59.0 |
| 2001 | 1 in 11 | 1 in 8 | 60.3 | 59.0 |
| 2002 | 1 in 11 | 1 in 8 | 60.2 | 59.0 |
| 2003 | 1 in 11 | 1 in 9 | 60.1 | 59.0 |
| 2004 | 1 in 11 | 1 in 9 | 60.2 | 59.0 |
| 2005 | 1 in 11 | 1 in 9 | 60.0 | 59.0 |
| 2006 | 1 in 11 | 1 in 9 | 60.1 | 59.0 |
| 2007 | 1 in 11 | 1 in 9 | 60.3 | 59.0 |
| 2008 | 1 in 11 | 1 in 8 | 60.4 | 60.0 |

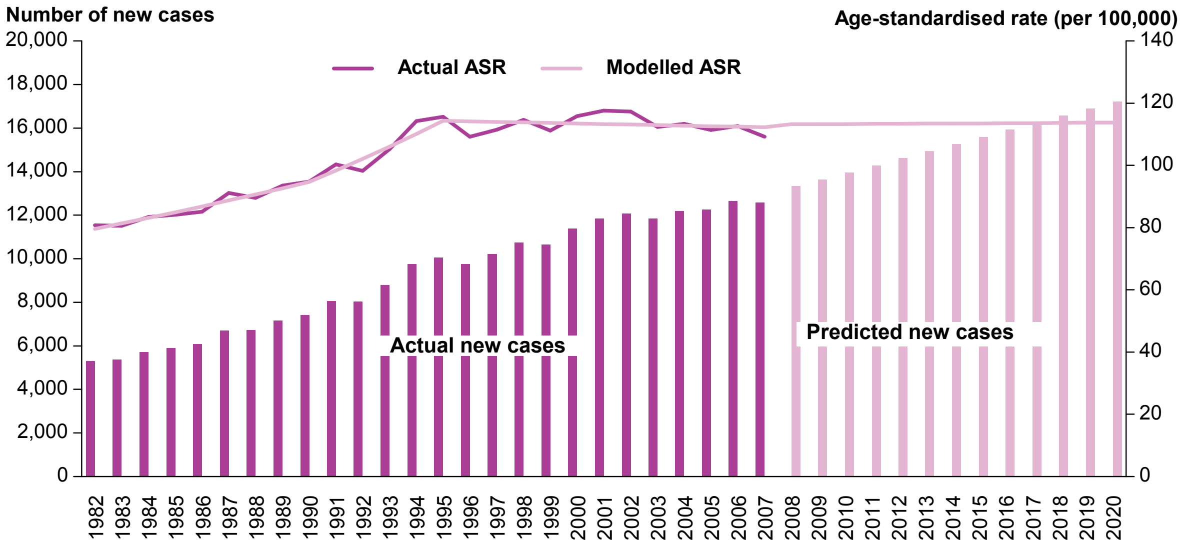
*Source:* AIHW Australian Cancer Database 2008.

## How many females are expected to be diagnosed with breast cancer in 2020?

In this section, longer-term national projections of breast cancer incidence from 2011 to 2020 are presented (Figure 2.4). The projection estimates, and the method by which they were derived, are detailed in the AIHW report *Cancer incidence projections, Australia 2011 to 2020* (AIHW 2012a). Note that the data source for the projections was the 2007 version of the Australian Cancer Database, which was the most current version of the database at the time at analysis. The 2008 version of the ACD is used in other sections of this report. The projections are a mathematical extrapolation of past trends, assuming that the same trend will continue into the future, and are intended to illustrate future changes that might reasonably be expected to occur if the stated assumptions were to apply over the projection period. The projections are not forecasts and do not attempt to allow for future changes in cancer detection methods, changes in cancer risk factors or for relevant non-demographic factors (such as government policy decisions or economic factors). The observation window for the projection model of breast cancer in females was set at 1995 to 2007.

Due to ageing of the population and increase in population size, the number of females diagnosed with breast cancer is expected to increase in the future (Figure 2.4). In 2012, the number of new breast cancers diagnosed is expected to be 14,610; in 2020, this number is expected to have increased to 17,210.

When expected changes in the age structure and size of the population are taken into account, the results suggest that the incidence rate of breast cancer will remain fairly stable through to 2020, at about 113 to 114 per 100,000.



*Notes*

1. The projections are based on incidence data for 1995 to 2007.
2. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
3. The data for this figure are shown in Appendix Table D2.4.

*Source:* AIHW 2012a.

**Figure 2.4: Incidence of breast cancer, females, Australia, observed for 1982 to 2007, projected to 2020**

## What are the most common types of breast cancer in females?

The data presented thus far in the chapter have related only to the site of origin of the cancer (that is, the breast). In addition to the site of origin, cancers can also be classified according to the type of cell that has become cancerous, which is referred to as the histological type.

For the purposes of this report, histology types of breast cancer were categorised into nine groups (Table 2.3). The histology types included in each group were determined by Cancer Australia and are listed in Appendix Table D2.5.

In 2008, more than three-quarters (78% or 10,527 cases) of breast cancer in females were classified as *invasive ductal carcinoma*. Of these, 9,947 cases were *infiltrating duct carcinoma* (that is, cancers originated in the ducts). Meanwhile, 11% of breast cancers were classified as *invasive lobular carcinoma* (that is, cancers originated in the lobules); while a further 5% of breast cancers were classified as *unspecified*.

**Table 2.3: Incidence of breast cancer and average age at diagnosis, by type of breast cancer[(a)], females, Australia, 2008**

| Type of breast cancer[(a)] | Number of cases | Percentage of all breast cancers | Mean age at diagnosis | Median age at diagnosis |
|---|---|---|---|---|
| Invasive ductal carcinoma | 10,527 | 77.6 | 59.3 | 59.0 |
| Invasive lobular carcinoma | 1,457 | 10.7 | 62.5 | 62.0 |
| Medullary carcinoma and atypical medullary carcinoma | 68 | 0.5 | 51.9 | 53.0 |
| Tubular carcinoma and invasive cribriform carcinoma | 215 | 1.6 | 58.4 | 58.0 |
| Mucinous carcinoma | 277 | 2.0 | 66.4 | 68.0 |
| Invasive papillary carcinoma | 81 | 0.6 | 64.1 | 65.0 |
| Inflammatory carcinoma | 15 | 0.1 | 50.1 | 49.0 |
| Other—specified | 304 | 2.2 | 64.1 | 63.0 |
| Unspecified | 623 | 4.6 | 69.8 | 71.0 |
| **Total** | **13,567** | **100.0** | **60.4** | **60.0** |

(a) All cases were coded as primary site, invasive breast cancers (ICD-10 code of C50). Appendix Table D2.5 provides a list of the histology types included in each group.

*Source*: AIHW Australian Cancer Database 2008.

## Does the age at diagnosis differ by histological type?

In 2008, the average (mean) age at first diagnosis of breast cancer for females varied by histological type (Table 2.3). Females with breast cancers classified as *inflammatory carcinoma* had the lowest mean age at diagnosis (50 years), while those with an *unspecified* type of breast cancer had the highest mean age (70 years). These figures compare with an overall average age at diagnosis of 60 years.

Further information about the relationship between age and histological type of breast cancer in 2008 is in Table 2.4. For all age groups, *invasive ductal carcinoma* was the most commonly diagnosed type of breast cancer, although the proportion of all breast cancers coded to this group decreased with increasing age; from 87% in females aged under 40 to 70% in those aged 70 and over.

*Invasive lobular carcinoma* also accounted for a relatively high proportion of breast cancers for each of the four age groups. However, differences in the proportion of all breast cancers coded to this group are evident, with values ranging from 3% in females aged under 40 to 12% in those aged 50–69.

**Table 2.4: Incidence of breast cancer, by histological type and age at diagnosis, females, Australia, 2008**

| | Number of new cases | | | | Percentage of all breast cancers | | | |
|---|---|---|---|---|---|---|---|---|
| **Type of breast cancer[(a)]** | **<40** | **40–49** | **50–69** | **70+** | **<40** | **40–49** | **50–69** | **70+** |
| Invasive ductal carcinoma | 672 | 2,003 | 5,467 | 2,385 | 87.2 | 82.2 | 78.7 | 69.9 |
| Invasive lobular carcinoma | 26 | 207 | 835 | 389 | 3.4 | 8.5 | 12.0 | 11.4 |
| Medullary carcinoma and atypical medullary carcinoma | 10 | 17 | 36 | 5 | 1.3 | 0.7 | 0.5 | 0.1 |
| Tubular carcinoma and invasive cribriform carcinoma | 6 | 40 | 139 | 30 | 0.8 | 1.6 | 2.0 | 0.9 |
| Mucinous carcinoma | 12 | 40 | 97 | 128 | 1.6 | 1.6 | 1.4 | 3.8 |
| Invasive papillary carcinoma | 3 | 11 | 36 | 31 | 0.4 | 0.5 | 0.5 | 0.9 |
| Inflammatory carcinoma | 2 | 7 | 4 | 2 | 0.3 | 0.3 | 0.1 | 0.1 |
| Other—specified | 14 | 48 | 128 | 114 | 1.8 | 2.0 | 1.8 | 3.3 |
| Unspecified | 26 | 64 | 206 | 327 | 3.4 | 2.6 | 3.0 | 9.6 |
| **Total** | **771** | **2,437** | **6,948** | **3,411** | **100.0** | **100.0** | **100.0** | **100.0** |

(a) All cases were coded as primary site, invasive breast cancers (ICD-10 code of C50). Appendix Table D2.5 provides a list of the histological types included in each group.

*Source:* AIHW Australian Cancer Database 2008.

## Have there been changes in the distribution of breast cancer types?

Trends in proportions of breast cancers by histological type are in Table 2.5 for four time periods from 1982–1988 to 2003–2008. Caution should be exercised when interpreting these data since changes in histological assessment and coding practices may have affected observed trends.

**Table 2.5: Incidence of breast cancer, by histological type, females, Australia, 1982–1988 to 2003–2008**

| | Number of new cases | | | | Percentage of all breast cancers | | | |
|---|---|---|---|---|---|---|---|---|
| **Type of breast cancer[(a)]** | **1982–1988** | **1989–1995** | **1996–2002** | **2003–2008** | **1982–1988** | **1989–1995** | **1996–2002** | **2003–2008** |
| Invasive ductal carcinoma | 26,107 | 42,803 | 58,825 | 58,598 | 62.3 | 72.0 | 76.6 | 77.9 |
| Invasive lobular carcinoma | 2,643 | 5,454 | 8,151 | 8,154 | 6.3 | 9.2 | 10.6 | 10.8 |
| Medullary carcinoma and atypical medullary carcinoma | 759 | 703 | 426 | 353 | 1.8 | 1.2 | 0.6 | 0.5 |
| Tubular carcinoma and invasive cribriform carcinoma | 322 | 1,504 | 2,007 | 1,311 | 0.8 | 2.5 | 2.6 | 1.7 |
| Mucinous carcinoma | 767 | 1,106 | 1,499 | 1,484 | 1.8 | 1.9 | 2.0 | 2.0 |
| Invasive papillary carcinoma | 223 | 254 | 315 | 384 | 0.5 | 0.4 | 0.4 | 0.5 |
| Inflammatory carcinoma | 33 | 57 | 52 | 77 | 0.1 | 0.1 | 0.1 | 0.1 |
| Other—specified | 6,050 | 3,457 | 1,877 | 1,663 | 14.4 | 5.8 | 2.4 | 2.2 |
| Unspecified | 5,023 | 4,143 | 3,624 | 3,167 | 12.0 | 7.0 | 4.7 | 4.2 |
| **Total** | **41,927** | **59,481** | **76,776** | **75,191** | **100.0** | **100.0** | **100.0** | **100.0** |

(a) All cases were coded as primary site, invasive breast cancer (ICD-10 code of C50). Appendix Table D2.5 provides a list of the histological types included in each group.

*Source:* AIHW Australian Cancer Database 2008.

There was an increase in the proportion of breast cancers classified as *invasive ductal carcinoma*, from 62% in 1982–1988 to 78% in 2003–2008. The proportion of all breast cancers that were classified as *invasive lobular carcinoma* also increased over the four time periods; from 6% in 1982–1988 to 11% in 2003–2008. In contrast, the proportion of breast cancers that were classified as *other specified* decreased from 14% in 1982–1988 to 2% in 2003–2008, while the proportion that were classified *unspecified* decreased from 12% to 4% over the same period.

## What was the most frequently recorded anatomical location of breast cancer in 2008?

In this section, data for six states and territories—New South Wales, Queensland, Western Australia, South Australia, Tasmania and the Australian Capital Territory—have been used to examine the incidence of breast cancer by anatomical location. As the level of missing information is very high (31%), caution should be exercised when interpreting these data.

As shown in Table 2.6, in the six states and territories for which data were available, the most frequently recorded anatomical location of the breast cancer in 2008 was 'upper-outer quadrant of breast' (28%), followed by 'overlapping lesion of breast' (11%).

**Table 2.6: Incidence of breast cancer, by anatomical location, New South Wales, Queensland, Western Australia, South Australia, Tasmania and the Australian Capital Territory[(a)], females, 2008**

| Anatomical location | Number of cases | Per cent |
|---|---:|---:|
| Upper-outer quadrant of breast | 2,811 | 27.8 |
| Overlapping lesion of breast | 1,151 | 11.4 |
| Upper-inner quadrant of breast | 1,061 | 10.5 |
| Lower-outer quadrant of breast | 805 | 8.0 |
| Central portion of breast | 483 | 4.8 |
| Lower-inner quadrant of breast | 476 | 4.7 |
| Nipple and areola | 124 | 1.2 |
| Axillary tail of breast | 41 | 0.4 |
| Unspecified | 3,145 | 31.1 |
| **Total** | **10,097** | **100.0** |

(a) Data were not available for Victoria or the Northern Territory.

*Source:* AIHW Australian Cancer Database 2008.

## Do incidence rates differ across population groups?

In this section, differences in incidence rates are provided according to state and territory; remoteness area of residence, socioeconomic status area of residence, Aboriginal and Torres Strait Islander status and country of birth. In order to take into account differences in age structures and the size of the groups compared, age-standardised rates are provided for each of the comparisons. The data are presented for the 5 years from 2004 to 2008 rather than for just one year because presenting the data for multiple years reduces random variation in rates. This is especially important for comparisons of small subgroups (for example, Aboriginal and Torres Strait Islander females or females in smaller states and territories).

Observed differences by the characteristics examined in this section may result from a number of factors including variation in:

- population characteristics (for example, a relatively greater proportion of Aboriginal and Torres Strait Islander females live in remote areas)
- the prevalence of risk factors (for example, obesity and reproductive patterns)
- detection rates due to variation in participation rates in the BreastScreen Australia program
- the availability of diagnostic services.

## Do incidence rates differ by state and territory?

Between 2004 and 2008, there was a clear predictable relationship between the size of the jurisdiction and the number of breast cancers diagnosed, such that the largest number of cancers was in New South Wales (20,959 cases) and the smallest number in the Northern Territory (308 cases) (Table 2.7).

The incidence rate of breast cancer for females was highest in the Australian Capital Territory (124 per 100,000). This rate was significantly higher than that for other states and territories, with the exception of Queensland and South Australia. In contrast, the incidence rate in the Northern Territory (84 per 100,000) was significantly lower than that for other states and territories. The lower rate in the Northern Territory may be due, at least in part, to the higher proportion of Aboriginal and Torres Strait Islander females residing in the Northern Territory.

**Table 2.7: Incidence of breast cancer, by state and territory, females, Australia, 2004–2008**

| State or territory | Number of cases | Age-standardised rate(a) | 95% confidence interval |
|---|---|---|---|
| New South Wales | 20,959 | 111.8 | 110.3–113.3 |
| Victoria | 15,792 | 112.0 | 110.3–113.8 |
| Queensland | 12,359 | 115.5 | 113.4–117.5 |
| Western Australia | 6,021 | 112.3 | 109.5–115.2 |
| South Australia | 5,320 | 114.0 | 110.9–117.1 |
| Tasmania | 1,536 | 106.8 | 101.5–112.4 |
| Australian Capital Territory | 1,027 | 123.9 | 116.3–131.7 |
| Northern Territory | 308 | 83.5 | 73.2–94.7 |
| **Total** | **63,322** | **112.6** | **111.7–113.5** |

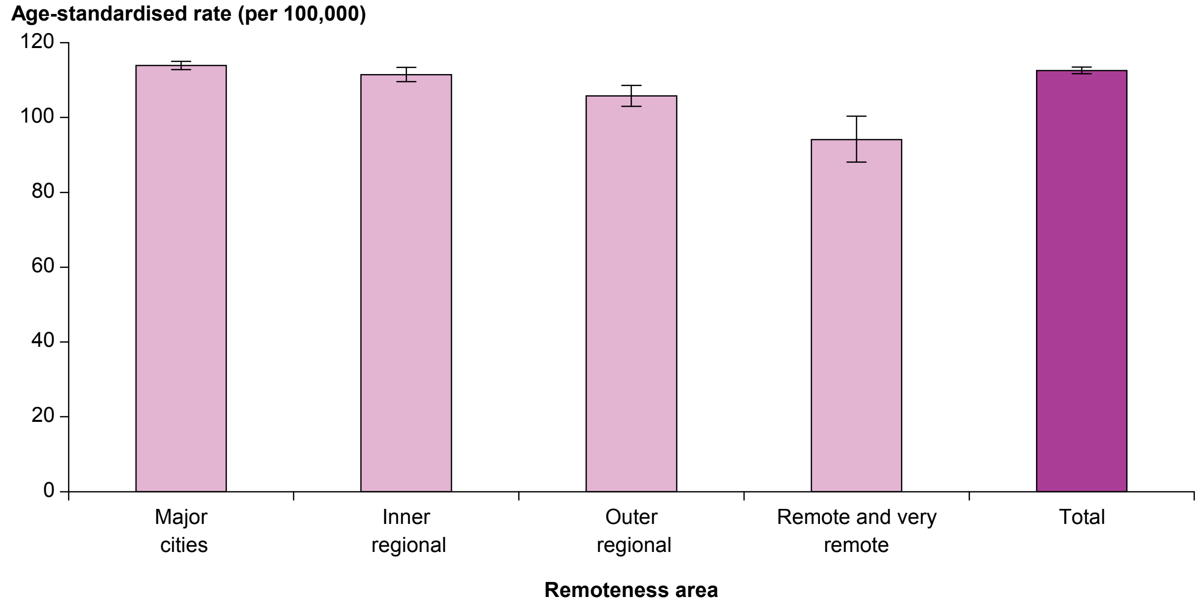
(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW Australian Cancer Database 2008.

## Do incidence rates differ by remoteness area?

To compare breast cancer incidence rates according to level of remoteness area of residence at diagnosis, the Australian Standard Geographical Classification Remoteness Area classification (ABS 2006) was used to allocate remoteness categories to areas across Australia. This classification divides all areas into five categories: *Major cities*, *Inner regional*, *Outer regional*, *Remote* and *Very remote* (AIHW 2004). For this report, the categories of *Remote* and *Very remote* were collapsed due to the small number of cases in these two subgroups. More information about this classification is in Appendix A and at <http://www.abs.gov.au/websitedbs/D3310114.nsf/home/remoteness+structure>.

As shown in Figure 2.5, during 2004 to 2008, the incidence rate of breast cancer in females tended to decrease with remoteness. While the rate in *Inner regional* areas (112 per 100,000) was similar to that in *Major cities* (114 per 100,000), the rates in *Outer regional* (106 per 100,000) and *Remote and very remote* areas (94 per 100,000) were significantly lower. Specifically, the incidence rates in *Outer regional* and *Remote and very remote* areas were 0.9 and 0.8 times that in *Major cities,* respectively. The lower incidence rate of breast cancer in remote areas may be related to a number of factors including lower cancer detection rates due to lower rates of mammographic screening though the BreastScreen Australia program in remote regions (see Chapter 7), the higher proportion of Aboriginal and Torres Strait Islander females living in remote areas, differential rates of access to diagnostic and other health services in more remote areas, and variation in other breast cancer risk factors.



*Notes*

1. Remoteness area was measured using the Australian Standard Geographical Classification Remoteness Area classification (see Appendix A).
2. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
3. The 'Total' column includes cases for which information on remoteness area was not available.
4. The data for this figure are shown in Appendix Table D2.6.

*Source:* AIHW Australian Cancer Database 2008.

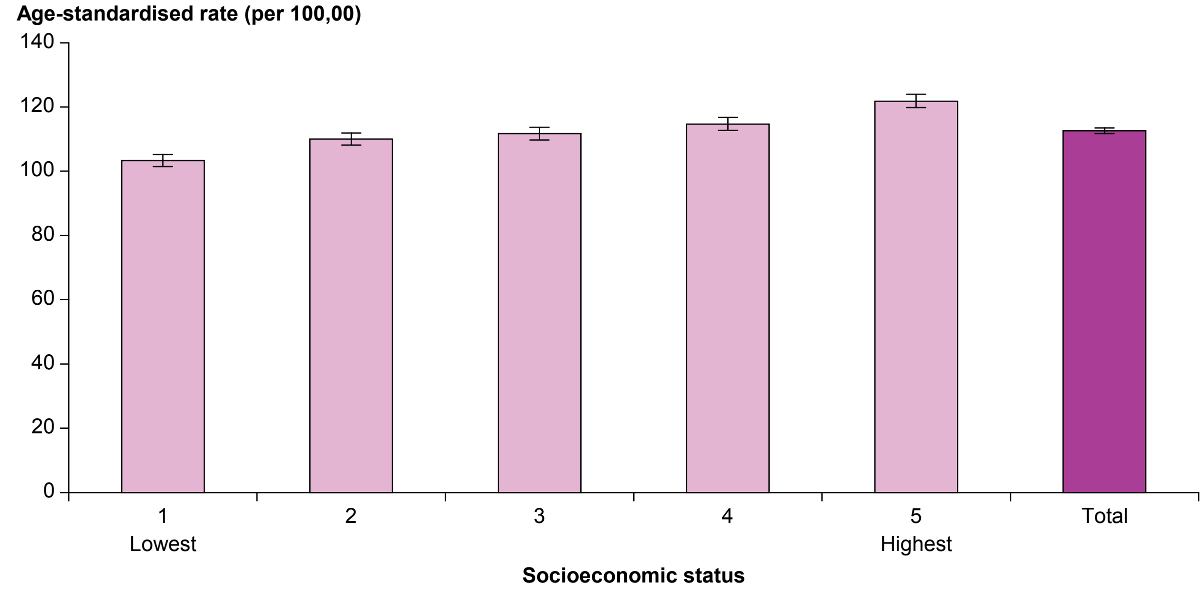
**Figure 2.5: Incidence of breast cancer, by remoteness area, females, Australia, 2004–2008**

## Do incidence rates differ by socioeconomic status?

It is well established that females of lower socioeconomic status have a higher overall risk of cancer. Socioeconomic status is associated with access to health services, material resources and educational opportunities. Furthermore, persons of lower socioeconomic status are more likely to have higher levels of cancer risk factors, including physical inactivity, tobacco use and poor diet (ACS 2010). In regard to breast cancer though, research suggests that a reverse pattern applies, with higher socioeconomic status being associated with higher breast cancer incidence (AIHW & NBOCC 2009). This may be explained, at least to some degree, by differences in fertility, reproductive and lifestyle factors associated with higher socioeconomic status.

The Index of Relative Socio-economic Disadvantage (IRSD) is used to indicate socioeconomic status. The IRSD scores each area by summarising attributes of the population such as low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations. In this report, the first socioeconomic status group (labelled '1') corresponds to geographical areas containing the 20% of the population with the lowest socioeconomic status according to the IRSD and the fifth group corresponds to the 20% of the population with the highest socioeconomic status. Note that the IRSD is an area-based measure of socioeconomic status rather than a person-based measure. It is used as a proxy for the socioeconomic status of people living in those areas and would not be correct for each person living in that area.

Between 2004 and 2008, the age-standardised incidence rate of breast cancer tended to increase with improving socioeconomic status (Figure 2.6). Females living in areas with the highest socioeconomic status (that is, group 5) had a significantly higher incidence rate of breast cancer (122 per 100,000) than those living in other areas (Figure 2.6). Meanwhile, those living in areas with the lowest socioeconomic status (group 1) had a significantly lower rate of breast cancer (103 per 100,000) than those living in other areas. The incidence rate for females in the highest socioeconomic status group was 1.2 times that of females in the lowest group.



*Notes*

1. Socioeconomic status was measured using the ABS Socio-Economic Index for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix A).
2. The rates were age-standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 females.
3. The 'Total' column includes cases for which information on socioeconomic status was not available.
4. The data for this figure are shown in Appendix Table D2.7.

*Source:* AIHW Australian Cancer Database 2008.

**Figure 2.6: Incidence of breast cancer, by socioeconomic status, females, Australia, 2004–2008**

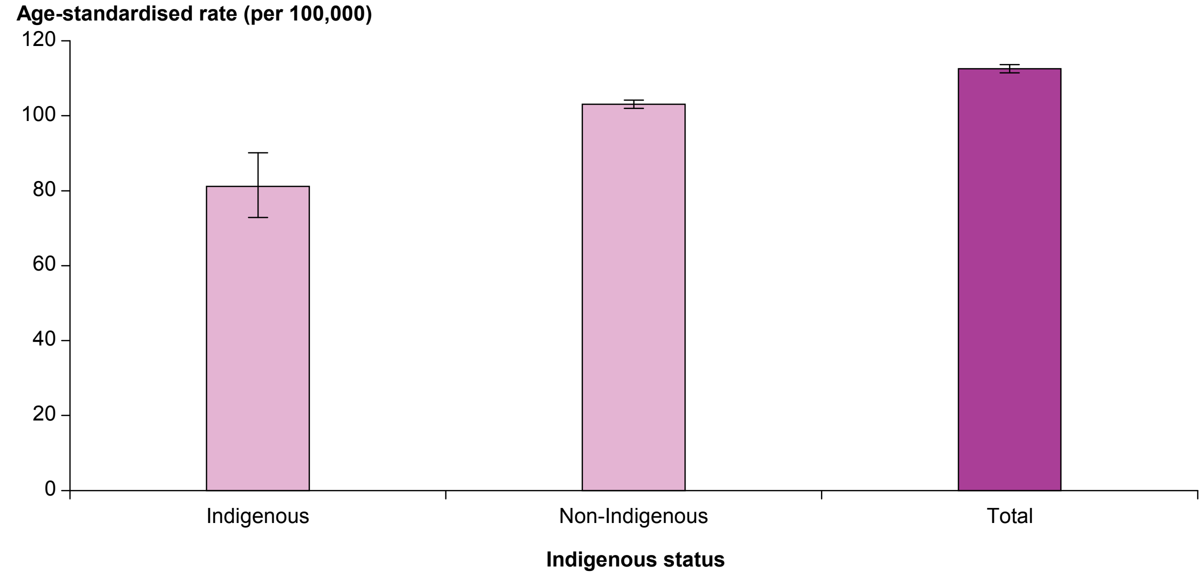
## Do incidence rates differ by Aboriginal and Torres Strait Islander status?

Across a range of health-related and socioeconomic indicators, Aboriginal and Torres Strait Islander people are disadvantaged relative to other Australians (AIHW 2011a). They are also more likely to live in remote areas of Australia and to have a relatively young age structure, with a median age of 21 years compared with 37 years for the non-Indigenous population. This age difference is believed to be largely due to higher rates of fertility as well as deaths occurring at younger ages among the Aboriginal and Torres Strait Islander population (ABS 2009c, 2009d).

Reliable data on the incidence of cancer for Aboriginal and Torres Strait Islander females are not available. While all of the state and territory cancer registries collect Aboriginal and Torres Strait Islander status information, the quality of the data in some areas is insufficient for analyses. In this report, data for four states and territories—New South Wales, Queensland, Western Australia and the Northern Territory—were used to compare breast cancer incidence by Aboriginal and Torres Strait Islander status. Note that even for these jurisdictions, the level of missing data on Aboriginal and Torres Strait Islander status is estimated to be about 9% from 2004 to 2008.

A total of 432 Aboriginal and Torres Strait Islander females were diagnosed with breast cancer in the 5 years from 2004 to 2008, making breast cancer the most common reportable cancer in Aboriginal and Torres Strait Islander females. The second most common reportable cancer was lung cancer (236 cases), followed by bowel cancer (160 cases) and cervical cancer (121 cases).

Figure 2.7 shows that Aboriginal and Torres Strait Islander were significantly less likely to be diagnosed with breast cancer than their non-Indigenous counterparts (81 and 103 per 100,000, respectively). This difference may be explained, at least in part, by the fact that Aboriginal and Torres Strait Islander females are less likely than non-Indigenous females to have a screening mammogram through BreastScreen Australia to detect asymptomatic lesions (as discussed in Chapter 7).



*Notes*

1. The rates were age-standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 females.
2. The 'Total' column includes cases for which information on Aboriginal and Torres Strait Islander status was not available.
3. Some states and territories use an imputation method for determining Aboriginal and Torres Strait Islander cancers, which may lead to differences between these data and those shown in jurisdictional cancer incidence reports.
4. The data for this figure are shown in Appendix Table D2.8.

*Source:* AIHW Australian Cancer Database 2008.

**Figure 2.7: Incidence of breast cancer, by Aboriginal and Torres Strait Islander status, females, New South Wales, Queensland, Western Australia and the Northern Territory, 2004–2008**

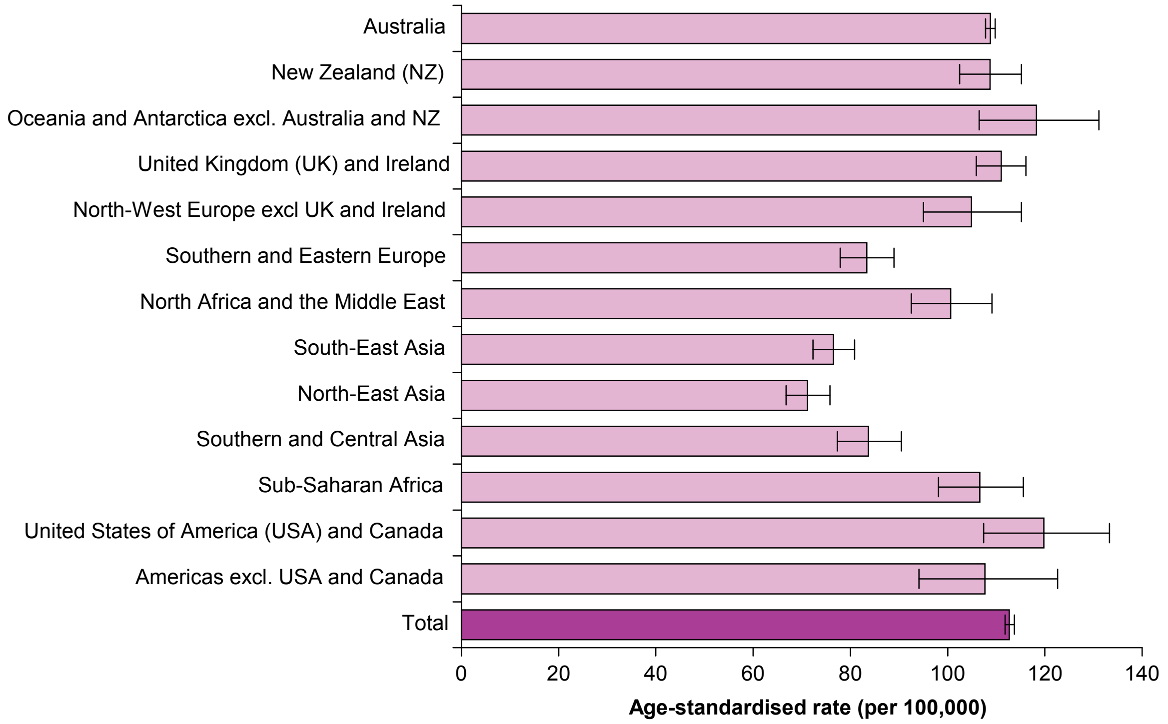
## Do incidence rates differ by country of birth?

Australia has one of the largest proportions of immigrants within its population in the world. In 2006, it was home to 4.4 million overseas-born people and one in four (25%) residents were born outside of the country (ABS 2009e). Research has found that most migrants are at least as healthy, if not more so, than the Australian-born population. This 'healthy migrant effect' is believed to result from two main factors: a self-selection process in which those people who are physically and economically able to migrate are the ones who do; and selection according to government eligibility criteria for migrants based on health, education, language and job skills (AIHW 2010b).

Furthermore, immigrants are more likely than Australian-born people to live in urban areas (ABS 2009e); this provides immigrants with relatively easier access to health-care services. At the same time, though, language and cultural barriers may mean that some immigrants are less likely or able to access available services.

Note that the data in this report do not take into account the length of time immigrants lived in Australia although it is well known that some groups—for instance, people from Asia—tend to be more recent immigrants, while people from many European countries have been in Australia for a longer period of time (ABS 2009e). Note also that for 7% of the cases of breast cancer in females, information on country of birth was not available.

The highest age-standardised rate was observed for females born in the United States of America and Canada (120 per 100,000) but this rate was not significantly higher than that observed for Australian-born females (109 per 100,000) (Figure 2.8). Females born in North-East Asia had a relatively low breast cancer incidence rate (71 per 100,000), as did those born in South-East Asia (77 per 100,000), Southern and Eastern Europe (83 per 100,000) and Southern and Central Asia (84 per 100,000). These rates were significantly lower than the rate for Australian-born females.



*Notes*

1. Country of birth is classified according to the Standard Australian Classification of Countries, 2nd edition (see Appendix A).
2. The rates were age-standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 females.
3. The 'Total' category includes cases for which information on country of birth was not available.
4. The data for this figure are shown in Appendix Table D2.9.

*Source:* AIHW Australian Cancer Database 2008.

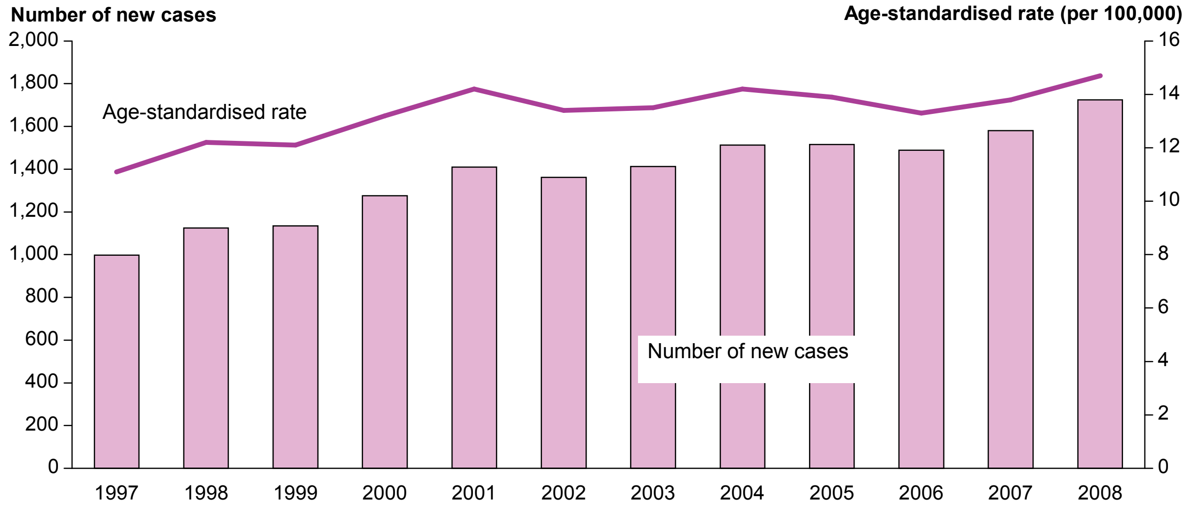
**Figure 2.8: Incidence of breast cancer, by country/region of birth, females, Australia, 2004–2008**

## How many females were newly diagnosed with ductal carcinoma in situ in 2008?

Ductal carcinoma in situ (DCIS) is a non-invasive tumour of the breast contained within the cells lining the ducts. As noted in Chapter 1, it is thought that invasive breast cancer may start as DCIS. Monitoring the number of DCIS cases over time is of particular interest in terms of assessing effects of interventions and informing broader policies for DCIS in Australian females.

Since DCIS is a condition that is generally not palpable, it is mostly diagnosed by a mammogram or incidental biopsy. The number of diagnosed DCIS cases has increased substantially since the introduction of breast cancer screening programs in the early 1990s. Information on new cases of DCIS is not included in the Australian Cancer Database because DCIS is an in situ carcinoma and not invasive. However, state and territory cancer registries have collected data on DCIS routinely for more than 10 years, and are the source of data for this chapter.

Between 1997 and 2008, the number of DCIS cases diagnosed in females increased by 72% — from 998 to 1,724 cases (Figure 2.9). Meanwhile, the age-standardised rate of females diagnosed with DCIS increased from 11 to 15 per 100,000 over the same period. This increase in the incidence rate indicates that the observed increase in the number of DCIS cases between 1997 and 2008 is not simply due to the ageing and growth in size of the population.



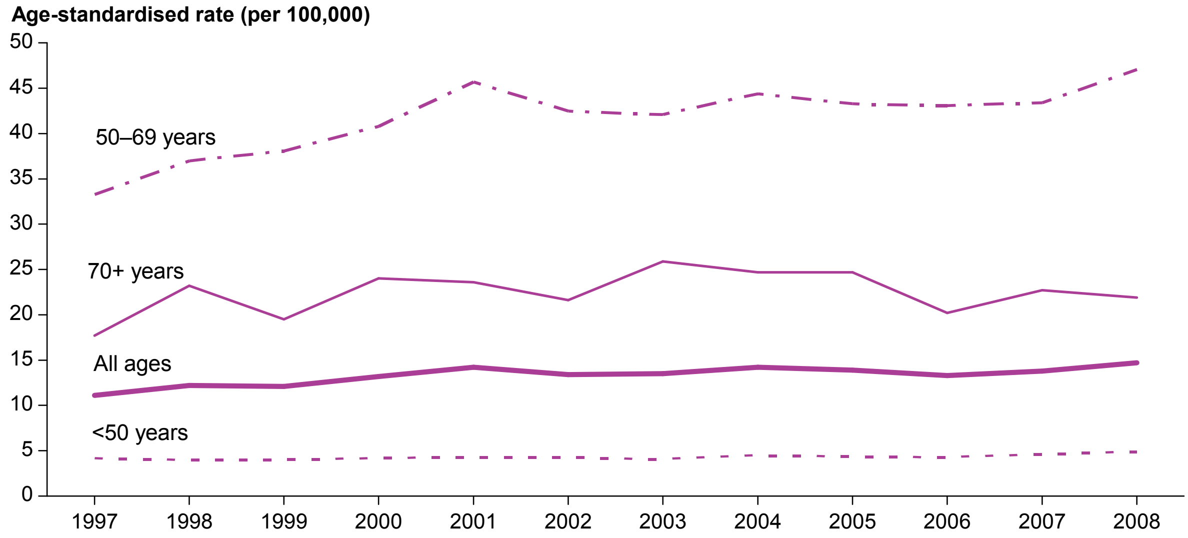
*Notes*

1. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
2. The data for this figure are shown in Appendix Table D2.10.

*Source:* AIHW analyses of data supplied by state/territory cancer registries.

**Figure 2.9: Incidence of ductal carcinoma in situ, females, Australia, 1997 to 2008**

The incidence rate for DCIS by age is shown in Figure 2.10. Since the target group for screening mammography through BreastScreen Australia is females aged 50 to 69, it was expected that the rate of DCIS for females in that age group would be much higher than that for females in other age groups. Over all of the years considered, this was the case. Furthermore, the data suggest a general increase in the incidence rate of DCIS cases for females aged 50–69 between 1997 and 2008 (from 33 to 47 per 100,000), although with a plateau suggested in 2001–2008. Meanwhile, over the years for which data were available, the rate of DCIS cases for females younger than 50 was fairly steady (ranging between 4 and 5 per 100,000), probably because these females are less likely than others to have a screening mammogram (see Chapter 7).



*Notes*

1. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
2. The data for this figure are shown in Appendix Table D2.11.

*Source:* AIHW analyses of data supplied by state/territory cancer registries.

**Figure 2.10: Incidence of ductal carcinoma in situ by age group, females, Australia 1997 to 2008**

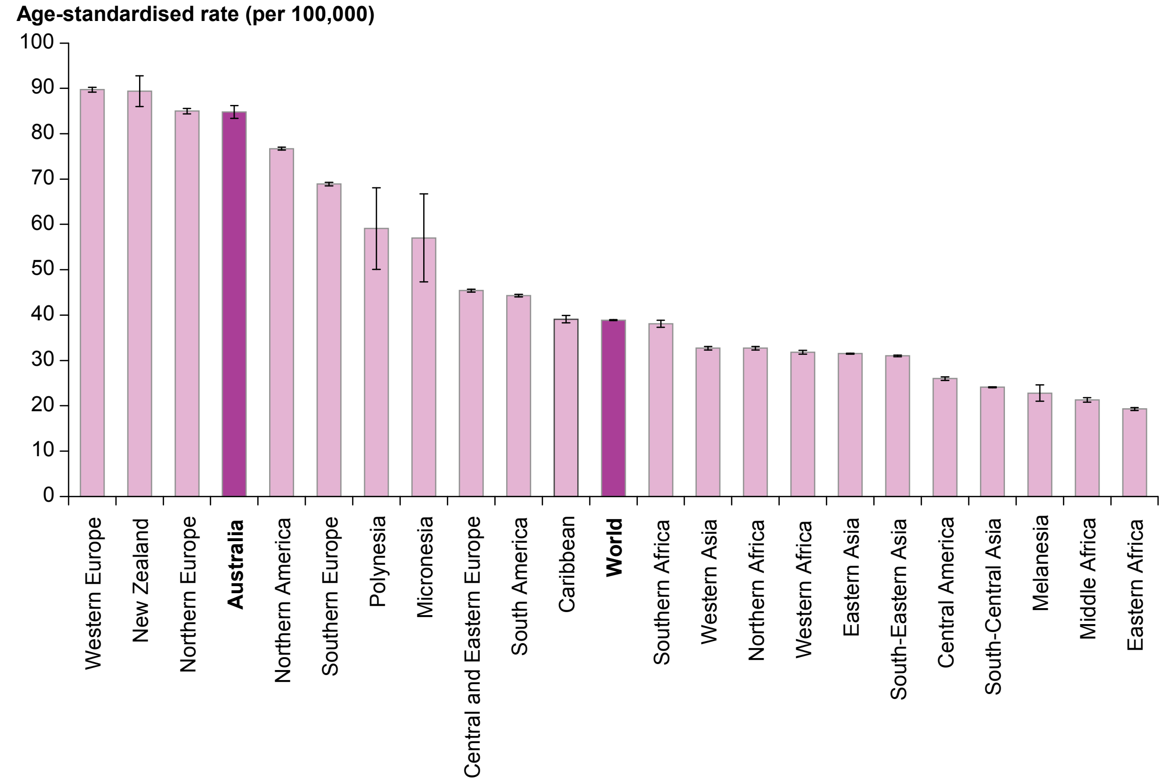
## How does Australia compare internationally?

In this section, the incidence rate of breast cancer in Australia is compared with that for other countries and regions, with the rates age-standardised to the World Standard Population (1966). The data were sourced from the GLOBOCAN database, which is prepared by the International Agency for Research on Cancer (IARC)(Ferlay et al. 2010). The most recent GLOBOCAN estimates are for 2008, with these estimates based on incidence data from about 3 to 5 years earlier. See Appendix C for further details about this database.

As discussed in Chapter 1, caution must be taken when comparing data from different countries since observed differences may be due to a range of methodological factors, not just differences in the underlying rates.

Figure 2.11 shows the estimated incidence rates of breast cancer around the world by region, and for Australia and New Zealand. The estimated age-standardised rate of breast cancer for Australian females (85 per 100,000) was only significantly lower than the rate estimated for Western Europe (90 per 100,000). Meanwhile, it was not significantly different than that estimated for females in New Zealand (89 per 100,000) and Northern Europe (85 per 100,000). In contrast, Australia’s rate was significantly higher than that for females in regions such as Southern Europe (69 per 100,000 females) and Central and Eastern Europe (45 per 100,000 females), as well as each of the African and Asian regions.

A number of factors could explain the international differences in breast cancer incidence rates including differences in genetic susceptibility, reproductive patterns, lifestyle (for example, diet and physical activity), obesity levels, screening intensity and use of hormone replacement therapy (CCS & NCIC 2007; Hulka & Moorman 2008), as well as differences in diagnostic procedures and completeness of cancer registration.



*Notes*

1. The data were estimated for 2008 and are based on data from approximately 3 to 5 years earlier.
2. The rates were age-standardised by the IARC using Doll et al. (1966) World Standard Population. The confidence intervals (as shown by the error bars) are approximations and were calculated by the AIHW (see Appendix B).
3. The data for this figure are shown in Appendix Table D2.12.

*Source:* Ferlay et al. 2010.

**Figure 2.11: International comparison of estimated incidence of breast cancer, females, 2008**

# Incidence of breast cancer in males

Since males also have breast tissue, they can develop breast cancer. However, breast cancer is far less common in males than females because their breast duct cells are less developed and because their breast cells are not constantly exposed to the tumour-promoting effects of female hormones (ACS 2012).

The risk of a man being diagnosed with a breast cancer before the age of 75 was low—1 in 1,258 based on 2008 data (Table 2.8). The corresponding risk to the age of 85 was 1 in 688.

Table 2.9 presents data on the incidence of breast cancer by age for males in the 5 years 2004–2008. The lowest incidence rate was observed for those under the age of 50 (0.1 per 100,000), while the highest rates were found for those aged 70–79 (6 per 100,000) and 80 and over (7 per 100,000).

**Table 2.8: Risk and average age at diagnosis of breast cancer, males, Australia, selected years from 1982 to 2008**

| Year | Risk to age 75 | Risk to age 85 | Mean age at first diagnosis | Median age at first diagnosis |
|---|---|---|---|---|
| 1982 | 1 in 1270 | 1 in 624 | 65.9 | 68.0 |
| 1988 | 1 in 1370 | 1 in 761 | 66.5 | 68.5 |
| 1992 | 1 in 2401 | 1 in 998 | 67.5 | 67.0 |
| 1998 | 1 in 1077 | 1 in 679 | 64.6 | 66.0 |
| 2002 | 1 in 1324 | 1 in 756 | 65.1 | 66.0 |
| 2008 | 1 in 1258 | 1 in 688 | 69.0 | 71.0 |

*Source:* AIHW Australian Cancer Database 2008.

**Table 2.9: Incidence of breast cancer by age group, males, Australia, 2004–2008**

| Age group (years) | Number of cases | Age-specific rate(a) | 95% confidence interval |
|---|---|---|---|
| <50 | 39 | 0.1 | 0.1–0.1 |
| 50–59 | 91 | 1.4 | 1.1–1.7 |
| 60–69 | 128 | 2.9 | 2.4–3.4 |
| 70–79 | 166 | 5.9 | 5.1–6.9 |
| 80+ | 97 | 7.2 | 5.8–8.7 |
| **Total(b)** | **521** | **1.0** | **0.9–1.1** |

(a) Number of cases per 100,000 males.

(b) The rate shown in this row was age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 males.

*Source:* AIHW Australian Cancer Database 2008.

The data also indicate that, on average, males tend to be diagnosed at an older age than females (Tables 2.2 and 2.8). In 2008, the mean age at first diagnosis of breast cancer in males was 69 years compared with 60 years for females.

Most breast cancers diagnosed in males during 2004 to 2008 were categorised as *Invasive ductal carcinoma* (441 cases), with most of these being *infiltrating duct carcinoma, not otherwise specified* (420 cases) (see Appendix Table D2.13).

Even though the number of males diagnosed with breast cancer has increased over the years, breast cancer in men is still rare (Table 2.10). In the 1980s, the number of new breast cancers in males ranged between 45 and 68 cases. In the 2000s, it ranged between 80 and 113 cases. In 2008, 113 breast cancers were diagnosed in males, representing 0.2% of all cancers in males (excluding basal and squamous cell carcinomas of the skin).

Considering breast cancer in both males and females, the total number of breast cancers in 2008 was 13,680, with men accounting for 0.8% of these cancers. The female to male incidence ratio was 120 to 1.

The age-standardised incidence rate of breast cancer in males remained largely unchanged over the 27-year period for which national data are available, at around 1 per 100,000. Since males are not eligible for mammograms through BreastScreen Australia's program, the number of breast cancers among males has not been influenced by the roll-out of screening mammography across Australia.

**Table 2.10: Incidence of breast cancer, males, Australia, 1982 to 2008**

| Year | Number of cases | Percentage of all cancer cases in males | Age-standardised rate[(a)] | 95% confidence interval |
|---|---|---|---|---|
| 1982 | 61 | 0.2 | 1.2 | 0.9–1.6 |
| 1983 | 45 | 0.2 | 0.9 | 0.6–1.2 |
| 1984 | 49 | 0.2 | 0.8 | 0.6–1.1 |
| 1985 | 59 | 0.2 | 1.0 | 0.7–1.3 |
| 1986 | 53 | 0.2 | 0.9 | 0.7–1.2 |
| 1987 | 56 | 0.2 | 0.9 | 0.6–1.1 |
| 1988 | 60 | 0.2 | 1.0 | 0.7–1.3 |
| 1989 | 68 | 0.2 | 1.0 | 0.8–1.3 |
| 1990 | 78 | 0.2 | 1.2 | 0.9–1.5 |
| 1991 | 65 | 0.2 | 1.0 | 0.8–1.3 |
| 1992 | 47 | 0.1 | 0.7 | 0.5–1.0 |
| 1993 | 64 | 0.2 | 0.9 | 0.7–1.1 |
| 1994 | 72 | 0.2 | 1.0 | 0.8–1.3 |
| 1995 | 57 | 0.1 | 0.8 | 0.6–1.0 |
| 1996 | 86 | 0.2 | 1.2 | 0.9–1.4 |
| 1997 | 71 | 0.2 | 0.9 | 0.7–1.1 |
| 1998 | 91 | 0.2 | 1.1 | 0.9–1.3 |
| 1999 | 73 | 0.2 | 0.9 | 0.7–1.1 |
| 2000 | 80 | 0.2 | 0.9 | 0.7–1.2 |
| 2001 | 90 | 0.2 | 1.1 | 0.8–1.3 |
| 2002 | 85 | 0.2 | 0.9 | 0.7–1.1 |
| 2003 | 101 | 0.2 | 1.1 | 0.9–1.3 |
| 2004 | 108 | 0.2 | 1.1 | 0.9–1.4 |
| 2005 | 97 | 0.2 | 1.0 | 0.8–1.2 |
| 2006 | 100 | 0.2 | 1.0 | 0.8–1.2 |
| 2007 | 103 | 0.2 | 1.0 | 0.8–1.2 |
| 2008 | 113 | 0.2 | 1.1 | 0.9–1.3 |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 males.

*Source:* AIHW Australian Cancer Database 2008.

# 3 Mortality from breast cancer

**Key findings**

**Females**

In 2007 in Australia:

- Breast cancer was the second most common cause of cancer death among Australian females, exceeded only by lung cancer.
- 2,680 females died from breast cancer.
- 87% of deaths due to breast cancer occurred in females aged 50 and over.
- The risk of a female in the general population dying from breast cancer before the age of 85 was 1 in 37.

Between 1982 and 2007:

- The number of female deaths due to breast cancer increased from 1,987 to 2,669 between 1982 and 1994. After this time, the number of deaths declined for several years, followed by a small increase from 2,521 to 2,680 between 2000 and 2007.
- The age-standardised mortality rate for breast cancer in females remained relatively stable around 30 per 100,000 between 1982 and the early 1990s, followed by a marked decline in rates from 1994 (31 per 100,000) to 2007 (22 per 100,000).

In the 5 years from 2003 to 2007:

- The age-standardised mortality rate varied by remoteness.
- There was no consistent association between the mortality rate and socioeconomic status.
- Mortality did not differ between Aboriginal and Torres Strait Islander females and non-Indigenous females.

**Males**

In 2007 in Australia:

- 26 males died from breast cancer.
- The risk of a male in the general population dying from breast cancer before the age of 85 was 1 in 3,227.

# About mortality from breast cancer

The number of deaths from breast cancer in a given time period is a result of the incidence of breast cancer, as well as factors that affect the likelihood of death from the disease such as the characteristics of the breast cancers diagnosed (for example, stage at diagnosis and type of breast cancer) and the nature and quality of treatments received.

In this report, mortality refers to the number of deaths for which the underlying cause was breast cancer. The breast cancer that led to the death may have been diagnosed many years previously, in the same year in which the person died or, in some cases, after death (for example at autopsy). Information on the underlying cause of death is derived from the medical certificate of cause of death, which is issued by a certified medical practitioner.

The main data source used in this chapter was the AIHW National Mortality Database. This database contains information about all deaths registered in Australia (see Appendix C for further information).

In this chapter, information on the number of female and male deaths attributed to breast cancer in 2007 is presented, as is trend information. In addition, for females, differences in mortality rates according to age, state and territory, remoteness area, socioeconomic status, Aboriginal and Torres Strait Islander status and country of birth are provided. Data for Australia are also compared with data for other countries.

# Mortality of females from breast cancer

## How many females died from breast cancer in 2007?

In 2007, breast cancer was the second most common cause of cancer deaths of females, with 2,680 females dying from the disease (Table 3.1). This means that on average, 7 females in Australia died from breast cancer every day in 2007.

The age-standardised mortality rate for breast cancer was 22 per 100,000. Moreover, deaths from breast cancer accounted for 16% of deaths from cancer in females and for 4% of deaths from any cause in females.

**Table 3.1: The five most common types of cancer death, females, Australia, 2007**

| Cancer type (ICD-10 codes) | Number of deaths | Percentage of all cancer deaths in females | Percentage of all deaths in females | Age-standardised rate[(a)] | 95% confidence interval |
|---|---|---|---|---|---|
| Lung (C33–C34) | 2,911 | 16.8 | 4.3 | 24.0 | 23.1–24.9 |
| Breast (C50) | 2,680 | 15.5 | 4.0 | 22.1 | 21.2–22.9 |
| Bowel (C18–C20) | 1,856 | 10.7 | 2.8 | 14.6 | 13.9–15.3 |
| Total lymphoid cancers (C81–C85, C88, C90, C91) | 1,129 | 6.5 | 1.7 | 8.8 | 8.3–9.3 |
| Unknown primary site (C77–C80) | 1,097 | 6.3 | 1.6 | 8.5 | 8.0–9.1 |
| **All cancers[(b)]** | **17,322** | **100.0** | **25.7** | **139.1** | **137.0–141.2** |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

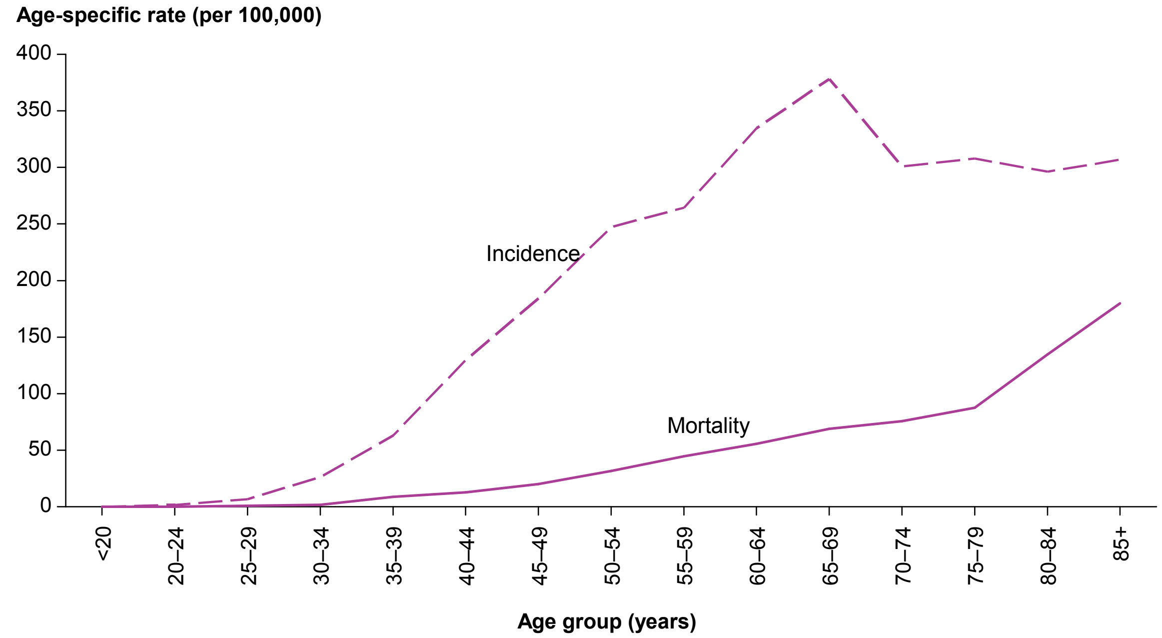
(b) Includes cancers coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3.

*Source:* AIHW National Mortality Database.

## Does mortality differ by age?

In 2007, 13% of deaths from breast cancer in females occurred in those younger than 50, 40% in those aged 50–69 and 47% in those aged 70 and over.

Differences in the mortality rate according to age at death for 2007 are shown in Figure 3.1. The incidence rate for 2008 by age at diagnosis is also indicated. While the incidence rate of breast cancer for females aged 70 and over was lower than that for females in their 60s (as discussed in Chapter 2), this is not the case in regard to the mortality rate. Instead, the mortality rate increased with age, with the sharpest increase observed for females aged 80 and over. Specifically, in 2007, the mortality rate from breast cancer was 135 (per 100,000) for females aged 80–84 and 180 (per 100,000) for females aged 85 and over. This latter rate is more than double the rate observed for females aged 75–79 (88 per 100,000) and more than five times the rate for those aged 50–54 (32 per 100,000).



*Note:* The data for this figure are shown in Appendix Tables D2.1 and D3.1.

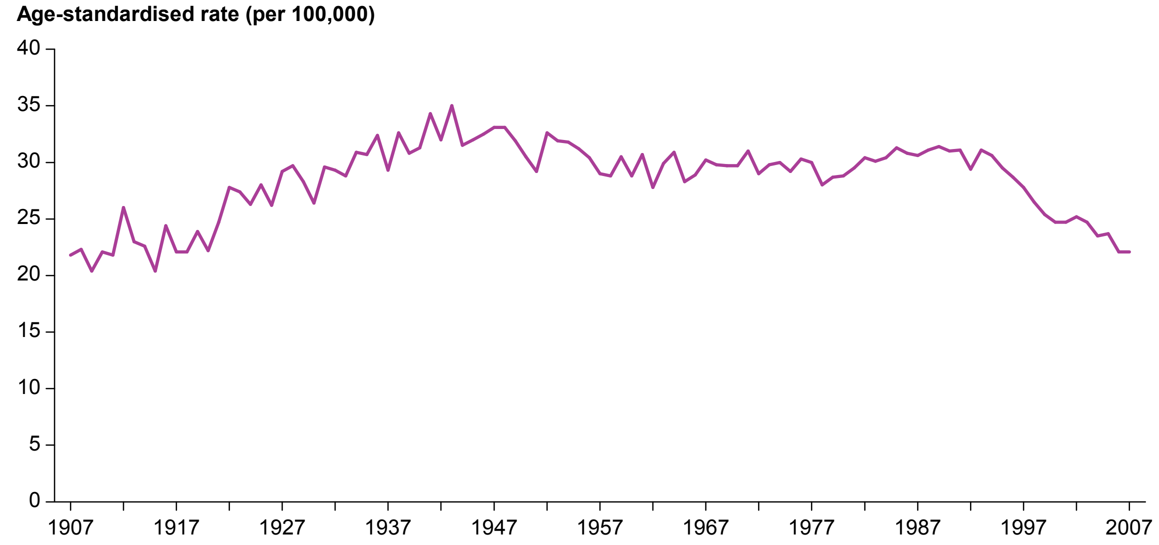
*Source*: AIHW Australian Cancer Database 2008; AIHW National Mortality Database.

**Figure 3.1: Breast cancer incidence, 2008 and mortality, 2007, by age group, females, Australia**

## Have breast cancer mortality rates changed over time?

In Figure 3.2, age-standardised mortality rates for females due to breast cancer are shown for the 101 years from 1907 to 2007 according to year of *registration* of death. While mortality data according to year of death are generally shown in this chapter, year of registration data are shown here because such long-term trend data are not available for breast cancer mortality by year of death. As a result, the data in this figure are slightly different from the mortality data presented elsewhere in this report, but the overall trends are the same.

Numerous year-to-year fluctuations in the mortality rate for females due to breast cancer are seen in the data. Nonetheless, the overall pattern indicates that mortality rates from breast cancer for females increased steadily during the first half of the 20th century, after which there was a decline in the middle of the century. This was followed by a general levelling of rates until about the mid-1990s when the mortality rate began to decline again. By 2007, the mortality rate of females from breast cancer was at the same level as that observed at the beginning of the 20th century.



*Notes*

1. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
2. These data are based on year of registration of death rather than year of death.
3. The data for this figure are shown in Appendix Table D3.2.

*Source*: AIHW National General Record of Incidence and Mortality 2007.

**Figure 3.2: Mortality from breast cancer, by year of death registration, females, Australia, 1907 to 2007**

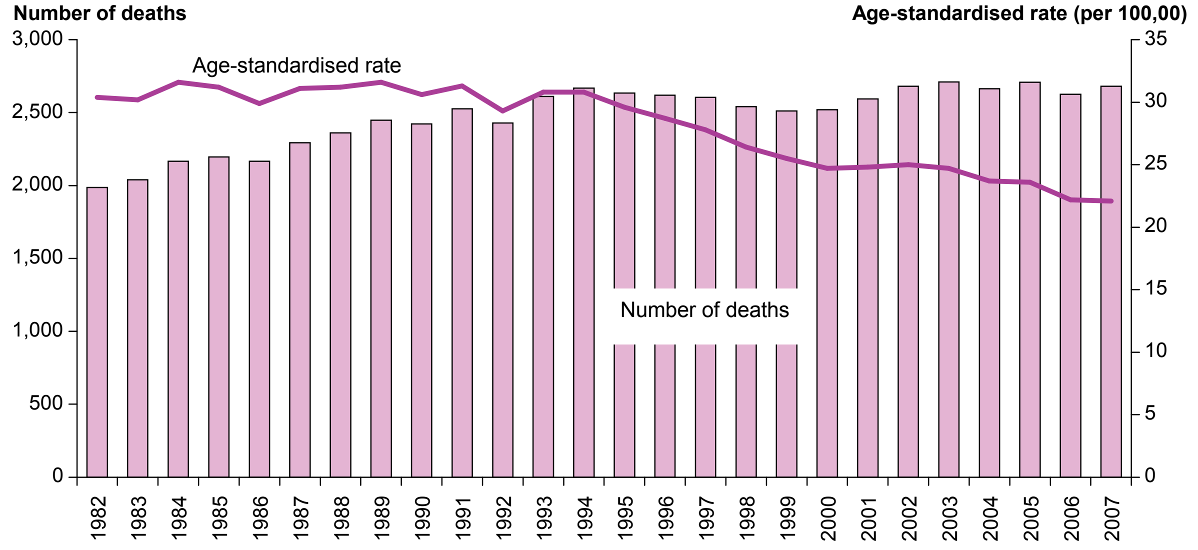
## Recent trends in mortality rates, 1982 to 2007

Information on deaths of females from breast cancer for the 26-year period from 1982 to 2007 is presented in Figure 3.3. The number increased between 1982 (1,987 deaths) and 1994 (2,669 deaths). After this, the number tended to fall for several years, with 2,512 deaths recorded in 1999, followed by a general increase in the number of deaths from breast cancer in the 2000s.

The proportion of cancer deaths of females that were due to breast cancer fell from 19% in 1982 to 16% in 2007. In contrast, there was no noticeable trend in the proportion of female deaths from all causes (not just cancer) that were due to breast cancer, with this figure approximating 4% for all of the years between 1982 and 2007 (Appendix Table D3.3).

When changes in age structure and population size are taken into account, the trend data indicate that the mortality rate for females remained fairly level from 1982 to the early 1990s (at around 29 to 32 per 100,000). After this, there was an appreciable decline in mortality rates. Specifically, between 1994 (when mortality was 31 per 100,000) and 2007 (22 per 100,000), the mortality rate for females decreased by 29%. The rate recorded for 2007 (22 per 100,000) was the lowest recorded since 1982.

This pattern of decrease in age-standardised mortality rates of females from breast cancer in recent decades is also observed in data from a number of other Westernised countries including Canada (CCSSCCS 2011), New Zealand (NZ Ministry of Health 2011), the United Kingdom (Cancer Reseach UK 2012) and the USA (ACS 2012). This decline is believed to be due mainly to increased availability and quality of screening mammography (and the related increase in diagnoses at an earlier stage), as well as improved treatment (ACS 2012; CCS & NCIC 2007; IARC 2008).



*Notes*

1. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
2. The data for this figure are shown in Appendix Table D3.3.

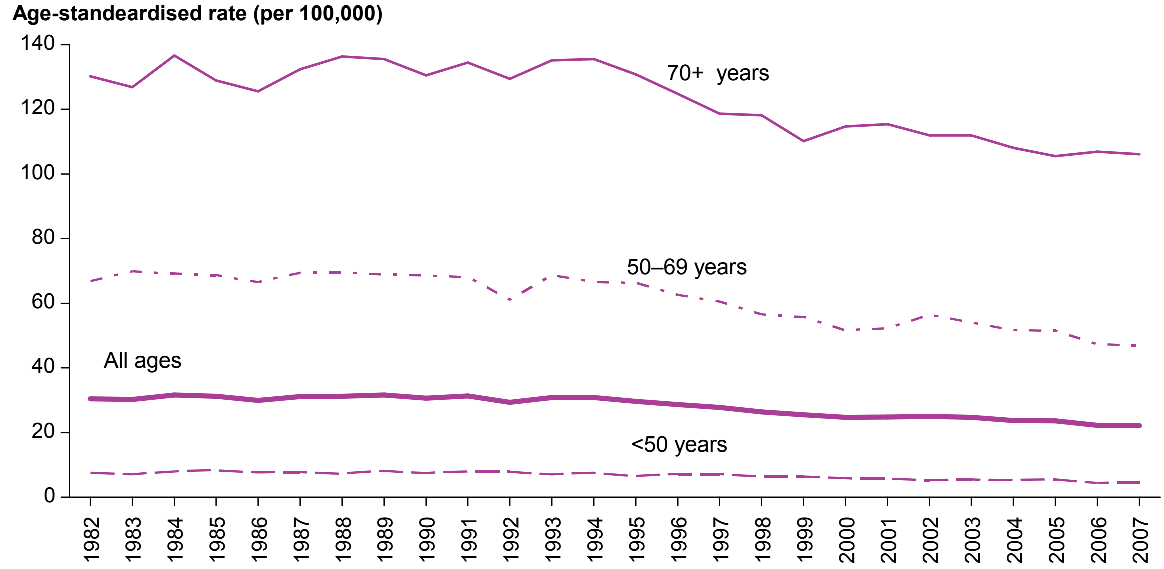
*Source*: AIHW National Mortality Database.

**Figure 3.3: Mortality from breast cancer, females, Australia, 1982 to 2007**

## Do trends in mortality differ by age at death?

The data in Figure 3.4 show that for females aged 70 and over, the mortality rate began to decrease in the mid-1990s and continued to do so over the following years, with a decrease of 22% between 1994 and 2007 (136 and 106 per 100,000, respectively). For those aged 50 to 69, a decrease in mortality rates was also found, with a fall in rates of around 32% from 1993 (69 per 100,000) to 2007 (47 per 100,000). Even though mortality from breast cancer for females younger than 50 was relatively low throughout the period considered, the mortality rate also decreased for this group by 38% from 1994 to 2007 (8 and 5 per 100,000, respectively).

The decrease in mortality rates for females aged 50–69 and 70 and over is partly due to the introduction of mammographic screening through BreastScreen Australia (BreastScreen Australia EAC 2009). This is because of continued elective screening in older females and also because mortality rates in older females often reflect deaths in females diagnosed with breast cancer several years earlier (Cancer Council Victoria 2002) when some of them would have been in the target age range for mammographic screening.



*Notes*

1. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
2. The data for this figure are shown in Appendix Table D3.4.

*Source*: AIHW National Mortality Database.

**Figure 3.4: Mortality from breast cancer, by age at death, females, Australia, 1982 to 2007**

## What is the risk of death from breast cancer?

The risk of a female in the general population dying from breast cancer before the age of 85 decreased from 1 in 29 in 1982 to 1 in 37 in 2007(Table 3.2).

## What is the average age at death?

The average age at which females die from breast cancer has increased over time (Table 3.2). In 1982, the mean age of death was 64, gradually increasing to 68 in 2007. The median age at death increased from 64 to 68 over this same period.

**Table 3.2: Risk of death and average age at death from breast cancer, females, Australia, 1982 to 2007**

| Year | Risk to age 75 | Risk to age 85 | Mean age at death | Median age at death |
|---|---|---|---|---|
| 1982 | 1 in 45 | 1 in 29 | 64.2 | 64.0 |
| 1983 | 1 in 43 | 1 in 29 | 64.4 | 64.0 |
| 1984 | 1 in 43 | 1 in 27 | 64.6 | 65.0 |
| 1985 | 1 in 43 | 1 in 28 | 64.2 | 65.0 |
| 1986 | 1 in 45 | 1 in 29 | 64.5 | 65.0 |
| 1987 | 1 in 44 | 1 in 28 | 64.5 | 65.0 |
| 1988 | 1 in 44 | 1 in 28 | 65.3 | 66.0 |
| 1989 | 1 in 43 | 1 in 27 | 64.8 | 65.0 |
| 1990 | 1 in 44 | 1 in 28 | 65.0 | 66.0 |
| 1991 | 1 in 43 | 1 in 28 | 64.7 | 66.0 |
| 1992 | 1 in 47 | 1 in 30 | 65.0 | 66.0 |
| 1993 | 1 in 45 | 1 in 27 | 65.6 | 66.0 |
| 1994 | 1 in 45 | 1 in 28 | 65.3 | 66.0 |
| 1995 | 1 in 46 | 1 in 29 | 65.9 | 67.0 |
| 1996 | 1 in 48 | 1 in 30 | 65.3 | 66.0 |
| 1997 | 1 in 49 | 1 in 31 | 65.0 | 66.0 |
| 1998 | 1 in 53 | 1 in 33 | 65.9 | 66.0 |
| 1999 | 1 in 53 | 1 in 34 | 65.4 | 65.0 |
| 2000 | 1 in 56 | 1 in 35 | 66.3 | 67.0 |
| 2001 | 1 in 55 | 1 in 34 | 66.5 | 67.0 |
| 2002 | 1 in 56 | 1 in 34 | 66.6 | 67.0 |
| 2003 | 1 in 56 | 1 in 35 | 66.7 | 67.0 |
| 2004 | 1 in 57 | 1 in 35 | 66.9 | 67.0 |
| 2005 | 1 in 59 | 1 in 36 | 66.6 | 67.0 |
| 2006 | 1 in 63 | 1 in 37 | 67.7 | 68.0 |
| 2007 | 1 in 63 | 1 in 37 | 67.8 | 68.0 |

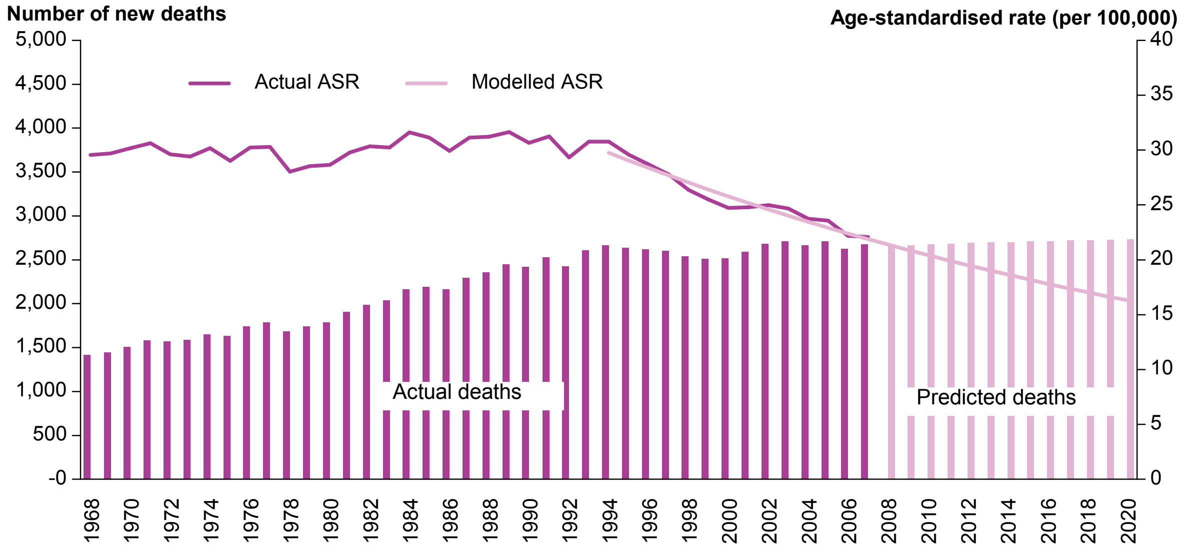
*Source*: AIHW National Mortality Database.

## How many females are expected to die from breast cancer in 2020?

In this section, longer-term national projections of breast cancer mortality from 2011 to 2020 are presented (Figure 3.5). These projections are a mathematical extrapolation of past trends, assuming that the same trend will continue into the future, and are intended to illustrate future changes that might reasonably be expected to occur if the stated assumptions were to apply over the projection period. The projections are not forecasts and do not attempt to allow for future changes in cancer detection methods, changes in cancer risk factors or for non-demographic factors (such as government policy decisions or significant changes in treatment). The mortality projections were calculated in a similar manner to the incidence projections in Chapter 2. Further information about the projection methodology can be found in the AIHW report *Cancer incidence projections, Australia 2011 to 2020* (AIHW 2012a). Note that the projections were based on national cancer mortality data from 1994 to 2007.

The number of deaths from breast cancer is expected to continue to marginally increase in the future. In 2012, the number of deaths from breast cancer is expected to be 2,690; in 2020, this number is expected to have increased to 2,730.

When expected changes in the age structure and size of the population are taken into account, the results suggest that the age-standardised mortality rate of breast cancer will decline from 19.5 deaths per 100,000 females in 2012 to 16.3 deaths per 100,000 females in 2020.



*Notes*

(a) The projections are based on incidence data for 1994 to 2007.

(b) Age-standardised rates are age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

(c) The data for this figure are shown in Appendix Table D3.5.

*Source*: AIHW National Mortality Database 2007.

**Figure 3.5: Mortality from breast cancer, observed for 1968 to 2007 and projected to 2020, females, Australia**

## Do mortality rates differ across population groups?

In this section, differences in mortality rates of females from breast cancer are presented according to state and territory, remoteness area, socioeconomic status, Aboriginal and Torres Strait Islander status and country of birth. Any observed differences among the groups compared may be due to a number of reasons, including:

- differences in incidence rates of breast cancer
- the characteristics of the cancers diagnosed (for example, stage at diagnosis and type of tumour), and
- access to, and quality of, treatment.

The mortality rates are presented for the 5 years from 2003 to 2007 rather than for just one year, since presenting data for multiple years reduces random variation in rates.

In this section, the age-standardised rates are compared by calculating rate ratios. Further information about rate ratios is in Appendix B.

## Do mortality rates differ by state and territory?

Between 2003 and 2007, the number of deaths of females from breast cancer ranged from 4,577 in New South Wales to 58 in the Northern Territory (Table 3.3). The age-standardised mortality rate was lowest in the Northern Territory (19 per 100,000), although this rate does not differ significantly from that of the other states and territories. The highest mortality rate from breast cancer for females was in South Australia (24 per 100,000). This rate was not significantly different from that of the other states and territories.

**Table 3.3: Mortality from breast cancer, by state and territory, females, Australia, 2003–2007**

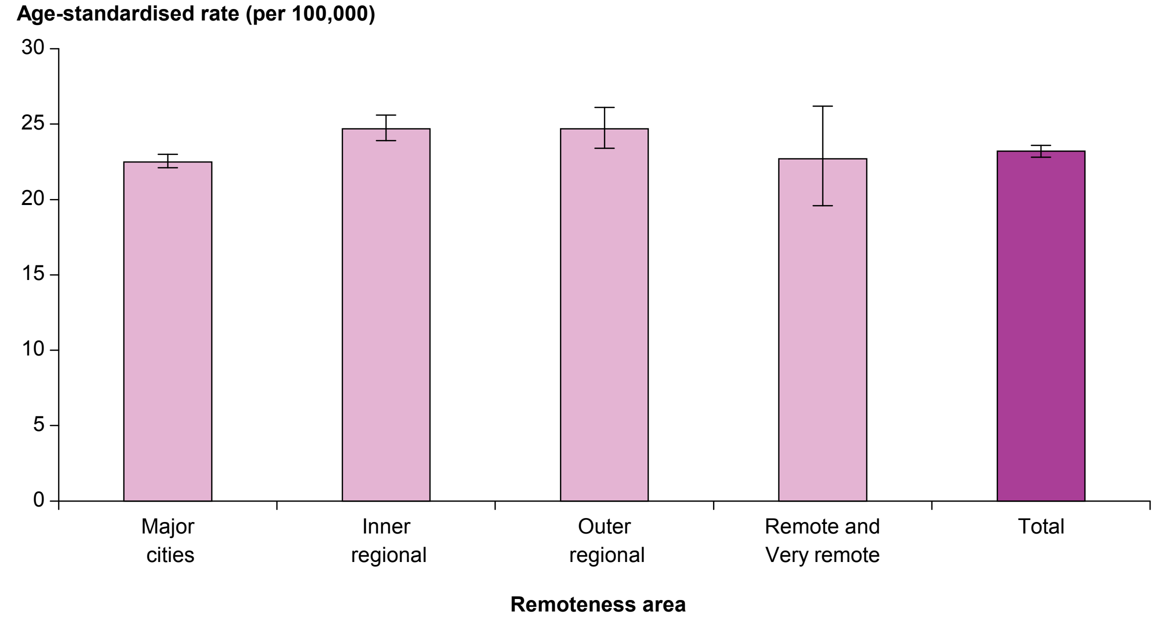
| State or territory | Number of deaths | Age-standardised rate[(a)] | 95% confidence interval |
|---|---|---|---|
| New South Wales | 4,577 | 23.4 | 22.8-24.1 |
| Victoria | 3,467 | 23.8 | 23.0-24.7 |
| Queensland | 2,367 | 22.2 | 21.3-23.1 |
| Western Australia | 1,182 | 22.2 | 21.0-23.6 |
| South Australia | 1,216 | 24.4 | 23.0-25.8 |
| Tasmania | 339 | 22.6 | 20.2-25.1 |
| Australian Capital Territory | 183 | 23.3 | 20.0-27.0 |
| Northern Territory | 58 | 19.0 | 13.7-25.5 |
| **Total** | **13,389** | **23.2** | **22.8-23.6** |

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

*Source:* AIHW National Mortality Database.

## Do mortality rates differ by remoteness area?

Mortality rates due to breast cancer are presented in Figure 3.6 according to remoteness area of residence at time of death. Between 2003 and 2007, the mortality rates for females in *Inner regional* (25 per 100,000) and *Outer regional* (25 per 100,000) areas were significantly higher than that for females in *Major cities* (23 per 100,000). The rate for females in *Remote and very remote* areas was at the same level (23 per 100,000) as for *Major cities*.



*Notes*

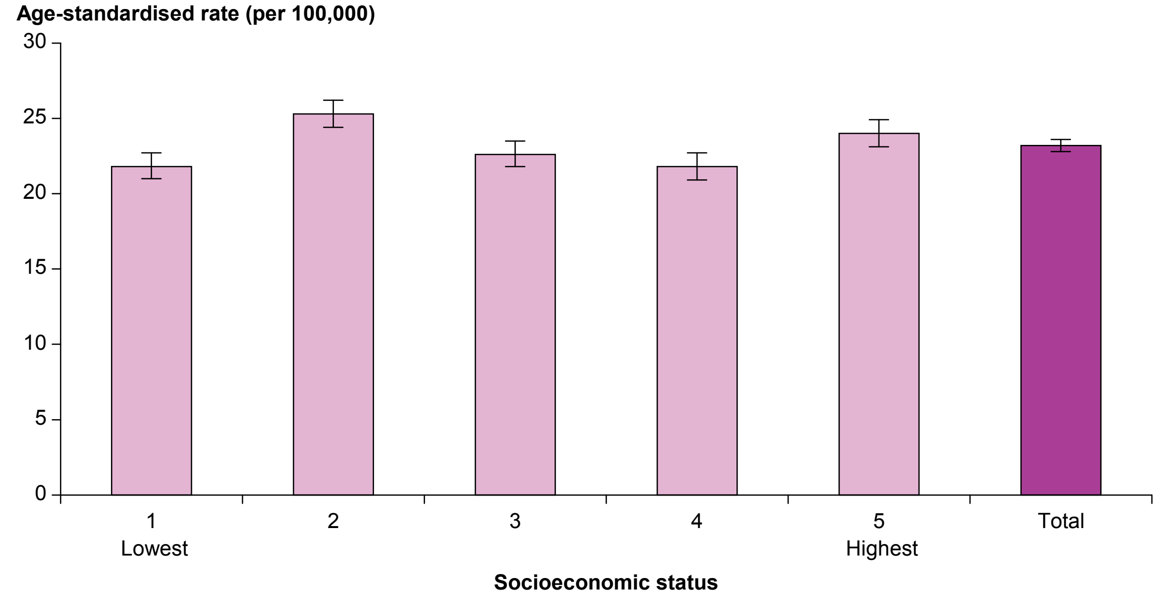
1. Remoteness area was measured using the Australian Standard Geographical Classification Remoteness Area classification (see Appendix A).
2. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
3. The 'Total' column includes deaths for which information on remoteness area was not available.
4. The data for this figure are shown in Appendix Table D3.6.

*Source:* AIHW National Mortality Database.

**Figure 3.6: Mortality from breast cancer, by remoteness area, females, Australia, 2003–2007**

## Do mortality rates differ by socioeconomic status?

As discussed in Chapter 2, the socioeconomic status measure used in this report pertains to the area in which the females lived, rather than the characteristics of the individual (see Appendix A). In the 5 years from 2003 to 2007, the mortality rate varied by socioeconomic status but no clear pattern was evident.



*Notes*

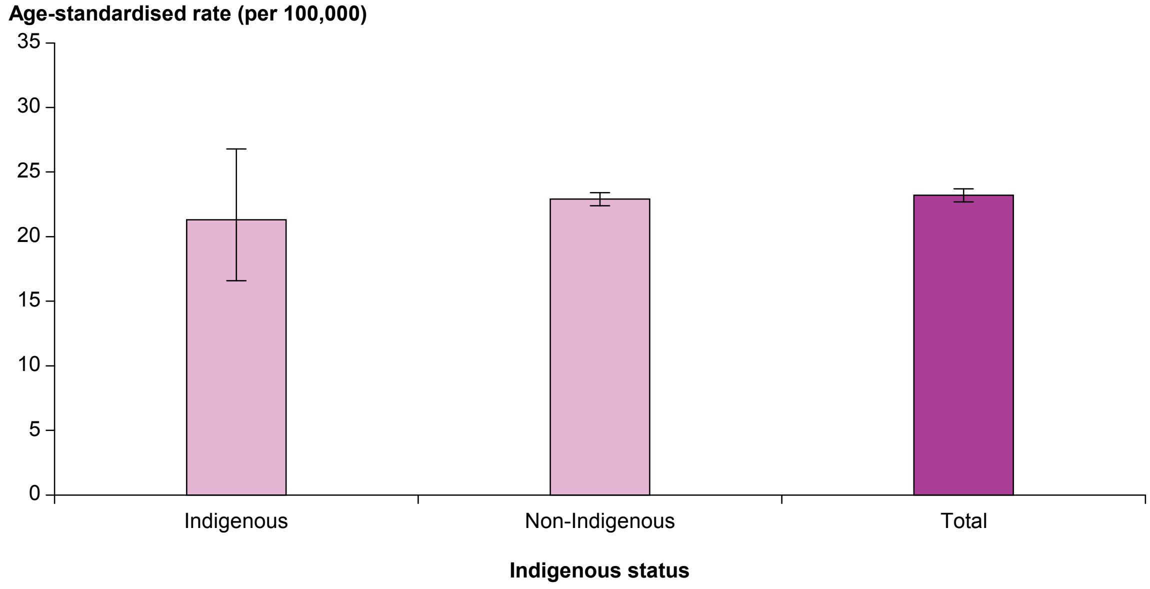
1. Socioeconomic status was measured using the ABS Socio-Economic Index for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix A).
2. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
3. The 'Total' column includes cases for which information on socioeconomic status was not available.
4. The data for this figure are shown in Appendix Table D3.7.

*Source:* AIHW National Mortality Database.

**Figure 3.7: Mortality from breast cancer, by socioeconomic status, females, Australia, 2003–2007**

## Do mortality rates differ by Aboriginal and Torres Strait Islander status?

Information on Aboriginal and Torres Strait Islander status in the National Mortality Database is considered to be of sufficient quality for reporting purposes for New South Wales, Queensland, South Australia and the Northern Territory. During the period 2003–2007, a total of 89 Aboriginal and Torres Strait Islander females in these four jurisdictions died from breast cancer (Appendix Table D3.8). Despite having significantly lower incidence rates (as discussed in Chapter 2), Figure 3.8 illustrates that breast cancer mortality rates for Aboriginal and Torres Strait Islander females in the four jurisdictions were not significantly different from those of their non-Indigenous counterparts (21 and 23 per 100,000, respectively).



*Notes*

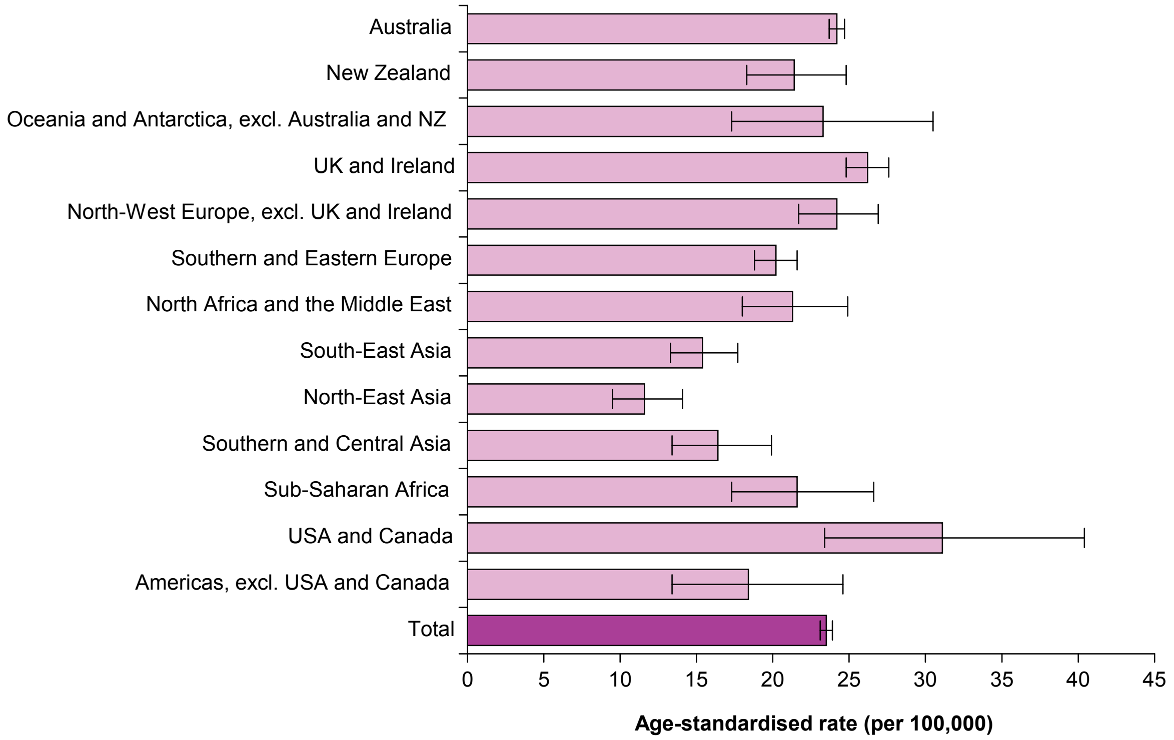
1. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
2. The 'Total' column includes deaths for which information on Aboriginal and Torres Strait Islander status was not available.
3. The data for this figure are shown in Appendix Table D3.8.

*Source:* AIHW National Mortality Database.

**Figure 3.8: Mortality from breast cancer, by Aboriginal and Torres Strait Islander status, females, New South Wales, Queensland, South Australia and the Northern Territory, 2003–2007**

## Do mortality rates differ by country of birth?

As shown in Figure 3.9, in 2003–2007, females living in Australia who were born in the UK and Ireland (26 per 100,000) had a significantly higher age-standardised mortality rate than females born in Australia (24 per 100,000). The lowest mortality rates were observed for females born in North-East Asia (12 per 100,000) and South-East Asia (15 per 100,000); these rates were significantly lower than the rate observed for Australian-born females.



*Notes*

1. Country of birth is classified according to the Standard Australian Classification of Countries, 2nd edition (see Appendix A).
2. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.
3. The 'Total' category includes cases for which information on country of birth was not available.
4. The data for this figure are shown in Appendix Table D3.9.

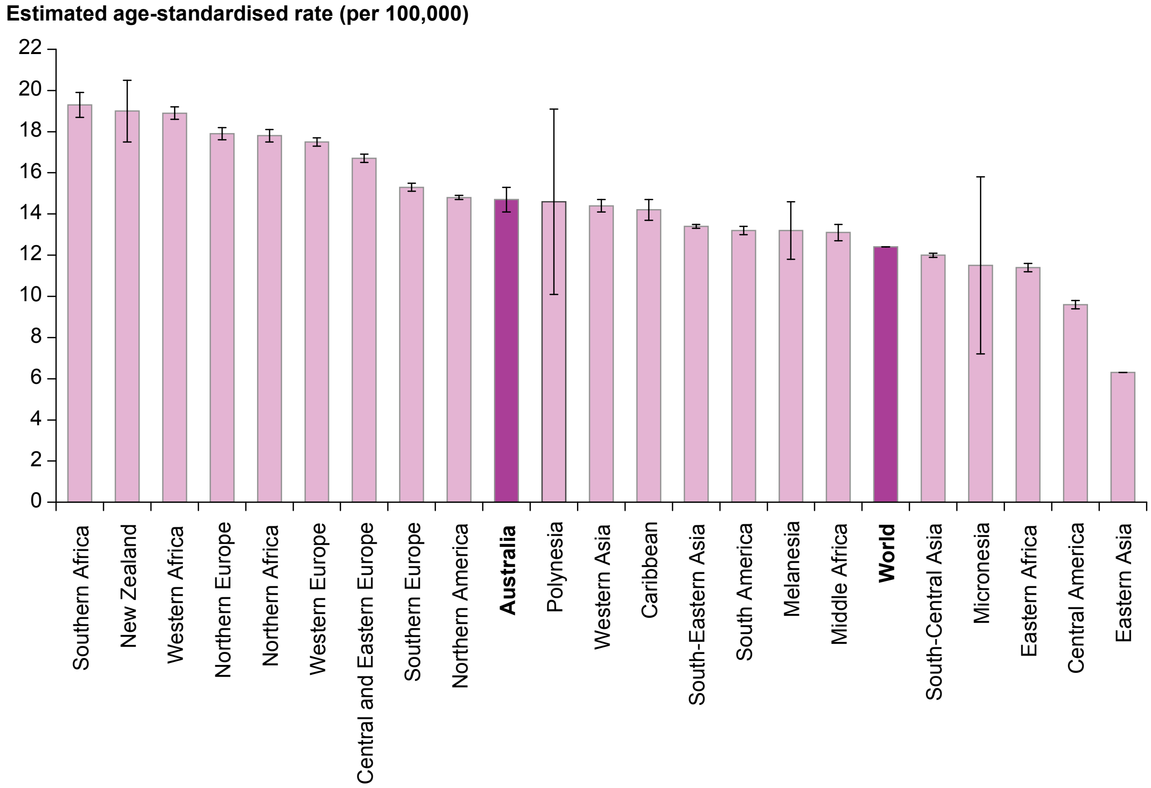
*Source*: AIHW National Mortality Database.

**Figure 3.9: Mortality from breast cancer, by country/region of birth, females, Australia, 2003–2007**

## How does Australia compare internationally?

As discussed in Chapter 1, caution must be taken when comparing international data on cancer mortality since observed differences may be due to a range of factors (AIHW 2012c), not just differences in the underlying mortality rates. Data on breast cancer deaths for females from the GLOBOCAN database (Ferlay et al. 2010) are shown in Figure 3.10. These are estimates for 2008 and are based on data from around 3 to 5 years earlier.

The estimates suggest that the age-standardised mortality rate for females from breast cancer was significantly lower in Australia (15 per 100,000) than in Southern Africa (19 per 100,000), New Zealand (19 per 100,000), Western Africa (19 per 100,000), Northern Europe (18 per 100,000), Northern Africa (18 per 100,000), Western Europe (18 per 100,000) and Central and Eastern Europe (17 per 100,000). Meanwhile, the age-standardised mortality for females from breast cancer was estimated to be significantly higher in Australia than regions such as South-Eastern Asia (13 per 100,000), South America (13 per 100,000) and all other Asian regions except Western Asia. Differences in mortality rates by country could relate to a number of factors including differences in incidence rates (see Chapter 2), features at diagnosis (for example, stage at diagnosis, histology type and levels of co-morbidity), and availability and quality of treatment (CCS & NCIC 2007).



*Notes*

1. The data were estimated for 2008 and are based on data from approximately 3 to 5 years earlier.
2. The rates were age-standardised and expressed per 100,000 females. The confidence intervals (as shown by the error bars) are approximations and were calculated by the AIHW (see Appendix B).
3. The data for this figure are shown in Appendix Table D3.10.

*Source:* Ferlay et al. 2010.

**Figure 3.10: International comparison of estimated mortality from breast cancer, females, 2008**

# Mortality of males from breast cancer

The number of males who die from breast cancer is much lower than the number of females who die from this disease. In 2007, 26 males died from breast cancer (Table 3.4). Since 1982, the number of males who died annually from breast cancer has ranged between 10 and 26.

**Table 3.4: Mortality from breast cancer, males, Australia, 1982 to 2007**

| Year | Number of deaths | Percentage of all cancer deaths | ASR[(a)] | 95% confidence interval | Mean age at death | Median age at death |
|---|---|---|---|---|---|---|
| 1982 | 17 | 0.12 | 0.4 | 0.2–0.6 | 70.7 | 71.0 |
| 1983 | 13 | 0.09 | 0.3 | 0.1–0.6 | 72.4 | 71.0 |
| 1984 | 17 | 0.11 | 0.4 | 0.2–0.6 | 70.2 | 69.0 |
| 1985 | 11 | 0.07 | 0.2 | 0.1–0.3 | 68.9 | 71.0 |
| 1986 | 17 | 0.11 | 0.3 | 0.2–0.5 | 66.5 | 65.0 |
| 1987 | 20 | 0.12 | 0.4 | 0.2–0.6 | 64.8 | 64.5 |
| 1988 | 23 | 0.14 | 0.4 | 0.3–0.7 | 71.6 | 70.0 |
| 1989 | 18 | 0.10 | 0.3 | 0.2–0.5 | 68.4 | 70.0 |
| 1990 | 16 | 0.09 | 0.3 | 0.1–0.4 | 71.4 | 69.5 |
| 1991 | 15 | 0.09 | 0.2 | 0.1–0.4 | 70.1 | 70.0 |
| 1992 | 19 | 0.10 | 0.3 | 0.2–0.5 | 71.6 | 70.0 |
| 1993 | 15 | 0.08 | 0.2 | 0.1–0.4 | 74.0 | 74.0 |
| 1994 | 20 | 0.10 | 0.3 | 0.2–0.4 | 70.7 | 70.0 |
| 1995 | 23 | 0.12 | 0.3 | 0.2–0.5 | 67.1 | 67.0 |
| 1996 | 21 | 0.11 | 0.3 | 0.2–0.5 | 68.8 | 68.0 |
| 1997 | 19 | 0.10 | 0.3 | 0.2–0.4 | 75.3 | 77.0 |
| 1998 | 19 | 0.09 | 0.2 | 0.1–0.4 | 70.3 | 71.0 |
| 1999 | 21 | 0.10 | 0.2 | 0.1–0.4 | 62.7 | 66.0 |
| 2000 | 21 | 0.10 | 0.3 | 0.2–0.4 | 66.3 | 69.0 |
| 2001 | 26 | 0.12 | 0.3 | 0.2–0.4 | 70.1 | 72.5 |
| 2002 | 17 | 0.08 | 0.2 | 0.1–0.3 | 66.2 | 66.0 |
| 2003 | 10 | 0.05 | 0.1 | 0.1–0.2 | 67.3 | 72.5 |
| 2004 | 19 | 0.09 | 0.2 | 0.1–0.3 | 71.3 | 77.0 |
| 2005 | 19 | 0.09 | 0.2 | 0.1–0.3 | 69.9 | 71.0 |
| 2006 | 25 | 0.11 | 0.3 | 0.2–0.4 | 72.8 | 76.0 |
| 2007 | 26 | 0.12 | 0.3 | 0.2–0.4 | 72.4 | 76.0 |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 males.

*Source:* AIHW National Mortality Database.

In each of the years from 1982 to 2007, of all males who died from cancer, approximately 0.1% — that is, one in a thousand — died from breast cancer (Table 3.4). The age-standardised mortality rates for males have remained relatively constant since 1982, ranging from 0.1 to 0.4 per 100,000. In 2007, the mortality rate was 0.3 per 100,000.

Over the years from 1982 to 2007, the mean age of death of males who died from breast cancer ranged from 63 (in 1999) to 75 (1997). In 2007, the mean age at death was 72 and the median age was 76. Given the relatively small number of deaths of males from breast cancer each year, this year-to-year fluctuation in average age at death is not unexpected.

As shown in Table 3.5, during 2003–2007, 61% males who died from breast cancer were aged 70 or over. The rate of death from breast cancer for those aged 70 to 79 (1 per 100,000) and for those aged 80 and over (2 per 100,000) was significantly higher than the rate for males in the other age groups.

**Table 3.5: Mortality from breast cancer, by age group, males, Australia, 2003–2007**

| Age group (years) | Number of deaths | Age-specific rate[(a)] | 95% confidence interval |
|---|---|---|---|
| <50 | 7 | 0.0 | 0.0–0.0 |
| 50–69 | 32 | 0.3 | 0.2–0.4 |
| 70–79 | 31 | 1.1 | 0.8–1.6 |
| 80+ | 29 | 2.3 | 1.5-3.2 |
| **Total(b)** | **99** | **0.2** | **0.2–0.3** |

(a) Number of deaths per 100,000 males.

(b) The rate in this row is age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 males.

*Source:* AIHW National Mortality Database.

# 4 Survival after a diagnosis of breast cancer

**Key findings**

**Females**

In the period 2006–2010 in Australia, 5-year relative survival from breast cancer in females:

- Was 89% for all ages combined.
- Was highest (more than 90%) for those diagnosed between the ages of 40–49 and 60–69, with significantly lower survival estimates for younger and older females.
- Was lower (84%) for those living in *Remote and very remote* areas compared with other areas.
- Increased slightly with improving socioeconomic status (from 88% in the lowest socioeconomic status group to 91% in the highest socioeconomic status group).

In 2006–2010, 5-year crude survival for breast cancer in females:

- Was significantly lower for Aboriginal and Torres Strait Islander females (69%) compared with non-Indigenous females (83%).

Between 1982–1987 and 2006–2010, 5-year relative survival for breast cancer in females:

- Increased significantly from 72% to 89%.

The mortality-to-incidence ratio calculated using 2008 GLOBCAN data for Australian females diagnosed with breast cancer:

- Was low at 0.2, which suggests better survival prospects compared with their counterparts in many other countries and regions.

**Males**

In the period 2006–2010 in Australia, 5-year relative survival from breast cancer in males:

- Was 85% for all ages combined.

## About survival after a diagnosis of breast cancer

Information on the survival of people diagnosed with breast cancer provides not only an indication of the prognosis of the cancer but also the success of control programs and treatments available. It refers to the probability of being alive for a given amount of time after diagnosis and reflects the impact of a cancer diagnosis.

Survival is influenced by a range of factors, including the characteristics of those diagnosed with cancer (for instance, age, sex, additional illness and lifestyle); the nature of the tumours (for instance, stage at diagnosis and histology type); and the health-care system (for instance, availability of screening, diagnostic and treatment facilities, as well as follow-up services) (Black et al. 1998; WCRF & AICR 2007).

Since survival estimates are based on the outcomes of a group of people with breast cancer and other characteristics, they provide an indication of the *average* survival experience. They do not reflect an *individual's* chance of surviving since this is affected by specific characteristics of the individual and the cancer they have.

In this report, 'relative survival' statistics are used to examine survival from breast cancer. These estimates are derived by comparing the survival of people diagnosed with breast cancer (that is, observed survival) with that experienced by people in the general population, matched for age and sex, in the same calendar year, and where applicable remoteness area and socioeconomic status (that is, expected survival). An estimate of less than 100% suggests that those with breast cancer had a lower chance of survival than the general population. For example, 5-year relative survival of 50% for people diagnosed with breast cancer means that these people had half the chance of surviving at least 5 years after diagnosis relative to comparable people in the general population.

The period method developed by Brenner and Gefeller (1996) was used to calculate relative survival estimates. This method examines the survival experience of people at risk of dying from cancer in a given period (see Box 4.1 and Appendix B for further information).

**Box 4.1: Period survival**

In this report, relative survival (see Box 4.2 for definition) was calculated using the period method (Brenner & Gefeller 1996). This method calculates survival from 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.

The period method is an alternative to the traditional cohort method, which focuses on a group of people diagnosed with cancer in a past time period, and follows these people over time. By its nature the period method produces more up-to-date estimates of survival than the cohort method. More information about the period method is in Appendix B.

In this chapter, 1-year survival is shown, along with longer-term survival proportions, such as 5- and 10-year survival, after a diagnosis of invasive breast cancer. Comparisons in survival are made over time, by age group and by histological type. Differences in relative survival by remoteness of usual residence and socioeconomic status are also presented, with the data sourced from the AIHW publication *Cancer survival and prevalence in Australia, period estimates from 1982 to 2010* (AIHW 2012d). Relative survival proportions cannot be calculated according to Aboriginal and Torres Strait Islander status due to data limitations and the lack of necessary life tables. However, *crude* survival (that is, observed survival, see Box 8.2 for definition) estimates can be calculated according to Aboriginal and Torres Strait Islander status for females in four Australian states and territories, and the results from these calculations are in this chapter. In addition, international data on survival are provided.

The survival estimates in this chapter are based on the analysis of records of breast cancer diagnosed between 1982 and 2008 as held in the Australian Cancer Database 2008 (ACD). Data from the National Death Index (NDI) on deaths (from any cause) that occurred up to 31 December 2010 were used to determine which people with breast cancer had died and when this occurred.

**Box 4.2: Survival terminology in this report**

**Survival:** a general term indicating the probability of being alive for a given amount of time after a diagnosis of cancer.

**Observed survival:** the proportion of people who remain alive for a given period of time following a diagnosis of cancer. Observed survival estimates are crude estimates calculated from population-based cancer data.

**Expected survival:** the proportion of people in the general population who remain alive for a given period of time. Expected survival estimates are crude estimates calculated from life tables of the general population by age, sex and calendar year and, where applicable, remoteness and socioeconomic status.

**Relative survival:** the ratio of observed survival to expected survival. Relative survival describes the survival of individuals with cancer, adjusted for the underlying mortality in the general population.

# Survival of females with breast cancer

## What was the prospect of survival for females with breast cancer?

In the period 2006–2010, 1-year relative survival for females diagnosed with breast cancer was very high, at 98%. The corresponding 5- and 10-year relative survival estimates were somewhat lower, at 89% and 83%, respectively (Table 4.1).

**Table 4.1: Relative survival from breast cancer, females, Australia, 2006–2010**

| Survival duration | Relative survival (%) | 95% confidence interval |
|---|---|---|
| 1-year relative survival | 97.8 | 97.6–98.0 |
| 5-year relative survival | 89.4 | 89.0–89.7 |
| 10-year relative survival | 83.0 | 82.6–83.5 |

*Note:* Relative survival was calculated using the period method. More information about the period method can be found in Box 8.1 and Appendix B.

*Source:* AIHW Australian Cancer Database 2008.

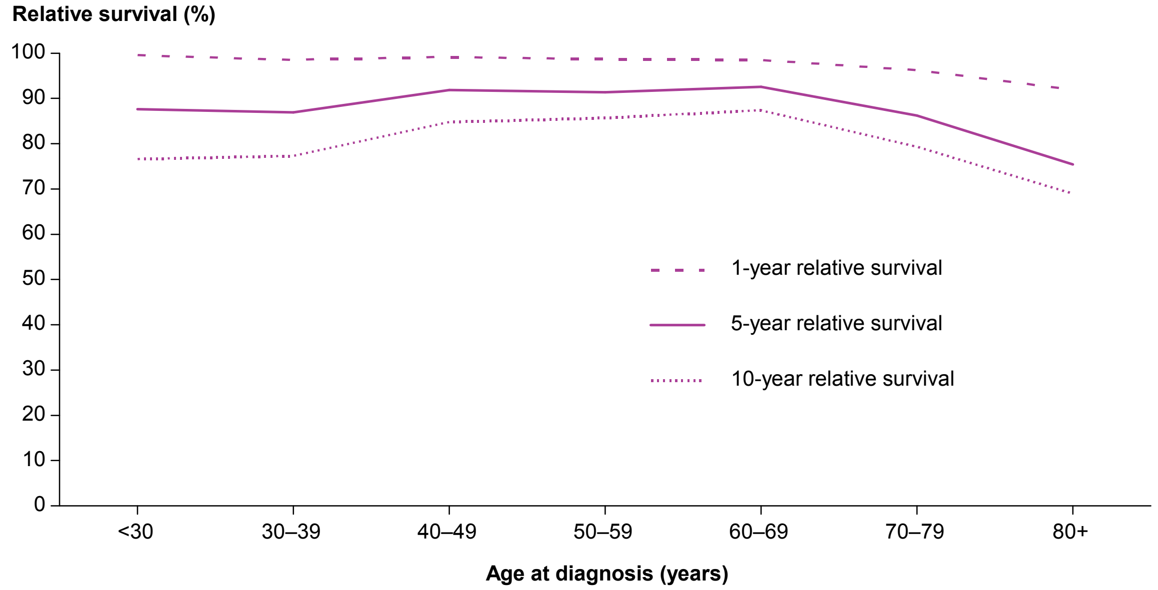
## Does survival differ by age?

In the period 2006–2010, 1-year relative survival for females diagnosed with breast cancer was consistently around 99% or 100% for those under 70. The survival estimates were somewhat lower for older females—96% for those aged 70–79 and 92% for those aged 80 and over.

Five-year relative survival was relatively high for females diagnosed between the ages of 40–49 and 60–69 (that it, above 91% for each of those age groups), with the survival estimates significantly lower for females under 40 and for those aged 70 and over.

Similarly, 10-year relative survival was highest in those aged 40–49 through to 60–69 at diagnosis (85% or higher for each age group), with significantly lower survival estimates for those under 40 and those aged 70 and over.

The lower survival for younger females may be due to the characteristics of the tumours diagnosed, with tumours diagnosed at young ages being more aggressive and less responsive to treatment (Anders et al. 2008; Balduzzi et al. 2007; CCS & NCIC 2007; Goldhirsch et al. 2001). Reasons for lower survival for females diagnosed at an older age include: less aggressive treatment, a smaller proportion of older people entering into clinical trials; a greater likelihood of comorbidities with other diseases; and a greater likelihood of being diagnosed with breast cancer at an advanced stage.



*Note:* The data for this figure are shown in Appendix Table D4.1.

*Source:* AIHW Australian Cancer Database 2008.

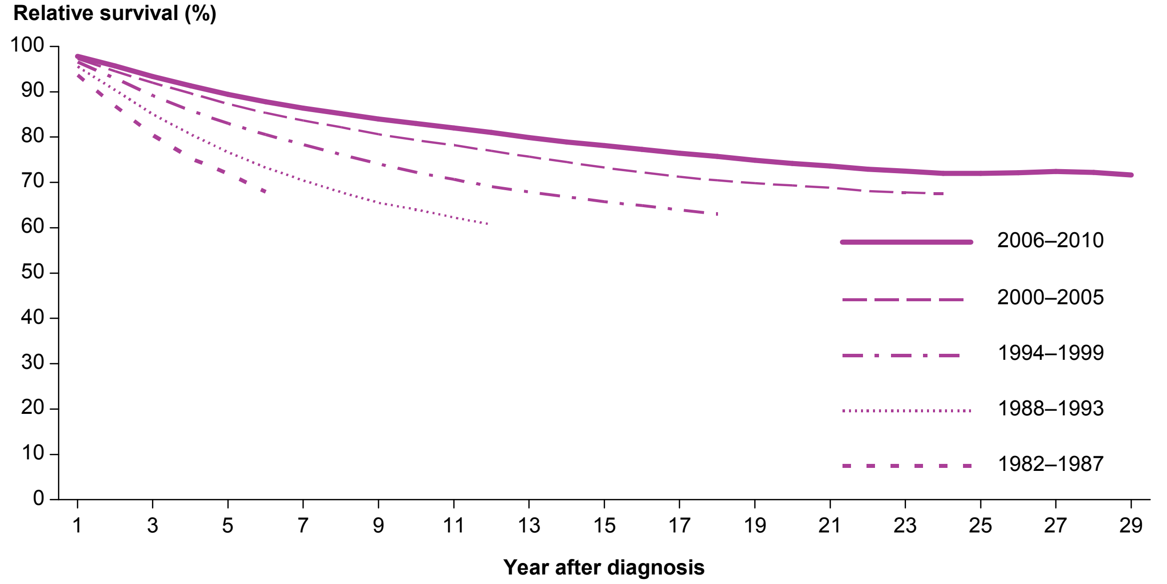
**Figure 4.1: Relative survival from breast cancer, by age at diagnosis, females, Australia, 2006–2010**

## Has survival from breast cancer changed over time?

Survival curves for breast cancer are in Figure 4.2 for five time periods from 1982–1987 to 2006–2010. Note that by using the period method, relative survival estimates for one to six years can be calculated for the earliest period and for one to 29 years for the latest period. More information about the period method is in Box 4.1 and Appendix B.

When the entire period from 1982–1987 to 2006–2010 is considered, 1-year relative survival increased significantly from 94% to 98%, while 5-year relative survival increased significantly from 72% to 89%. Moreover, 10-year relative survival increased significantly from 64% in 1988–1993 to 83% in 2006–2010.

It has been suggested that these gains in survival from breast cancer may be due to a combination of earlier diagnosis associated with screening, and better treatments (Berry et al. 2005; Duffy et al. 2010; Giordano et al. 2004a; Sant et al. 2006).



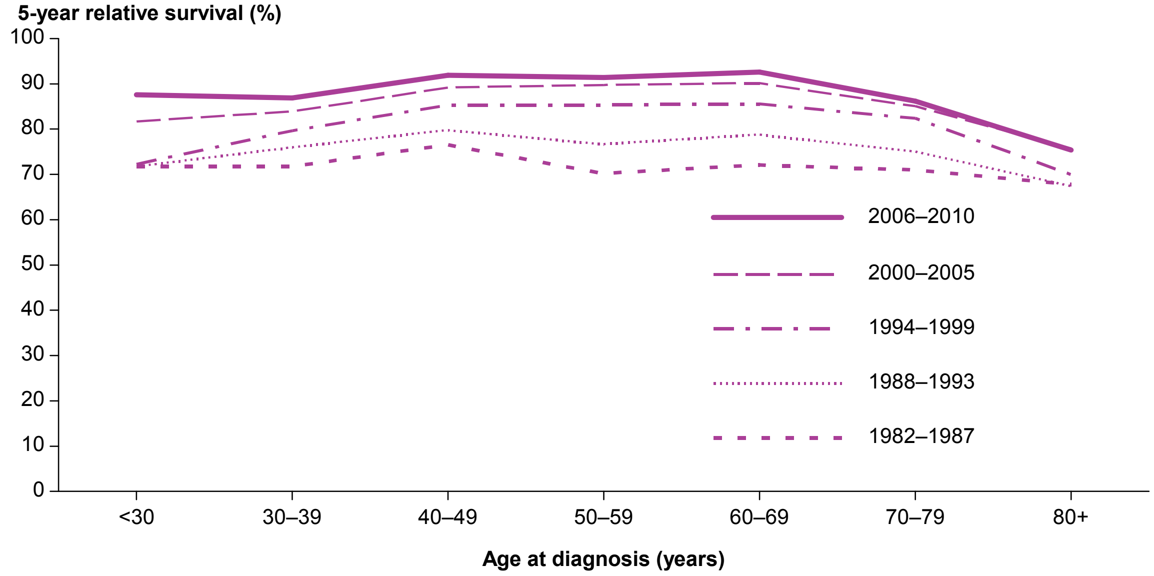
*Note:* The data for this figure are shown in Appendix Tables D4.2.

*Source:* AIHW Australian Cancer Database 2008.

**Figure 4.2: Relative survival from breast cancer, by time period, females, Australia, 1982–1987 to 2006–2010**

## Is the change in survival over time evident in all age groups?

Although greater gains are seen for some age groups than others, the trend towards improved 5-year survival was seen for all age groups, with the differences between survival during the periods 1982–1987 and 2006–2010 being statistically significant (Figure 4.3). The largest increase in survival was for those aged 50–59 and 60–69 (the target age group for BreastScreen Australia). Specifically, between the periods 1982–1987 and 2006–2010, 5-year relative survival increased from 70% to 91% for those aged 50–59 and from 72%to 93% for those aged 60–69.



*Note:* The data for this figure are shown in Appendix Table D4.3.

*Source:* AIHW Australian Cancer Database 2008.

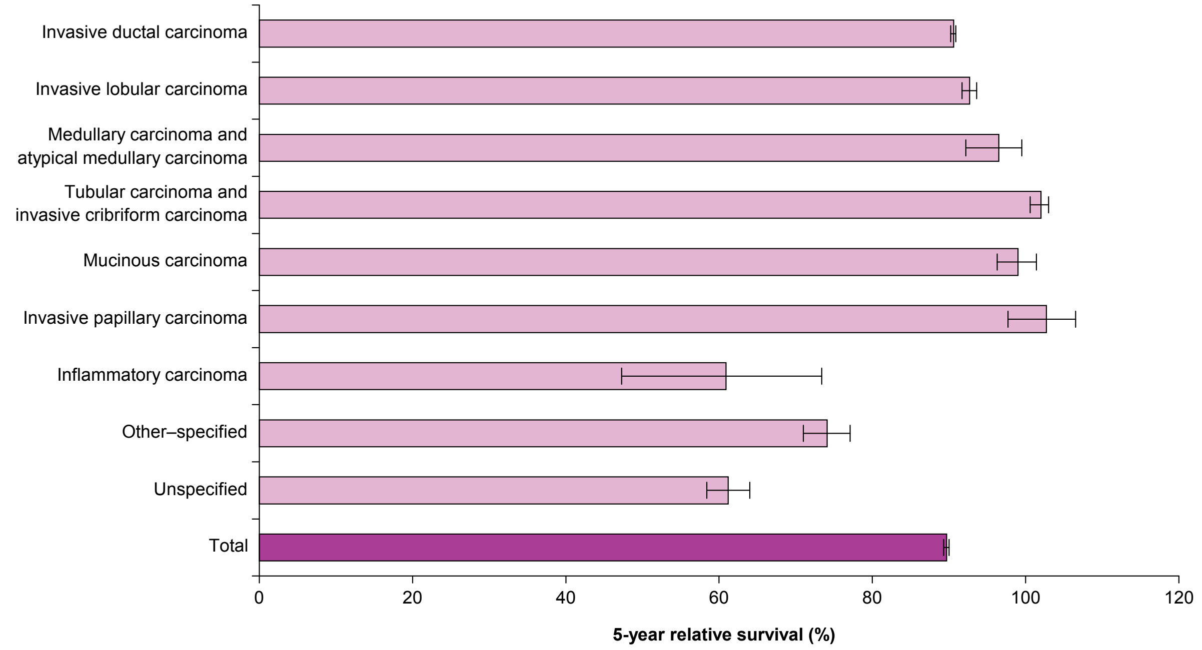
**Figure 4.3: Five-year relative survival from breast cancer, by age at diagnosis, female, Australia, 1982–1987 to 2006–2010**

## Does survival differ by histological type of breast cancer?

Figure 4.4 shows 5-year relative survival estimates for females with breast cancer by histological type for the period 2006–2010. In this period, 5-year relative survival for females diagnosed with *invasive ductal carcinoma*—the most common type of breast cancer—was 90%.

Females diagnosed with *tubular carcinoma and invasive cribriform carcinoma* had the highest 5-year relative survival (101%), which was significantly higher than survival estimates for each of the other major histology groupings. Meanwhile, females diagnosed with *inflammatory carcinoma* had by far the lowest 5-year relative survival (48%). Five-year relative survival was also relatively low for females diagnosed with an ‘unspecified’ type of breast cancer (58%), which may be explained by the fact that these females tend to be older than average (as discussed in Chapter 2), with older age associated with a poorer prognosis.

Appendix Table D4.4 presents 5-year relative survival estimates from breast cancer by age group for each of the histological groups for the period 1982–2010.



*Notes*

1. Appendix Table D2.6 provides a list of the histological types included in each group.
2. The data for this figure are in Table 4.2.

*Source:* AIHW Australian Cancer Database 2008.

**Figure 4.4: Five-year relative survival from breast cancer, by histological type, females, Australia, 2006–2010**

## How has the survival for the most common types of breast cancer changed over time?

Table 4.2 shows that there were significant improvements in 5-year relative survival between 1982–1987 and 2006–2010 for some histology groups but not others. Between the first and the last period, there was a significant improvement in survival estimates for females diagnosed with *invasive ductal carcinoma* – from 74% in 1982–1987 to 90% in 2006–2010. Five-year relative survival also increased significantly for females diagnosed with *invasive lobular carcinoma* (from 78% to 92%), *medullary carcinoma and atypical medullary carcinoma* (from 84% to 94%) and *mucinous carcinoma* (from 86% to 97%). In contrast, there was no significant improvement in survival for those diagnosed with some of the other types of breast cancer, such as *tubular carcinoma and invasive cribriform carcinoma* and *invasive papillary carcinoma,* where survival was already very high (>96%).

### Table 4.2: Five-year relative survival from breast cancer, by histological type, females, Australia, 1982–1987 to 2006–2010

| | 1982–1987 | | 1988–1993 | | 1994–1999 | | 2000–2005 | | 2006–2010 | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Type of breast cancer** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** |
| Invasive ductal carcinoma | 73.7 | 72.6–74.8 | 78.2 | 77.6–78.8 | 84.5 | 84.1–85.0 | 88.5 | 88.2–88.9 | 90.3 | 89.9–90.6 |
| Invasive lobular carcinoma | 77.6 | 73.8–81.0 | 85.3 | 83.7–86.9 | 88.2 | 87.1–89.4 | 91.2 | 90.3–92.1 | 91.8 | 90.8–92.7 |
| Medullary carcinoma and atypical medullary carcinoma | 83.8 | 78.5–88.2 | 85.6 | 82.2–88.6 | 89.1 | 85.6–92.0 | 96.8 | 93.4–99.2 | 93.5 | 89.2–96.5 |
| Tubular carcinoma and invasive cribriform carcinoma | 98.7 | 92.1–102.7 | 98.5 | 95.3–101.0 | 98.4 | 96.8–99.8 | 100.1 | 98.9–101.1 | 101.0 | 99.6–102.0 |
| Mucinous carcinoma | 85.8 | 78.8–91.9 | 90.8 | 86.8–94.3 | 95.9 | 92.9–98.6 | 97.5 | 95.0–99.7 | 96.6 | 93.9–99.0 |
| Invasive papillary carcinoma | 96.7 | 85.8–104.4 | 96 | 89.1–101.5 | 88.3 | 80.8–94.5 | 94.8 | 88.8–99.7 | 98.9 | 93.9–102.7 |
| Inflammatory carcinoma | 21.1 | 6.5–41.6 | 34.6 | 16.4–54.0 | 29.9 | 18.3–42.5 | 50.1 | 33.4–65.2 | 48.4 | 34.8–60.9 |
| Other—specified | 67.4 | 65.4–69.4 | 66.6 | 65.0–68.3 | 65.6 | 63.4–67.8 | 63.2 | 60.4–65.9 | 71.1 | 68.0–74.1 |
| Unspecified | 59.8 | 57.3–62.3 | 55 | 53.0–56.9 | 48.6 | 46.5–50.8 | 50.1 | 47.8–52.4 | 58.4 | 55.6–61.2 |
| **Total** | **72** | **71.1–72.8** | **76.7** | **76.2–77.2** | **83.1** | **82.7–83.5** | **87.4** | **87.1–87.8** | **89.4** | **89.0–89.7** |

*Note:* All cases were coded as primary site, invasive breast cancer. Appendix Table D2.6 provides a list of the histological types included in each group.

*Source:* AIHW Australian Cancer Database 2008.

## Does survival differ by stage at diagnosis?

Research in Australia (AIHW & NBCC 2007) and overseas (Michaelson et al. 2002) has uniformly shown that survival is considerably better for females diagnosed with small rather than large tumours. An Australian study (AIHW & NBCC 2007) examined the relative survival to 2006 of females who were diagnosed with breast cancer in 1997 and found that survival was significantly poorer for females with larger tumours at diagnosis (that is, 30 mm or more) compared with those with smaller tumours. Specifically, 5-year relative survival was 98% for females with tumours of 10 mm in size or less and declined with increasing tumour size to 73% for females with cancers size of 30 mm or more and to 49% for females with unknown tumour size at diagnosis (Table 4.3). In addition, the study found that survival was significantly higher for females whose lymph nodes were cancer-free (that is, negative nodal status) compared with females whose cancer had spread to their lymph nodes (that is, positive nodal status).

**Table 4.3: Relative survival from breast cancer, by size and nodal status, females, 1997–2006 diagnosis years**

| | 1-year relative survival | | 5-year relative survival | | 9-year relative survival | |
|---|---|---|---|---|---|---|
| | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI |
| **Size of cancer** | | | | | | |
| 0–10 mm | 99.6 | 99.0–100.0 | 98.2 | 96.9–99.4 | 96.0 | 94.2–97.7 |
| 11–15 mm | 99.7 | 99.0–100.1 | 94.7 | 93.2–96.1 | 90.7 | 88.7–92.6 |
| 16–19 mm | 99.6 | 98.6–100.3 | 93.0 | 90.6–95.1 | 87.7 | 84.6–90.7 |
| 20–29 mm | 99.4 | 98.6–99.9 | 87.9 | 86.0–89.6 | 79.2 | 76.8–81.6 |
| 30+ mm | 95.6 | 94.3–96.6 | 73.1 | 70.6–75.5 | 63.6 | 60.7–66.4 |
| Unknown | 74.0 | 71.1–76.6 | 49.1 | 45.7–52.5 | 39.0 | 35.5–42.5 |
| **Nodal status** | | | | | | |
| Nodes negative | 100.0 | 99.6–100.2 | 96.5 | 95.5–97.4 | 93.5 | 92.2–94.7 |
| Nodes positive | 97.7 | 96.9–98.3 | 80.2 | 78.5–81.7 | 69.7 | 67.7–71.6 |
| Unknown | 87.2 | 85.6–88.6 | 70.7 | 68.4–72.9 | 63.4 | 60.8–66.0 |
| **Total** | **96.3** | **95.8–96.7** | **85.6** | **84.7–86.4** | **79.3** | **78.2–80.4** |

*Source:* AIHW & NBCC 2007.

While tumour size and nodal status are relevant for determining the stage of the tumour at diagnosis, they are insufficient for determining stage. Since national data are not available on stage at diagnosis in Australia, national relative survival estimates for breast cancer by stage at diagnosis cannot be calculated. However, data from the United States of America (USA) (Howlader et al. 2012) based on the Surveillance, Epidemiology, and End Result (SEER) summary stage system (see Box 4.3) indicates that there is a clear gradient in the survival estimates according to stage at diagnosis. According to the USA data, in the period 2002–2008, 5-year relative survival was 99% for females diagnosed with localised cancer, 84% for those with regional cancer but only 23% for those with distant metastases.

**Box 4.3: Summary staging system—extent of disease at diagnosis**

In the SEER Summary Stage system, tumours are allocated to one of three categories, as well as an 'unknown' category (Young et al. 2001):

**Local**: the tumour is confined to one or both breasts.

**Regional**: the tumour has spread to surrounding tissue or nearby lymph nodes.

**Distant:** the tumour has spread to distant organs and has begun to grow at the new location.

**Unknown:** there is not sufficient evidence available to adequately assign a stage.

## Does survival from breast cancer differ across population groups?

In this section of the report, differences in relative survival are discussed in relation to remoteness area of residence and socioeconomic status. These analyses were based on records of breast cancers diagnosed between 1982 and 2007 as held in the Australian Cancer Database (ACD) 2007. Differences in crude survival are also discussed in relation to Aboriginal and Torres Strait Islander status, with these analyses based on records of breast cancer diagnosed between 1982 and 2008 as held in the ACD in 2008.

Note that the method used to calculate the survival estimates does not include an adjustment for age; thus, differences in survival between groups may be affected by differing age distributions.

### Does survival differ by remoteness area?

Five-year relative survival for breast cancer in the period 2006–2010 was analysed according to level of remoteness of the area in which females lived at diagnosis (Table 4.4). The Australian Standard Geographical Classification (ABS 2006) was used to categorise areas of Australia. Further information about this classification is provided in Appendix A.

Cancer survival outcomes might vary according to the level of remoteness where females live because of differences in: the age at which females are diagnosed with cancer, the stage of the disease at diagnosis, cancer histology types, the presence of comorbidity and access to health services.

In addition, differences in relative survival across regions might be influenced by the population composition in these regions. For example, Aboriginal and Torres Strait Islander females are more likely than other Australian females to live in *Remote and very remote* areas. Given the higher proportion of Aboriginal and Torres Strait Islander females in more remote areas, relative survival from cancer is more strongly affected by the health status of Aboriginal and Torres Strait Islander females in these areas than in more urban centres.

In 2006–2010, the 5-year relative survival estimate for females with breast cancer living in *Remote and very remote* areas was 84%. This was significantly lower than estimates for females living in other areas which ranged from 88% to 90%. Five-year survival estimates for remoteness areas by age group are shown in Appendix Table D4.5.

**Table 4.4: Relative survival from breast cancer, by remoteness area[(a)], females, Australia, 2006–2010**

| | 1-year relative survival | | 5-year relative survival | | 10-year relative survival | |
|---|---|---|---|---|---|---|
| **Remoteness area[(a)]** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** |
| Major cities | 98.0 | 97.7–98.2 | 89.5 | 89.1–90.0 | 84.0 | 83.4–84.5 |
| Inner regional | 97.6 | 97.1–98.0 | 89.6 | 88.8–90.3 | 83.5 | 82.4–84.6 |
| Outer regional | 97.5 | 96.7–98.2 | 88.9 | 87.6–90.1 | 82.5 | 80.8–84.1 |
| Remote and very remote | 97.2 | 94.7–98.7 | 84.3 | 80.7–87.4 | 77.9 | 73.6–81.9 |

(a) Measured using the Australian Standard Geographical Classification Remoteness Area classification (see Appendix A).

*Source:* AIHW Australian Cancer Database 2007.

## Does survival differ by socioeconomic status?

Five-year relative survival from breast cancer in the period 2006–2010 was analysed according to level of socioeconomic disadvantage of the area in which females lived at diagnosis. The Index of Relative Socio-economic Disadvantage (IRSD) (ABS 2008b) was used to classify areas of Australia. This measure of socioeconomic status pertains to the characteristics of people in the area in which females lived, rather than to the characteristics of the individual. Further information about this classification is provided in Appendix A.

Table 4.5 shows that in 2006–2010, 5-year relative survival for breast cancer increased slightly with improving socioeconomic status, with the survival estimate for those living in the areas with the highest socioeconomic status (91%) being significantly higher than that for females living in the areas with the lowest socioeconomic status (88%). Appendix Table D4.6 provides 5-year survival estimates according to socioeconomic status and age group.

**Table 4.5: Relative survival from breast cancer, by socioeconomic status[(a)], females, Australia, 2006–2010**

| | 1-year relative survival | | 5-year relative survival | | 10-year relative survival | |
|---|---|---|---|---|---|---|
| **Socioeconomic status[(a)]** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** |
| 1 (lowest) | 97.7 | 97.2–98.1 | 88.3 | 87.4–89.1 | 82.0 | 80.9–83.2 |
| 2 | 97.3 | 96.8–97.8 | 88.3 | 87.4–89.1 | 82.3 | 81.2–83.4 |
| 3 | 97.8 | 97.3–98.2 | 89.3 | 88.5–90.1 | 83.9 | 82.8–85.0 |
| 4 | 98.1 | 97.6–98.5 | 90.1 | 89.3–90.9 | 83.8 | 82.7–84.9 |
| 5 (highest) | 98.4 | 98.0–98.7 | 90.9 | 90.1–91.5 | 85.6 | 84.6–86.6 |

(a) Measured using the ABS Socio-Economic Index for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix A).

*Source:* AIHW Australian Cancer Database 2007.

## Does survival differ by Aboriginal and Torres Strait Islander status?

*Relative* survival estimates cannot be calculated for Aboriginal and Torres Strait Islander Australians because of data issues and the lack of necessary life tables. However, 5-year *crude* survival estimates can be derived based on data from New South Wales, Queensland, Western Australia and the Northern Territory. As discussed earlier in this chapter, crude survival estimates do not take into account the cause of death, nor do they compare observed survival with expected survival. Past research has shown that the life expectancy of

Aboriginal and Torres Strait Islander Australians is shorter than that of non-Indigenous Australians (ABS 2004, 2009b).

As shown in Table 4.6, the crude 5-year survival estimates for breast cancer in the period 2006–2010 was 69% for Aboriginal and Torres Strait Islander females, significantly lower than that for non-Indigenous females at 83%.

Although data by age group are also shown in Table 4.6, the relatively small number of Aboriginal and Torres Strait Islander females in each age group should be considered when interpreting these data.

**Table 4.6: Five-year crude survival from breast cancer, by Aboriginal and Torres Strait Islander status, New South Wales, Queensland, Western Australia and the Northern Territory, 2006–2010**

| | Indigenous | | Non-Indigenous | |
|---|---|---|---|---|
| **Age group (years)** | **CS (%)** | **95% CI** | **CS (%)** | **95% CI** |
| <50 | 71.9 | 63.6–78.6 | 89.8 | 89.2–90.5 |
| 50–59 | 70.2 | 60.8–77.8 | 89.4 | 88.7–90.0 |
| 60–69 | 75.1 | 64.4–83.0 | 88.1 | 87.4–88.8 |
| 70+ | 51.9 | 37.7–64.3 | 61.9 | 60.8–63.0 |
| **All ages** | **69.3** | **64.4–73.6** | **82.6** | **82.2–83.0** |

*Note*: Some states and territories use an imputation method for determining Indigenous cancers, which may lead to differences between these data and those in jurisdictional cancer incidence reports.

*Source:* AIHW Australian Cancer Database 2008.

## How does Australia compare internationally?

In addition to the methodological challenges associated with comparing cancer statistics from different countries (as discussed in Chapter 1), additional uncertainties arise when comparing relative survival estimates. In particular, there tends to be wide variation across countries in:

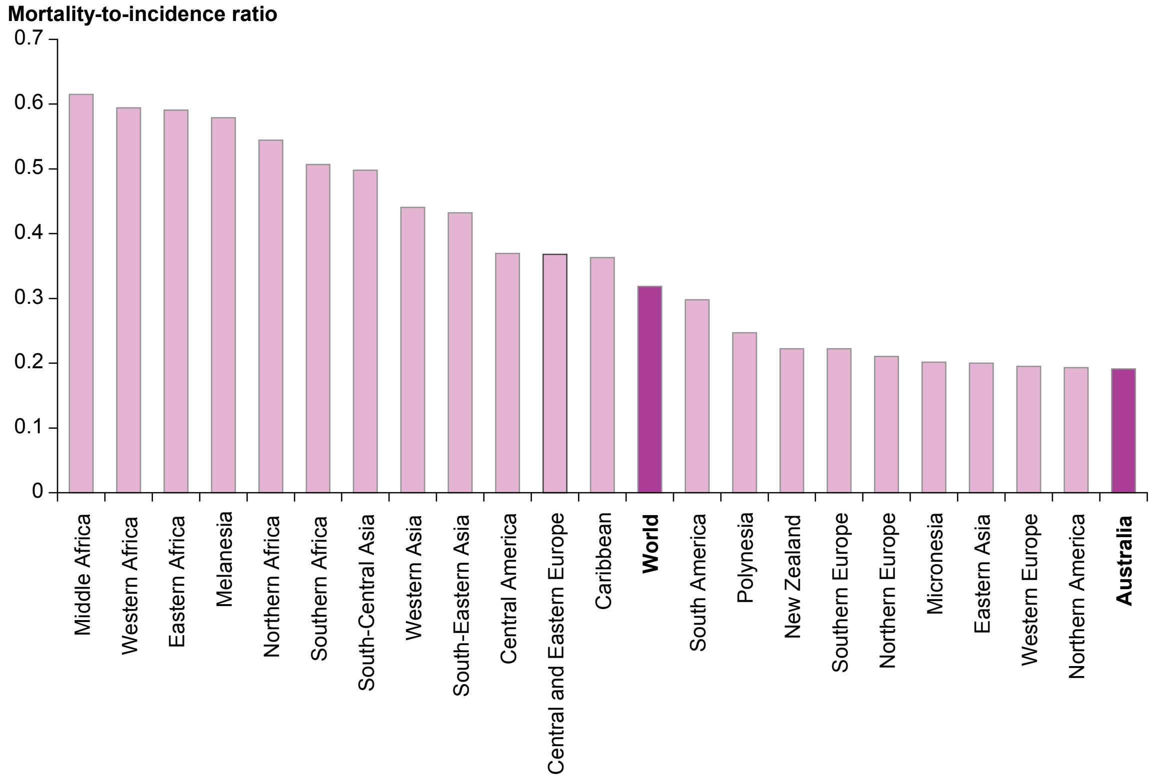
- years to which the relative survival estimates apply
- length of the follow-up period considered (for example, 1-, 5- and 10-year)
- methods and age groups used to calculate the relative survival estimates.

For these reasons, relative survival estimates for different countries are not compared in this report.

Although more rudimentary than relative survival estimates, the mortality-to-incidence ratio (MIR) is used in this report to make international comparisons. This ratio describes how many deaths there were in a particular year due to a particular disease, relative to the number of new cases diagnosed that year (using age-standardised data). For example, an MIR of 0.60 for breast cancer would indicate that there were 60 deaths for every 100 new cases diagnosed in that year (although the deaths need not relate to the same people as the cases). If survival tends to be lower in a particular country relative to others, the MIR for that country generally would be expected to be higher (that is, closer to 1.00). In contrast, if survival is higher, the ratio generally would be closer to zero. Appendix B provides further information about interpreting MIRs.

For this report, mortality-to-incidence ratios for breast cancer were calculated using data from the GLOBOCAN database (Ferlay et al. 2010). The fact that the GLOBOCAN data showed estimates rather than actual data for 2008 should be taken into account when interpreting the results in Figure 4.5.

The GLOBOCAN data suggest that the survival from for breast cancer varied between different countries and regions. Survival appeared lowest among females in Middle Africa, Western Africa, Eastern Africa and Melanesia (MIR of approximately 0.6), and highest among females in Polynesia, New Zealand, Southern Europe, Northern Europe, Micronesia, Eastern Asia, Western Europe, Northern America and Australia (MIR of approximately 0.2). The MIR of females in Australia was lowest at 0.2, which suggests that Australian females who were diagnosed with breast cancer had better survival prospects compared with their counterparts in other countries and regions.



*Notes*

1. The ratios were based on estimates for 2008 and are based on data from about 3 to 5 years earlier. The rates were age-standardised by the IARC using the Doll et al. (1966) World Standard Population. The mortality-to-incidence ratio equals the age-standardised mortality rate divided by the age-standardised incidence rate.
2. The data for this figure are in Appendix Table D4.7.

*Source:* Ferlay et al. 2010.

**Figure 4.5: International comparison of mortality-to-incidence ratios for breast cancer, 2008**

# What was the prospect of survival for males with breast cancer?

In the period 2006–2010, the 1- and 5-year relative survival estimates for males diagnosed with breast cancer were 99% and 85%, respectively (Table 4.7). This was not significantly different from the corresponding estimates for females (98% and 89%, respectively) (see

Table D4.1). However when 10-year relative survival estimates are considered, survival was significantly lower for males than females (76% and 83% respectively), indicating that the prognosis for males diagnosed with breast cancer is poorer in the longer period.

It is difficult to compare these findings for males with other research results since most studies have only considered survival of females from breast cancer. An exception is a study using USA data from 1973 to 1998 which indicated that relative survival for males was worse than that for females largely because males were more likely to be diagnosed with breast cancer at a later stage, with larger tumours and with more frequent lymph node involvement (Giordano et al. 2004b). Within individual stage categories, survival differences by sex were no longer evident. The lack of national data on stage at diagnosis in Australia means that it cannot be determined whether the same would hold true in Australia.

**Table 4.7: Relative survival from breast cancer by time period, males, Australia, 1982–1987 to 2006–2010**

| Years after diagnosis | 1982–1987 | | 1988–1993 | | 1994–1999 | | 2000–2005 | | 2006–2010 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI |
| 1 | 92.4 | 88.0–95.6 | 91.8 | 87.9–94.8 | 94.2 | 90.9–96.6 | 96.3 | 93.8–98.2 | 98.7 | 95.9–100.5 |
| 5 | 82.9 | 73.2–91.2 | 77.6 | 71.1–83.6 | 81.8 | 75.8–87.1 | 83.0 | 78.0–87.6 | 85.0 | 79.9–89.6 |
| 10 | . . | . .. | 64.0 | 54.0–73.8 | 68.6 | 60.6–76.4 | 71.3 | 64.3–78.1 | 75.8 | 68.8–82.5 |
| 15 | . . | . .. | . . | . .. | 58.3 | 47.9–69.1 | 68.7 | 59.6–77.8 | 66.4 | 57.6–75.3 |

*Source:* AIHW Australian Cancer Database 2008.

Table 4.7 presents change over time in relative survival from breast cancer in males. One-year relative survival increased significantly from 92% in 1982–1987 to 99% in 2006–2010. Although some improvements were also seen in 5- and 10-year relative survival estimates, these differences were not statistically significant.

# 5 Prevalence of breast cancer

**Key findings**

**Females**

At the end of 2008 in Australia:

- More than 57,300 females were alive who had been diagnosed with breast cancer within the previous 5 years.
- Five-year prevalence increased with age (from 156 females aged under 30 to 6,138 females aged over 80), with the highest prevalence rate seen in those aged 60–69 (15,449 females).
- The highest 5-year prevalence of females, as a proportion of the respective female population, was in South Australia (59 per 100,000) and the lowest in the Northern Territory (26 per 100,000).
- Five-year prevalence of females, as a proportion of the respective population, was highest among females born in the UK and Ireland and in 'North-West Europe excluding the UK and Ireland' (both 87 per 100,000).

**Males**

At the end of 2008 in Australia:

- 438 males were alive who had been diagnosed with breast cancer within the previous 5 years.

# About prevalence of breast cancer

In this report, 'limited-duration prevalence' is presented, which provides information on the number of people alive who were diagnosed with breast cancer within a specified time period. Five-year prevalence data, for example, would indicate the number of people alive on 31 December of a specific year who were diagnosed with breast cancer within the previous 5 years.

The prevalence of a disease in a given population is influenced by the incidence of the disease, survival from the disease, deaths from other causes and the age at which people are diagnosed, because older people are more likely to die sooner due to age-related morbidity and frailty.

Along with information on incidence, mortality and survival, prevalence is an indicator of the impact of breast cancer in our society, both at the personal or family level. In particular, it is an indicator of impact at a societal level, especially in terms of need for health-care services. It is important for workforce planning, resource allocation and service delivery.

In this report, limited-duration prevalence is presented using data from the Australian Cancer Database (see Appendix C). Limited-duration prevalence data are presented for 1, 5, 10, 15, 20 and 27 years with an index date of 31 December 2008. Note that 27-year prevalence is the longest duration that can be calculated based on the earliest (1982) and latest (2008) years of incidence data available.

The limited-duration prevalence estimates are presented as an absolute number and as a proportion of the population, with the proportions calculated based on the total Australian female or male population as at 31 December 2008. For females, information is provided on differences in prevalence by age, state and territory, and country of birth. For males, information is only provided on differences by age.

In this chapter, no international comparisons are made. Making such comparisons is difficult because prevalence data from other countries often differ from Australian data in the years to which they apply, the number of years considered (for example, 1 and 5 years) and the analytical methods used to calculate prevalence.

Unlike the incidence data, which pertain to the number of breast cancers, the prevalence data in this report pertain to the number of *people* who have been diagnosed with breast cancer and are still alive. However, as mentioned in Chapter 2, because it is rare for a person to be diagnosed with more than one primary breast cancer in one year, the number of new breast cancers in a particular year would be very similar to the number of *people* newly diagnosed with breast cancer in that year.

# Prevalence of breast cancer in females

## How prevalent was breast cancer in 2008?

At the end of 2008, 159,325 females were alive who had been diagnosed with breast cancer in the previous 27 years. This equated to 147 per 10,000 females. The 10-year prevalence for breast cancer was 100,649 females (93 per 10,000), 5-year prevalence was 57,327 females (53 per 10,000) and 1-year prevalence was 13,198 females (12 per 10,000).

To put the prevalence estimates for breast cancer into context, it is useful to compare these estimates with those of other cancers. In this report, the prevalence estimates for breast cancer are compared with those for the most commonly diagnosed gynaecological cancers. As indicated in Table 5.1, regardless of the prevalence duration, breast cancer was by far the most prevalent type of cancer in Australian females (excluding basal cell and squamous cell skin lesions). The higher prevalence of breast cancer in females, compared with commonly diagnosed gynaecological cancers, is due to a number of factors including:

- A larger number of females diagnosed with breast cancer each year compared with commonly diagnosed gynaecological cancers. Breast cancer was the most common cancer among Australian women, representing more than a quarter of all reported cancer cases in females (see Chapter 2).
- Higher survival for those diagnosed with breast cancer compared with gynaecological cancers (see Chapter 4).
- The younger average age at diagnosis of females with breast cancer compared with most gynaecological cancers. For example, in 2008, the mean age at diagnosis of breast cancer in females was 60 years. In comparison, the mean age at diagnosis was 64 years for both ovarian and uterine cancer (AIHW & CA 2012).

**Table 5.1: Limited-duration prevalence of breast cancer and selected gynaecological cancers, females, Australia, end of 2008**

| | 1-yr prevalence | | 5-yr prevalence | | 10-yr prevalence | | 27-yr prevalence | |
|---|---|---|---|---|---|---|---|---|
| **Cancer site/type** | **No.**[(a)] | **Rate**[(b)] | **No.**[(a)] | **Rate**[(b)] | **No.**[(a)] | **Rate**[(b)] | **No.**[(a)] | **Rate**[(b)] |
| Breast (C50) | 13,198 | 12.1 | 57,327 | 52.7 | 100,649 | 92.6 | 159,325 | 146.5 |
| Cervical (C53) | 710 | 0.7 | 2,886 | 2.7 | 5,287 | 4.9 | 14,190 | 13.0 |
| Uterine (C54–C55) | 1,913 | 1.8 | 7,944 | 7.3 | 13,355 | 12.3 | 22,103 | 20.3 |
| Ovarian (C56) | 1,043 | 1.0 | 3,630 | 3.3 | 5,410 | 5.0 | 8,878 | 8.2 |

(a) Prevalence refers to number of living people previously diagnosed with cancer, not the number of cancer cases.

(b) Based on the number of females in the Australian population at 31 December 2008 and expressed per 10,000 females.

*Source:* AIHW Australian Cancer Database 2008.

## Does prevalence differ by age?

Table 5.2 presents 5-year prevalence by age group. Note that in these prevalence statistics, age refers to the age of a female on the index date of 31 December 2008. At the end of 2008, 5-year prevalence rate peaked within the 60–69 age group (154 per 10,000), followed by the 70–79 age group (145 per 10,000).

**Table 5.2: Five-year prevalence of breast cancer, by age group, females, Australia, end of 2008**

| Age group (years) | Number[(a)] | Rate[(b)] |
|---|---:|---:|
| <30 | 156 | 0.4 |
| 30–39 | 2,092 | 13.5 |
| 40–49 | 9,128 | 58.8 |
| 50–59 | 15,037 | 109.7 |
| 60–69 | 15,449 | 153.9 |
| 70–79 | 9,327 | 144.7 |
| 80+ | 6,138 | 124.8 |
| **Total** | **57,327** | **52.7** |

(a) Prevalence refers to number of living people previously diagnosed with cancer, not the number of cancer cases.

(b) Based on the number of females in the Australian population at 31 December 2008 and expressed per 10,000 females.

*Source*: AIHW Australian Cancer Database 2008.

## Does prevalence differ across population groups?

As noted earlier in this chapter, the prevalence of breast cancer is influenced by the incidence of the disease, survival rates and the average age at diagnosis. Since these factors can differ across population groups, prevalence may also differ for these reasons. In this section, prevalence data are presented by state and territory and by country of birth.

### Does prevalence differ by state and territory?

Table 5.3 presents prevalence data for the end of 2008 according to the state and territory in which the female lived at the time of diagnosis. Because it is unknown whether people lived in the same state and territory in 2008 as they did at the time of diagnosis, these data should be interpreted with caution.

**Table 5.3: Five-year prevalence of breast cancer, by state and territory of diagnosis, females, end of 2008**

| | 1-yr prevalence | | 5-yr prevalence | | 10-yr prevalence | | 27-yr prevalence | |
|---|---:|---:|---:|---:|---:|---:|---:|---:|
| **State or territory** | **No.[(a)]** | **Rate[(b)]** | **No.[(a)]** | **Rate[(b)]** | **No.[(a)]** | **Rate[(b)]** | **No.[(a)]** | **Rate[(b)]** |
| New South Wales | 4,287 | 12.1 | 18,932 | 53.3 | 33,519 | 94.3 | 54,019 | 152.1 |
| Victoria | 3,287 | 12.1 | 14,223 | 52.5 | 24,902 | 92.0 | 39,895 | 147.4 |
| Queensland | 2,657 | 12.2 | 11,251 | 51.7 | 19,410 | 89.2 | 29,508 | 135.7 |
| Western Australia | 1,309 | 12.0 | 5,537 | 50.9 | 9,703 | 89.3 | 15,113 | 139.0 |
| South Australia | 1,088 | 13.3 | 4,787 | 58.7 | 8,464 | 103.7 | 13,609 | 166.8 |
| Tasmania | 293 | 11.6 | 1,376 | 54.3 | 2,453 | 96.8 | 3,809 | 150.2 |
| Australian Capital Territory | 204 | 11.6 | 943 | 53.8 | 1,703 | 97.2 | 2,627 | 150.0 |
| Northern Territory | 73 | 6.8 | 278 | 26.0 | 495 | 46.4 | 745 | 69.8 |
| **Total** | **13,198** | **12.1** | **57,327** | **52.7** | **100,649** | **92.6** | **159,325** | **146.5** |

(a) Prevalence refers to number of living people previously diagnosed with cancer, not the number of cancer cases.

(b) Based on the number of females in the Australian population at 31 December 2008 and expressed per 10,000 females.

*Source*: AIHW Australian Cancer Database 2008.

Five-year prevalence, as a proportion of the respective female population, was highest in South Australia (59 per 10,000) and lowest in the Northern Territory (26 per 10,000).

### Does prevalence differ by country of birth?

The prevalence of breast cancer for the end of 2008 according to country or region of birth is presented in Table 5.4. Five-year prevalence, as a proportion of the respective female population, was highest among females born in the United Kingdom and Ireland and in 'North-West Europe excluding the United Kingdom and Ireland' (both 87 per 10,000). The lowest 5-year prevalence, as a proportion of the respective female population, was for females born in North-East Asia (26 per 10,000). These estimates compare with 46 per 10,000 for females born in Australia.

**Table 5.4: Five-year prevalence of breast cancer, by country/region of birth, females, end of 2008**

| | 1-yr prevalence | | 5-yr prevalence | | 10-yr prevalence | | 27-yr prevalence | |
|---|---|---|---|---|---|---|---|---|
| **Country/region of birth[(a)]** | **No.[(b)]** | **Rate[(c)]** | **No.[(b)]** | **Rate[(c)]** | **No.[(b)]** | **Rate[(c)]** | **No.[(b)]** | **Rate[(c)]** |
| North-West Europe, excl. UK and Ireland | 283 | 17.5 | 1,406 | 86.8 | 2,607 | 161.0 | 4,291 | 265.0 |
| United Kingdom (UK) and Ireland | 1,167 | 19.0 | 5,329 | 86.9 | 9,686 | 158.0 | 15,872 | 258.9 |
| Southern and Eastern Europe | 661 | 15.7 | 3,160 | 75.3 | 5,792 | 138.0 | 9,787 | 233.1 |
| United States of America (USA) and Canada | 71 | 11.6 | 302 | 49.2 | 541 | 88.1 | 803 | 130.7 |
| **Australia** | **8,437** | **10.5** | **36,733** | **45.6** | **65,153** | **80.9** | **102,980** | **127.8** |
| Americas, excl. USA and Canada | 80 | 13.5 | 306 | 51.7 | 476 | 80.5 | 725 | 122.6 |
| North Africa and the Middle East | 172 | 11.4 | 752 | 49.8 | 1,259 | 83.3 | 1,850 | 122.5 |
| Oceania and Antarctica excl. Australia and NZ | 97 | 13.9 | 356 | 51.0 | 569 | 81.5 | 820 | 117.5 |
| New Zealand (NZ) | 298 | 11.9 | 1,157 | 46.2 | 1,993 | 79.6 | 2,939 | 117.4 |
| Sub-Saharan Africa | 114 | 8.5 | 524 | 39.2 | 861 | 64.4 | 1,221 | 91.4 |
| South-East Asia | 345 | 8.4 | 1,457 | 35.4 | 2,473 | 60.2 | 3,434 | 83.5 |
| Southern and Central Asia | 129 | 6.4 | 551 | 27.5 | 933 | 46.5 | 1,393 | 69.4 |
| North-East Asia | 187 | 5.8 | 828 | 25.6 | 1,380 | 42.7 | 1,960 | 60.7 |
| Inadequately described, not stated or unknown | 1,157 | . . | 4,466 | . . | 6,926 | . . | 11,250 | . . |
| **Total** | **13,198** | **12.1** | **57,327** | **52.7** | **100,649** | **92.6** | **159,325** | **146.5** |

(a) Classified according to the Standard Australian Classification of Countries, second edition (see Appendix A).

(b) Prevalence refers to number of living people previously diagnosed with cancer, not the number of cancer cases.

(c) Based on the number of females in the Australian population at 31 December 2008, expressed per 10,000 females.

Source: AIHW Australian Cancer Database 2008.

## Prevalence of breast cancer in males

At the end of 2008, 1,000 males were alive who had been diagnosed with breast cancer in the previous 27 years (Table 5.5). This equated to 1.0 per 10,000 males in the population. At the same time, 10-year prevalence count was 699 males, 5-year prevalence count was 438 and 1-year prevalence count was 107.

**Table 5.5: Limited-duration prevalence of breast cancer, males, Australia, end of 2008**

| Time period | Number[(a)] | Rate[(b)] |
|---|---|---|
| 1-yr prevalence | 107 | 0.1 |
| 5-yr prevalence | 438 | 0.4 |
| 10-yr prevalence | 699 | 0.7 |
| 27-yr prevalence | 1,000 | 1.0 |

(a) Prevalence refers to number of living people previously diagnosed with cancer, not the number of cancer cases.

(b) Based on the number of males in the Australian population at 31 December 2008, expressed per 10,000 males.

*Source:* AIHW Australian Cancer Database 2008.

Table 5.6 shows the differences in 5-year prevalence of breast cancer in males by age group. At the end of 2008, 107 males aged 80 and over had been diagnosed with breast cancer in the previous 5 years, compared with 140 males aged 70–79 and 103 males aged 60–69.

**Table 5.6: Five-year prevalence of breast cancer by age group, males, Australia, end of 2008**

| Age group (years) | Number[(a)] | Rate[(b)] |
|---|---|---|
| <50 | 29 | 0.04 |
| 50–59 | 59 | 0.44 |
| 60–69 | 103 | 1.03 |
| 70–79 | 140 | 2.42 |
| 80+ | 107 | 3.48 |
| **Total** | **438** | **0.41** |

(a) Prevalence refers to number of living people previously diagnosed with cancer, not the number of cancer cases.

(b) Based on the number of males in the Australian population at 31 December 2008, expressed per 10,000 males.

*Source*: AIHW Australian Cancer Database 2008

# 6 Burden of disease due to breast cancer

**Key findings**

**Females**

In 2012 in Australia:

- Breast cancer is expected to be the sixth leading cause of burden of disease for females, accounting for 61,300 'disability-adjusted life years' (DALYs), 4% of all female burden of disease and 24% of all female burden due to cancer.
- Breast cancer is expected to contribute more years of life lost (40,800) (YLL) than years of healthy life lost to disability (20,500) (YLD).
- The burden on females from breast cancer is expected to be concentrated in females aged 40–69, with this disease accounting for 8% of the total burden of disease for females in that age range.

**Males**

In 2012 in Australia:

- Breast cancer is expected to contribute a total of 140 DALYs for males, with these DALYs comprised exclusively of years of life lost.

## About burden of disease due to breast cancer

The effect of breast cancer on the health of the population can be summarised using a number of different measures that combine information on both mortality and non-fatal health outcomes into a single number. Such measures can be used for a range of purposes including:

- comparing the burden associated with different diseases
- comparing the effect of a particular disease among population groups or over time
- setting priorities for health planning, public health programs, as well as research and development (Murray et al. 1999).

Of the available summary measures, one of the most commonly used is the 'disability-adjusted life year' (DALY), also commonly referred to as 'burden of disease'. The DALY combines information on the extent of:

- premature death—which is measured by the years of life lost (YLL) due to disease or injury and
- non-fatal health outcomes—which is measured by years of 'healthy' life lost (YLD) due to disease, disability or injury.

In order to combine these two health measures into a summary measure, the DALY uses time as a common 'currency'. Hence, the DALY is a measure of the years of healthy life lost due to premature death (YLL) or disease, disability or injury (YLD), or a combination of the two, with one DALY equal to one lost year of 'healthy' life. The more DALYs associated with a particular disease, the greater the burden. Further information about DALYs can be found in AIHW's report on the burden of disease and injury (Begg et al. 2007) and in Appendix C.

In this chapter, the estimated burden of disease in 2012 due to breast cancer is presented along with comparisons between other diseases that are also major contributors to the overall burden. These estimations were derived from projections of the burden of disease assessed for 2003. It is important to note that the projections are not intended to function as exact forecasts, but to give an indication of what might be expected if the stated assumptions were to apply over the projected time frame. Information on the methodology used to estimate the burden of disease for Australia in 2012 can be found in the report by Begg et al. (2007).

**Box 6.1: What is a 'DALY'?**

One disability-adjusted life year or 'DALY' is one year of 'healthy life' lost due to a disease or injury. To illustrate the basic concept, a person who has been healthy all his life but who suddenly dies of a heart attack 20 years earlier than expected has lost 20 years of healthy life—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. Using information about the duration and severity of diseases and injuries in individuals, and the pattern of these conditions among the community, DALYs can be added up for each problem (for example, breast cancer) and also combined to give a grand total for a specific disease group, such as cancer (AIHW 2010b).

# Burden of disease due to breast cancer in females

## What was the estimated burden of disease due to breast cancer in 2012?

The total burden of disease for females in 2012 is expected to be more than 1.4 million DALYs and the burden due to cancer is expected to be 256,900 DALYs. Table 6.1 presents the leading causes of disease burden in females, along with the three leading cancers in females. Breast cancer is expected to be the sixth leading cause of burden of disease for females (61,300 DALYs), accounting for about 4% of all female burden of disease and almost one-quarter (24%) of all female burden due to cancer. The burden of disease due to breast cancer is expected to be roughly equivalent to the burden of disease caused by stroke (62,800 DALYs).

**Table 6.1: Estimated[(a)] leading causes of burden of disease, including leading cancers, females, Australia, 2012**

| Cause | Disability-adjusted life years (DALYs) | Percentage of total DALYs | Percentage of DALYs due to cancer | Rank |
|---|---|---|---|---|
| Anxiety and depression | 135,700 | 9.6 | . . | 1 |
| Ischaemic heart disease | 107,100 | 7.6 | . . | 2 |
| Type 2 diabetes | 88,000 | 6.2 | . . | 3 |
| Dementia | 81,500 | 5.8 | . . | 4 |
| Stroke | 62,800 | 4.4 | . . | 5 |
| Chronic obstructive pulmonary disease (COPD) | 40,800 | 2.9 | . . | 8 |
| Asthma | 36,100 | 2.5 | . . | 9 |
| *All cancers*[(b)] | *256,900* | *18.2* | *100.0* | . . |
| Breast cancer | 61,300 | 4.3 | 23.9 | 6 |
| Lung cancer | 43,400 | 3.1 | 16.9 | 7 |
| Bowel cancer | 30,700 | 2.2 | 12.0 | 10 |
| **Total for all causes** | **1,413,000** | **100.0** | **. .** | **. .** |

. . Not applicable

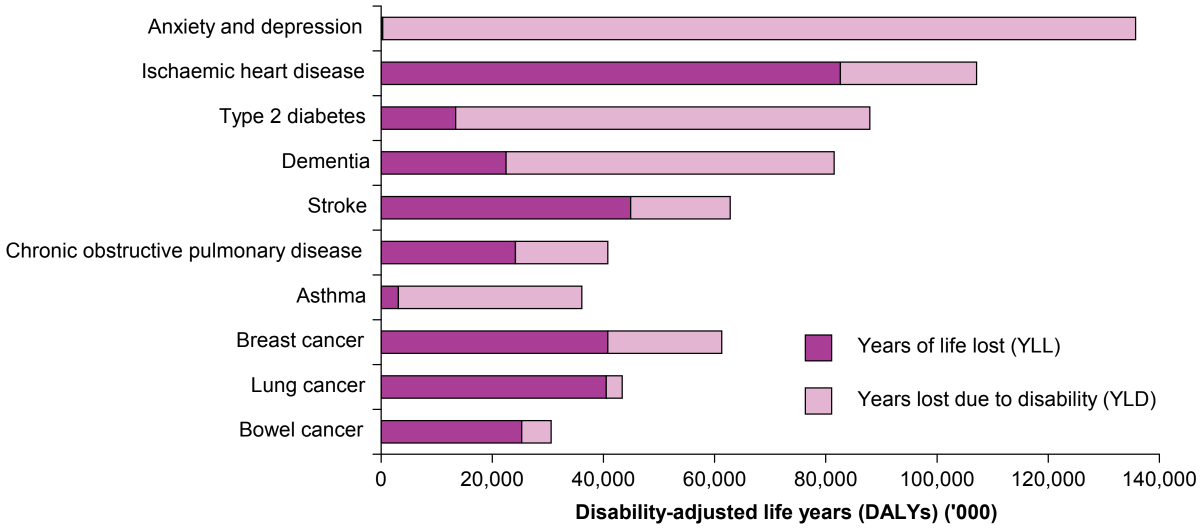
(a) The estimates are projected from a 2003 baseline. See Appendix C for further details.

(b) Includes cancers coded in ICD-10 as C00–C96.

*Source*: AIHW Burden of Disease database.

Figure 6.1 and Table 6.2 show the extent of the burden associated with the leading causes of disease burden for females that were expected to be due to premature death (YLL) and disease, disability or injury (YLD). For breast cancer, causes of years of healthy life lost to disability include side effects during and after treatment (for example, after radiotherapy, chemotherapy or hormonal therapies), potential changes in menopause, the effects of lymphoedema and the psychosocial differences in 'life after therapy' (NBOCC 2008).

Due to the relatively poor prognosis from many cancers compared with most other diseases, most cancers are expected to contribute more years of life lost (YLL) than years of healthy life lost to disability (YLD). Breast cancer is no exception, with an expected two-thirds (67%) of the total DALYs for females being due to premature mortality (YLL). Furthermore, while breast cancer is expected to account for 3% of total years of healthy life lost to disability (YLD) from all diseases for females in 2012, it is expected to account for 7% of all years of life lost due to premature mortality (YLL). Thus, on this latter measure, it is expected to rank third of all diseases, after ischaemic heart disease (14% of total YLL) and stroke (7% of total YLL). In regard to all cancers, breast cancer is expected to represent almost half (46%) of all years of healthy life lost to disability and one-fifth (19%) of the mortality burden.



*Notes*

1. The estimates are projected from a 2003 baseline. See Appendix C for further details.
2. The data for this figure are shown in Table 6.2.

*Source:* AIHW Burden of Disease database.

**Figure 6.1: Estimated leading causes of burden of disease, including leading cancers, by fatal (YLL) and non-fatal (YLD) components, females, Australia, 2012**

## Table 6.2: Estimated[(a)] leading causes of burden of disease, including leading cancers, by fatal (YLL) and non-fatal (YLD) components, females, Australia, 2012

| | Fatal component | | | Non-fatal component | | | Total[(b)] | | |
|---|---|---|---|---|---|---|---|---|---|
| **Cause** | **Years of life lost (YLL)** | **Percentage of total YLL** | **Rank** | **Years of healthy life lost (YLD)** | **Percentage of total YLD** | **Rank** | **Disability-adjusted life years (DALYs)** | **Percentage of DALYs due to YLL** | **Percentage of DALYs due to YLD** |
| Anxiety and depression | 300 | 0.0 | 95 | 135,400 | 16.8 | 1 | 135,700 | 0.2 | 99.8 |
| Ischaemic heart disease | 82,600 | 13.6 | 1 | 24,500 | 3.0 | 7 | 107,100 | 77.1 | 22.9 |
| Type 2 diabetes | 13,400 | 2.2 | 9 | 74,500 | 9.2 | 2 | 88,000 | 15.2 | 84.7 |
| Dementia | 22,500 | 3.7 | 7 | 59,000 | 7.3 | 3 | 81,500 | 27.6 | 72.4 |
| Stroke | 44,900 | 7.4 | 2 | 17,900 | 2.2 | 11 | 62,800 | 71.5 | 28.5 |
| Chronic obstructive pulmonary disease (COPD) | 24,200 | 4.0 | 6 | 16,600 | 2.1 | 13 | 40,800 | 59.3 | 40.7 |
| Asthma | 3,100 | 1.0 | 42 | 33,000 | 4.1 | 4 | 36,100 | 8.6 | 91.4 |
| *All cancers*[(c)] | *212,200* | *35.0* | . . | *44,700* | *5.5* | . . | *256,900* | *82.6* | *17.4* |
| Breast cancer | 40,800 | 6.7 | 3 | 20,500 | 2.5 | 8 | 61,300 | 66.6 | 33.4 |
| Lung cancer | 40,500 | 6.7 | 4 | 2,900 | 0.4 | 49 | 43,400 | 93.3 | 6.7 |
| Bowel cancer | 25,300 | 4.2 | 5 | 5,300 | 0.7 | 32 | 30,700 | 82.4 | 17.3 |
| **Total for all causes** | **605,500** | **100.0** | . . | **807,500** | **100.0** | . . | **1,413,000** | **42.9** | **57.1** |

(a) The estimates are projected from a 2003 baseline. See Appendix C for further details.

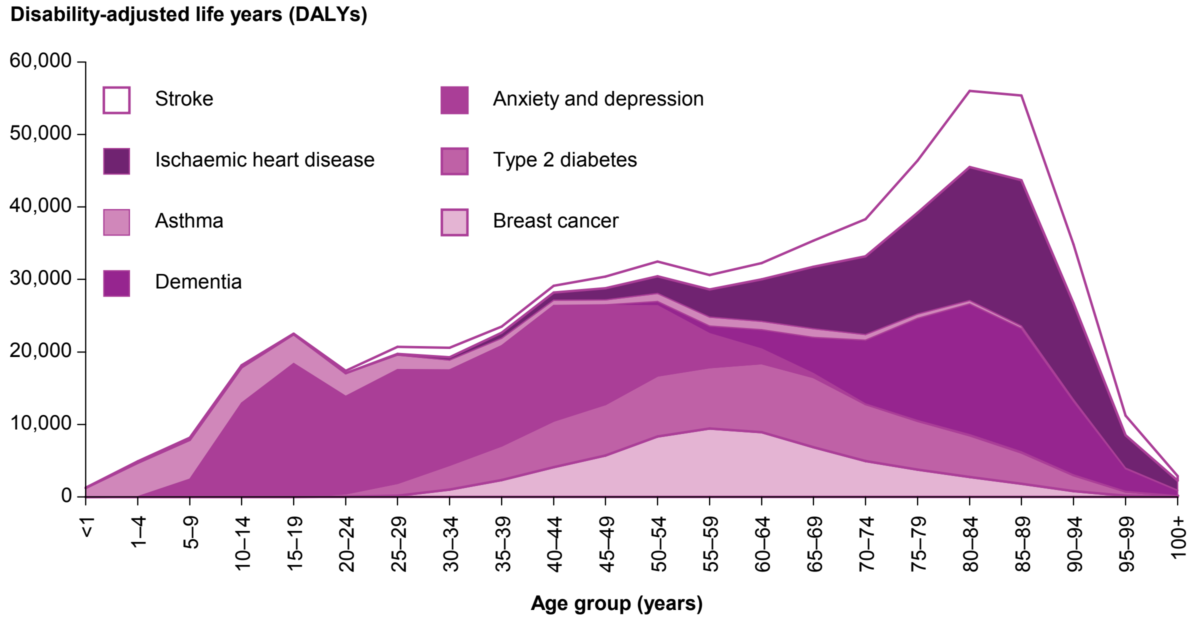
(b) The estimates may not add up to the total due to rounding.

(c) Includes cancers coded in ICD-10 as C00–C96.

*Source:* AIHW Burden of Disease database.

### Does the estimated burden of disease differ by age?

The leading causes of the burden of disease are expected to affect females at different stages of life. As shown in Figure 6.2, in 2012, anxiety and depression are expected to account for the highest burden of disease for females in the younger age groups (that is, those less than 45). In contrast, stroke, dementia and ischaemic heart disease are expected to account for a relatively high proportion of the burden at older ages (for those aged 75 years and over). The burden on females from breast cancer is expected to be concentrated in females aged 40–69, accounting for 8% of the total burden of disease for females in that age range.



*Notes*

1. The estimates are projected from a 2003 baseline. See Appendix C for further details.
2. The data for this figure are shown in Appendix Table D6.1.

*Source*: AIHW Burden of Disease database.

**Figure 6.2: Estimated leading causes of burden of disease, by age group, females, Australia, 2012**

# Burden of disease due to breast cancer in males

Among males, the total burden of disease in 2012 is expected to be about 1.5 million DALYs and the burden due to cancer about 294,400 DALYs (Table 6.4). Breast cancer is expected to contribute a total of 140 DALYs for males, with these DALYs comprised exclusively of years of life lost.

Considering the burden of disease due to breast cancer for both males and females together, the total estimated number of DALYs from breast cancer in 2012 is expected to be about 61,400.

### Table 6.3: Selected[a] leading causes of burden of disease by fatal (YLL) and non-fatal (YLD) components, males, Australia, 2012

| | Fatal component | | Non-fatal component | | Total[b] | | |
|---|---|---|---|---|---|---|---|
| Cause | Years of life lost (YLL) | Percentage of total YLL | Years of life lost due to disability (YLD) | Percentage of total YLD | Disability-adjusted life years (DALYs) | Percentage of total DALYs | Rank |
| Ischaemic heart disease | 111,800 | 15.2 | 24,000 | 3.2 | 135,700 | 9.1 | 1 |
| Type 2 diabetes | 19,400 | 2.6 | 80,800 | 10.6 | 100,100 | 6.7 | 2 |
| Anxiety and depression | 180 | 0.0 | 70,900 | 9.3 | 71,000 | 4.7 | 3 |
| Stroke | 35,000 | 4.8 | 18,400 | 2.4 | 53,400 | 3.6 | 6 |
| Dementia | 11,400 | 1.5 | 36,400 | 4.8 | 47,800 | 3.2 | 7 |
| *All cancers*[c] | *245,200* | *33.3* | *49,200* | *6.5* | *294,400* | *19.7* | . . |
| Lung cancer | 53,700 | 7.3 | 3,600 | 0.5 | 57,300 | 3.8 | 4 |
| Prostate cancer | 28,500 | 3.9 | 15,700 | 2.1 | 44,300 | 3.0 | 8 |
| Bowel cancer | 31,600 | 4.3 | 7,200 | 0.9 | 38,800 | 2.6 | 11 |
| Breast cancer | 140 | — | 0 | — | 140 | 0.0 | >100 |
| **Total for all causes** | **736,100** | **100.0** | **761,500** | **100.0** | **1,497,600** | **100.0** | . . |

— nil or rounded to zero.

(a) The estimates are projected from a 2003 baseline. See Appendix C for further details.

(b) The estimates may not add up to the total due to rounding.

(c) Includes cancers coded in ICD-10 as C00–C96.

*Source:* AIHW Burden of Disease database.

# 7 Mammography

**Key findings**

**BreastScreen Australia**

In the 2009–2010 two-year period:

- 1,710,312 women participated in BreastScreen Australia.
- The participation rate was 55% for women in the target age group of 50–69.
- The participation rate for those aged 50–69 varied by remoteness area of residence, with the highest participation in *Outer regional* areas (58%) and the lowest in *Very remote* areas (47%).
- Participation rates were similar across socioeconomic groups, ranging between 53% and 56% for those aged 50–69.
- The participation rate for those aged 50–69 was significantly lower for Aboriginal and Torres Strait Islander than non-Indigenous women (36% versus 55%).

Between 1999–2000 and 2009–2010:

- The participation rate remained steady between 55% and 57%, despite a sustained increase in the actual number of women participating over this time.

**MBS-funded mammography**

In 2011:

- 354,340 Medicare Benefits Scheme (MBS)-funded mammography services were provided to women, representing 0.2% of all services to women subsidised by the MBS.
- More than 70% of all MBS-funded mammography services were provided to women aged 35–64.

Between 1994 and 2011:

- The number of MBS-funded mammograms provided to women fell from 383,181 to 354,340, a decrease of 8%.

# About mammography

Mammography involves an X-ray examination of the breast in order to determine if abnormalities (including cancers) exist. The availability and uptake of mammography contributes to the detection of breast cancer. Mammography can be used either as a screening or a diagnostic tool.

The aim of mammography for breast cancer screening purposes is to detect cases of unsuspected breast cancer in women, enabling intervention at an early stage. Finding breast cancer early often means that the cancer is small, which is associated with increased treatment options (NBOCC 2009b) and improved survival (AIHW & NBCC 2007).

In Australia, screening mammograms are available to women 40 years and over at no charge to the client through BreastScreen Australia, Australia's national breast cancer screening program. Some women may choose to obtain a screening mammogram outside of BreastScreen Australia (for example, at a private radiology clinic) but the extent to which this occurs is unknown. This may effect variation in screening rates across population groups.

In contrast to screening mammography, diagnostic mammography is undertaken to determine if cancer is present in a woman with symptoms—such as a breast lump or nipple discharge. The symptoms may have been noticed by the woman, by a doctor or at screening. In Australia, diagnostic mammograms are generally provided by organisations such as private radiology clinics and public hospital radiology departments. Medicare Benefits Schedule (MBS) rebates, which may be bulk-billed, are available for diagnostic mammography where a doctor's referral is provided. Doctors can refer a woman for a mammogram on the basis of suspicion of breast cancer due to personal or family history of breast cancer, or presence of symptoms.

In this chapter, information on the use of mammography in Australia is presented. The first section provides data on the number of women obtaining a screening mammogram through BreastScreen Australia. The second section presents data on MBS-funded mammography.

The MBS distinguishes between two types of mammography services:

- mammography of both breasts (MBS item number 59300)
- mammography of one breast (MBS item number 59303).

Documentation about the MBS indicates that MBS-funded mammography should include both breasts unless the referral specifically requests a mammography of just one breast (DoHA 2012). The MBS also notes that both types of mammography services are to be used in the investigation of clinical abnormalities—that is, for diagnostic purposes—and not for screening women who are asymptomatic. However, some screening mammograms for women with increased breast cancer risk—for example, women with a personal or family history of breast cancer—are eligible for MBS funding (Stieber 2005) and are coded to the same item numbers noted above.

# BreastScreen Australia

BreastScreen Australia was established in 1991 and operates as a joint program of the Australian and state and territory governments. It aims to reduce illness and death resulting from breast cancer in Australia through organised mammographic screening to detect cases of unsuspected breast cancer in women, enabling intervention at an early stage. BreastScreen Australia targets women aged 50–69 for 2-yearly screening mammograms, although women aged 40 or above are also eligible to attend.

Women aged 50–69 are targeted because they have a relatively high incidence of breast cancer, and screening mammography is known to be effective in reducing mortality in this age group (BreastScreen Australia 2004). Screening mammography is less effective in women under 50, probably because of biological differences in the breast tissue of pre-menopausal women. This results in more investigations and missed breast cancers (false negative results) due to the lower sensitivity of screening mammography in this age group (Irwig et al. 1997).

In this section, data from BreastScreen Australia that relate specifically to the number of women who obtained a screening mammogram are described. Since BreastScreen Australia recommends that a woman in the target age group has a screening mammogram every 2 years, the measure of participation used is the proportion of women in the target age group who were screened though BreastScreen Australia in a 2-year period. Data are presented for the 2-year period of 2009–2010, with trend data from 1999–2000. The data were sourced from state and territory BreastScreen programs (see Appendix C for further information).

For more information on BreastScreen Australia and other population health screening issues, please refer to <www.cancerscreening.gov.au>.

**Box 7.1: BreastScreen Australia monitoring report**

The BreastScreen Australia monitoring report is an annual report presenting national data on key BreastScreen Australia activity, performance and outcome indicators.

More comprehensive data on participation and other BreastScreen Australia indicators can be found in the latest BreastScreen Australia monitoring report. A copy of the latest report can be obtained from the AIHW website visit <www.aihw.gov.au>.

## How many women participated in BreastScreen Australia in 2009–2010?

In the 2009–2010 two-year period, 1,710,312 women participated in BreastScreen Australia (that is, had at least one screening mammogram over the 2 years), of which 1,352,112 were in the target age group of 50–69. This is more than half (55%) of all women aged 50–69 in Australia.

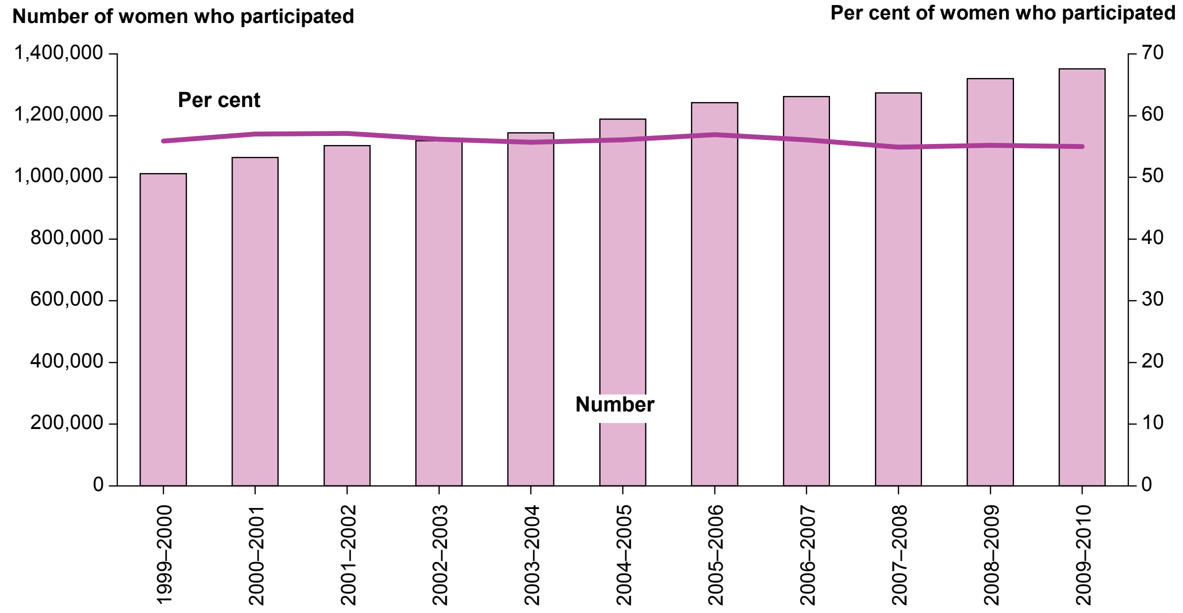
Table 7.1: Participation in BreastScreen Australia, women, 2009–2010

| Age group (years) | Number of women | Percentage of women |
|---|---|---|
| 50–69 | 1,352,112 | 55.0 |

*Source*: AIHW analysis of BreastScreen Australia data.

## Has the participation in the BreastScreen Australia program changed over time?

Figure 7.1 shows time trends in BreastScreen Australia participation for women in the target age group of 50–69. In the 10 years from 1999–2000 to 2009–2010, the number of women aged 50–69 participating in BreastScreen Australia increased from 1,012,184 to 1,352,112. Meanwhile, the age-standardised participation rate has remained steady at between 55% and 57% (Figure 7.1).



*Notes*

1. The data for this figure are shown in Appendix Table D7.1.
2. The screening periods cover 1 January of the initial year to 31 December of the latter year indicated.

*Source*: AIHW analysis of BreastScreen Australia data.

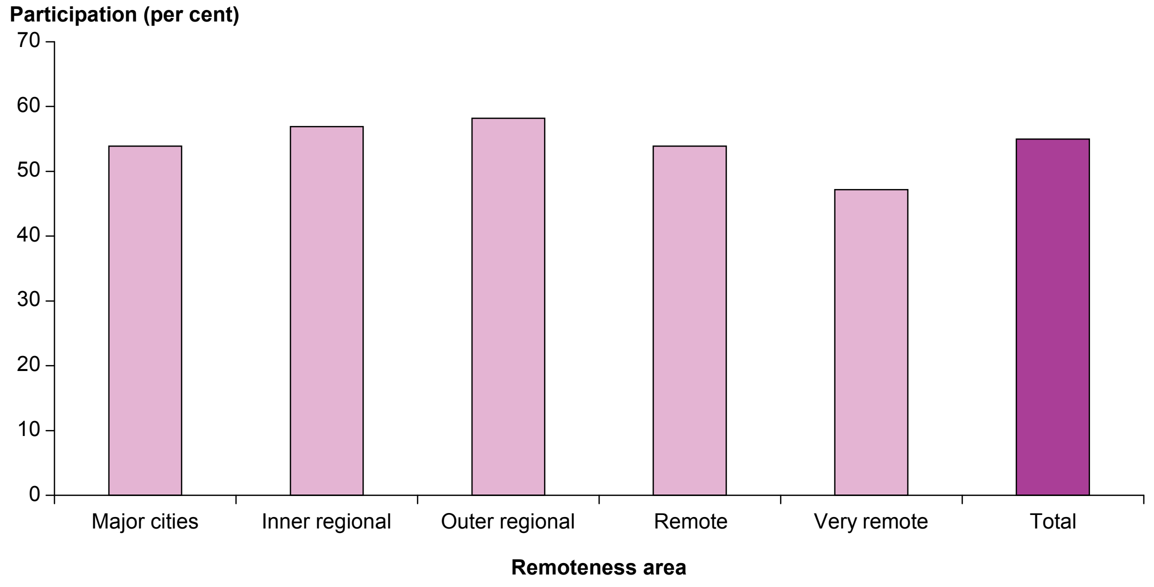
**Figure 7.1: Participation in BreastScreen Australia, women aged 50–69, 1999–2000 to 2009–2010**

## Does participation differ across population groups?

In this section, BreastScreen Australia participation data for women in the target age group of 50–69 are provided according to remoteness area, socioeconomic status and Aboriginal and Torres Strait Islander status. To take account of the different age structures and size of the groups being compared, age-standardised rates are provided for each of the comparisons.

### Does participation differ by remoteness area?

Participation also varied by remoteness area of residence for women aged 50–69, with highest participation recorded in *Outer regional* areas (58.2%), and lowest participation in *Very remote* areas (47.2%) (Figure 7.2). To improve access for women in *Remote* and *Very remote* areas, states and territories use relocatable screening services, mobile screening vans and community buses to overcome transport barriers.



*Notes:*

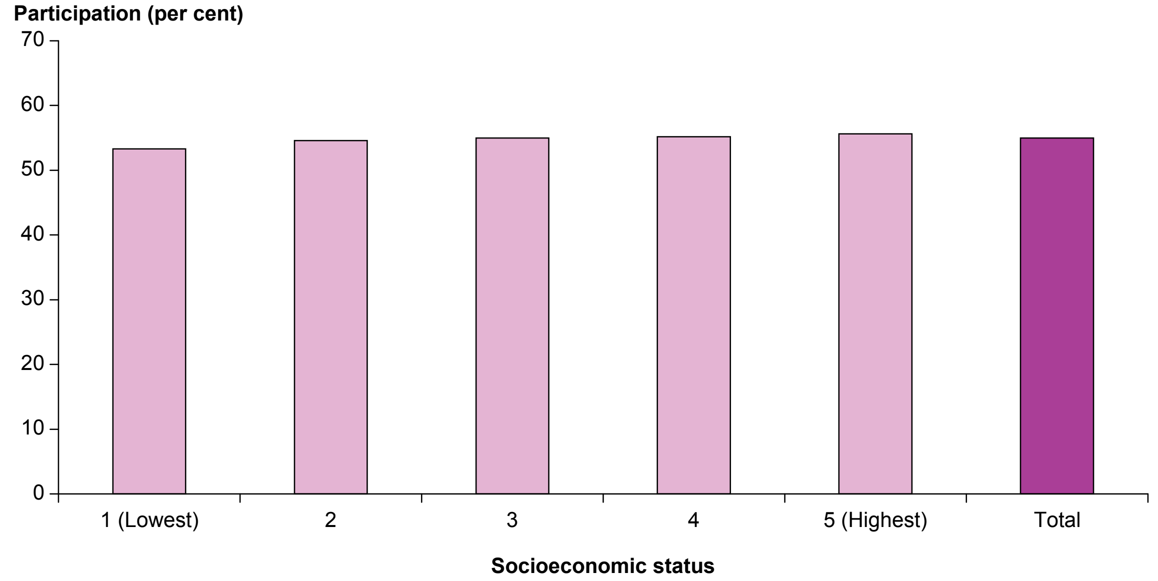
1. Remoteness was classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Area (see Appendix A).
2. The data for this figure are shown in Appendix Table D7.2.

*Source*: AIHW analysis of BreastScreen Australia data.

**Figure 7.2: Participation in BreastScreen Australia, by remoteness area, women aged 50–69, Australia, 2009–2010**

## Does participation differ by socioeconomic status?

While BreastScreen Australia participation increased with improving socioeconomic status, differences were small, with all socioeconomic groups recording participation rates between 53% and 56% (Figure 7.3), indicating similar accessibility to all women.



*Notes:*

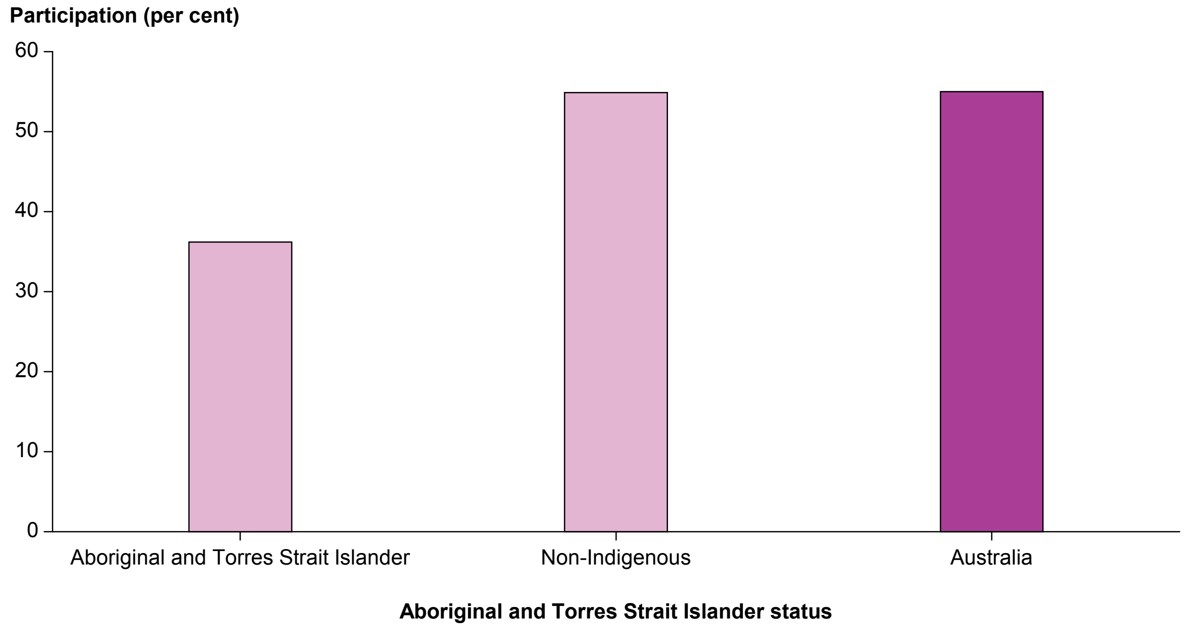
1. Socioeconomic status area was classified by mapping their residential postcode (through a postal area) to the ABS IRSD for 2006.
2. The data for this figure are shown in Appendix Table D7.3.

*Source*: AIHW analysis of BreastScreen Australia data.

**Figure 7.3: Participation in BreastScreen Australia, by socioeconomic status, women aged 50–69, Australia, 2009–2010**

### Does participation differ by Aboriginal and Torres Strait Islander status?

Participation by Aboriginal and Torres Strait Islander women in 2009–2010 was 36.2%, compared with 54.9% for non-Indigenous women. Data should be treated with caution due to issues with Indigenous status identification.



*Note:* The data for this figure are shown in Appendix Table D7.4.

*Source*: AIHW analysis of BreastScreen Australia data.

**Figure 7.4: Participation in BreastScreen Australia, by Aboriginal and Torres Strait Islander status, women aged 50–69, 2009–2010**

# MBS-funded mammography in 2011

In this section of the report, data are provided on the number of mammograms that were subsidised through the MBS. MBS subsidies for mammograms are available for one or both breasts if there is a reason to suspect the presence of malignancy because (i) the past occurrence of breast malignancy in the patient or members of the patient's family; or (ii) symptoms or indications of a malignancy found on an examination of the patient by a medical practitioner.

It should be noted that MBS data are not able to capture all mammography that occurs outside the screening mammography and assessment process performed through BreastScreen Australia. This is because some women may choose to access screening mammography through the private sector on a user-pays basis, for which a MBS rebate cannot be claimed (BreastScreen Australia EAC 2009).

For women, differences by age and geographical area are considered. Although men are not eligible for screening mammography through BreastScreen Australia, they are eligible for reimbursement for mammograms through the MBS. Hence, data on MBS-funded mammograms are also presented for men. Data are presented for MBS-funded services for 2011, along with trend data from 1994.The main data source for this section was the

Medicare Australia website (Medicare Australia 2012). Further information about this data source can be found in Appendix C.

## How many MBS-funded mammography services were provided to women in 2011?

The total number of MBS-funded services provided to women in 2011 was 188,622,146 (Medicare Australia 2012). Over 350,000 of these were mammography services (Table 7.2), with the age-standardised rate equalling 31 per 1,000 women. Further, mammographic services represented 0.2% of all services to women subsidised by MBS in 2011, with almost 9out of 10 (88%) services involving mammograms of both breasts rather than one breast (Table 7.2).

**Table 7.2: Medicare Benefits Schedule–funded mammography services, women, Australia, 2011**

| Service type | Number of Services | Percentage of mammography services | Age-standardised rate[(a)] | 95% CI |
|---|---|---|---|---|
| Mammography of both breasts | 311,660 | 88.0 | 27.4 | 27.3–27.5 |
| Mammography of one breast | 42,680 | 12.0 | 3.8 | 3.7–3.8 |
| **Total mammography** | **354,340** | **100.0** | **31.2** | **31.1–31.3** |

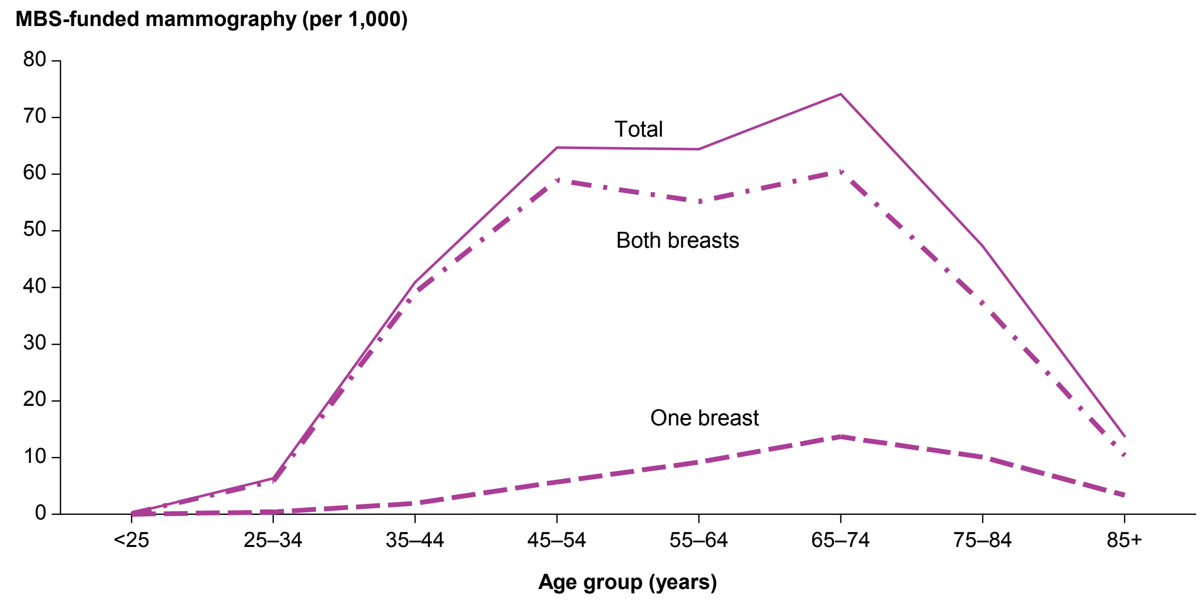
(a) Standardised to the Australian population as at 30 June 2001 and expressed per 1,000 women.

*Source*: AIHW analysis of Medicare Australia data.

## Differences by age

When the number of services is considered, around 71% of all MBS-funded mammography services were provided to women aged 35–44 through to 55–64 in 2011 (250,116 services).

Women aged 65–74 had the highest rate of MBS-funded mammography services (74 per 1,000 women) closely followed by women aged 45–54 and 55–64 (65 and 64 per 1,000 women, respectively) (Figure 7.5). Age-specific rates of MBS-funded mammography dropped away steeply outside of these age groups.



*Note:* The data for this figure are shown in Appendix Table D7.5.

*Source*: Medicare Australia Statistics, Australian Government Department of Health and Ageing.

**Figure 7.5: Medicare Benefits Schedule–funded mammography services by age group, women, Australia, 2011**

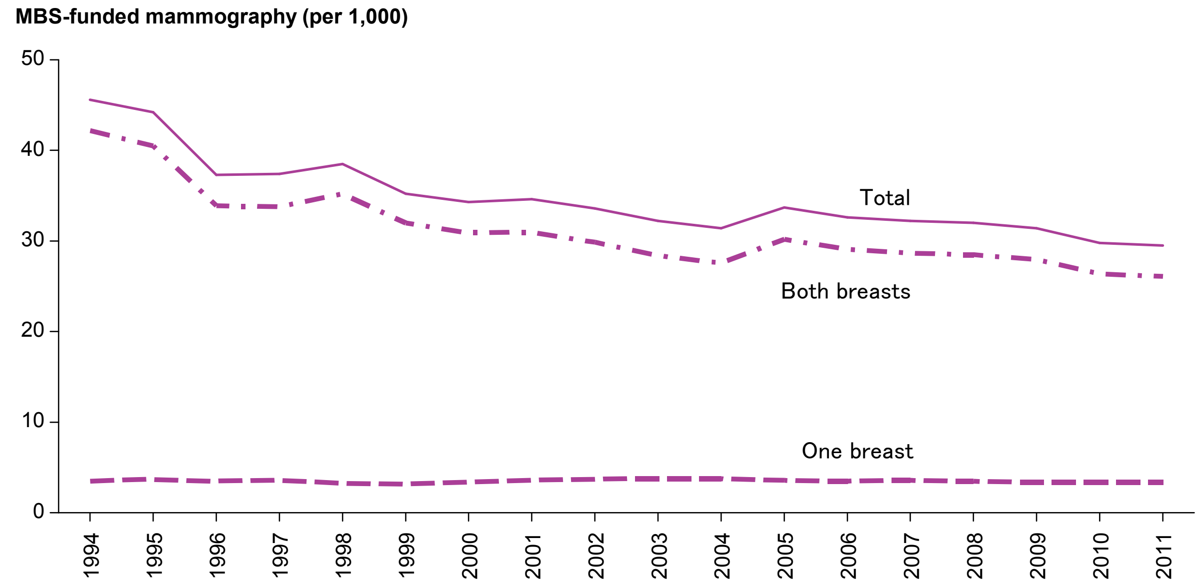
When the rates for women who had a mammogram of one breast versus both breasts are considered, the patterns by age differ. In particular, the rate of mammography of both breasts increased sharply to 45–54 where it remained relatively steady for women aged 55–64 and 65–74, after which the rate decreased sharply. In comparison, the rate of mammography in one breast increased steadily with age until 65–74, where it peaked at 14 per 1,000 women. The rates for women aged 75–84 and 85 and over were considerably lower than for 65–74 year olds.

## Trends

The number of MBS-funded mammograms provided to women fell from 383,181 in 1994 to 354,340 in 2011, which is a decrease of 8% (Appendix Table D7.6).

Trends in the age-standardised rates of MBS-funded mammography are illustrated in Figure 7.7. Overall, there has been a downward trend in the rate of women having MBS-funded mammograms, with the sharpest decrease occurring between 1995 and 1996 (44 to 37 per 1,000, respectively). This decrease in the mid-1990s could be related to the greater availability of mammography services through BreastScreen Australia as this program continued to extend across more regions of Australia.

All of the decrease in the rate of women having MBS-funded mammograms pertained to mammograms of both breasts, with the rate of women having an MBS-funded mammogram of one breast virtually stable (ranging from 3 to 4 per 1,000 over the time period considered).



*Note*: The data for this figure are shown in Appendix Table D7.6.

*Source*: Medicare Australia Statistics, Australian Government Department of Health and Ageing.

**Figure 7.6: Medicare Benefits Schedule–funded mammography services, women, Australia, 1994–2011**

## Differences by state and territory

Information on the provision of MBS-funded mammography services is available according to the state or territory in which the person lived at the time of claiming for the service.

As shown in Table 7.3, of all MBS-funded mammography services provided to women, 39% were to women living in New South Wales and 25% to women in Victoria.

The age-standardised rates indicate that New South Wales also had the highest proportion of women who had an MBS-funded mammography service in 2011 (35 services per 1,000 women), followed by Victoria and Queensland (both with 29 services per 1,000 women). The Northern Territory had the lowest proportion of women who had an MBS-funded mammography service in 2011 (13 per 1,000 women).

**Table 7.3: Medicare Benefits Schedule–funded mammography services by state and territory, women, 2011**

| State or territory | Number of services | Age-standardised rate[(a)] | 95% CI |
|---|---|---|---|
| New South Wales | 137,251 | 35.1 | 34.9–35.3 |
| Victoria | 87,898 | 29.2 | 29.0–29.4 |
| Queensland | 68,592 | 28.8 | 28.5–29.0 |
| Western Australia | 23,403 | 19.6 | 19.3–19.8 |
| South Australia | 24,800 | 26.4 | 26.1–26.7 |
| Tasmania | 6,474 | 22.2 | 21.6–22.7 |
| Australian Capital Territory | 4,672 | 25.4 | 24.7–26.2 |
| Northern Territory | 1,250 | 12.7 | 11.9–13.5 |
| **Total** | **354,340** | **29.5** | **29.4–29.6** |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 1,000 women.

*Source:* AIHW analysis of Medicare Australia data.

## How many MBS-funded mammography services were provided for men in 2011?

Men are also eligible for MBS-funded mammography services, with 1,677 such services provided to males in 2011 (Table 7.4). When men and women are considered together, a total of 356,017 MBS-funded mammography services were provided in 2011.

**Table 7.4: Medicare Benefits Schedule–funded mammography services by sex, 2011**

| | Mammography of both breasts | | Mammography of one breast | | Total mammography | |
|---|---|---|---|---|---|---|
| | Number of services | Per cent | Number of services | Per cent | Number of services | Per cent |
| Men | 1,278 | 0.4 | 399 | 0.9 | 1,677 | 0.5 |
| Women | 311,660 | 99.6 | 42,680 | 99.1 | 354,340 | 99.5 |
| **Total** | **312,938** | **100.0** | **43,079** | **100.0** | **356,017** | **100.0** |

*Note*: In the previous report, *Breast cancer in Australia 2009*, 2007–2008 MBS-funded mammography services data were presented for services provided to persons for whom the sex of the recipient was not recorded. 2011 data do not have any records where this occurred.

*Source:* AIHW analysis of Medicare Australia data.

# 8 Hospitalisations for breast cancer

**Key findings**

**Females**

In the 2009–10 financial year in Australia:

- There were just over 113,000 hospitalisations of females due to breast cancer.
- 83% of the hospitalisations for breast cancer were classified as same-day.
- 56% of the hospitalisations for breast cancer were in females aged 50–69.
- 62% of the hospitalisations for breast cancer were in private hospitals.
- 91% of same-day hospitalisations for breast cancer involved *administration of pharmacotherapy*.
- 75% of the overnight hospitalisations for breast cancer involved a surgical procedure.
- The most commonly reported surgical procedures were *excision procedures on lymph node of axilla*, *excision of lesion of breast* and *simple mastectomy* (applying to 64%, 40% and 29% of all overnight hospitalisations, respectively).
- The most common additional diagnoses, where the principal diagnosis was breast cancer, were *cancer, diseases of the blood and blood forming organs* and *diseases of the circulatory system.*
- The proportion of overnight hospitalisations that involved *simple mastectomy* varied by remoteness from 27% in *Major cities* to 40% in *Remote and very remote areas*.

Between 2000–01 and 2009–10:

- The actual number of hospitalisations of females for breast cancer increased by 72% (from 65,970 to 113,132), while the hospitalisation rate increased by 40%.

**Males**

In the 2009–10 financial year in Australia:

- 549 males were hospitalised due to breast cancer.
- 55% of the breast cancer-related hospitalisations were for males aged 50–59.

# About hospitalisations for breast cancer

Extent of hospitalisation for breast cancer is an important indicator of the burden of this cancer on the Australian population. The number of hospitalisations for breast cancer in any one year is related not only to the number of people with breast cancer, but also to the number of occasions on which they were admitted to hospital. Other influential factors include availability of alternative health-care services, relative accessibility of hospital care, and admission criteria and administrative policies.

In this chapter, information is provided on admitted patient hospitalisations that are related to the care and/or treatment of people with breast cancer. The data were sourced from the National Hospital Morbidity Database (NHMD), which contains data on admitted patient hospitalisations. The most recent data available pertain to the 2009–10 financial year. Note that the data from the NHMD refer to hospitalisations, not individuals. Any person may have multiple hospitalisations during the course of a year but data on the number of people hospitalised for a particular disease are not available. Note also that hospitalisations for which the care type was newborn (unqualified days only), hospital boarder or posthumous organ procurement were excluded. Further information about the NHMD is in Appendix C and in AIHW's annual *Australian hospital statistics* reports (AIHW 2011b).

There are two distinct types of diagnosis recorded in the NHMD—*principal diagnosis* and *additional diagnosis*. The principal diagnosis is the diagnosis established after study to be chiefly responsible for causing an episode of admitted patient care. The additional diagnosis is a condition or complaint that either coexists with the principal diagnosis or arose during treatment (NCCH 2008a). The principal and additional diagnoses are coded using the International Statistical Classification of Diseases and Related Health Problems, tenth revision, Australian modification (ICD-10-AM), 6th edition. The diagnosis can include a disease or a specific treatment for a current condition. Where a treatment is recorded as the principal diagnosis, the disease being treated is usually recorded as an additional diagnosis.

As discussed in more detail in Appendix E, breast cancer-related hospitalisations are defined in this report (unless stated otherwise) as admitted patient hospitalisations in which:

- breast cancer (ICD-10-AM code of C50) was recorded as the principal diagnosis, or
- breast cancer (ICD-10-AM code of C50) was recorded as an additional diagnosis where the principal diagnosis code related specifically to the treatment or care of patients with breast cancer (see Appendix E for a list of these codes).

In this chapter, information on the number of hospitalisations and the average length of stay (ALOS) for females due to breast cancer is provided from 2000–01 to 2009–10. In addition, information on hospitalisation and ALOS is provided according to age and hospital sector. To take into account differences in age structures and size of the groups being compared, age-standardised rates and ALOS's are provided for each comparison (see Appendix B). Information is also provided on the type of procedures performed on patients with breast cancer while in hospitals. For males, discussion is focussed on hospitalisation trends and differences by age.

Note that the data presented in this report may have been influenced by admission practices, which can vary among health service providers and over time. For example, over the past few years there has been a gradual reclassification of chemotherapy patients from admitted patients to non-admitted patients (outpatients) in public hospitals in New South Wales, South Australia and the Australian Capital Territory (see Appendix E for more information).

**Box 8.1: Summary of terms used in the hospitalisation chapter**

**Admitted patient:** a patient who undergoes a hospital's formal admission process to receive treatment and/or care. This treatment and/or care is provided over a period of time and can occur in hospital and/or in the person's home (for hospital-in-the-home patients)

**Hospitalisation:** refers to an episode of care for an admitted patient, which can be a total hospital stay (from admission to discharge, transfer or death), or a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute to rehabilitation). A hospitalisation is classified as *same-day* when a patient is admitted and separates (that is, the process by which an admitted patient completes an episode of care either by being discharged, dying, transferring to another hospital or changing type of care) on the same date. A hospitalisation is classified as *overnight* when a patient is admitted to and separated from the hospital on different dates.

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

**Principal diagnosis:** is the diagnosis established after study to be chiefly responsible for occasioning the patient's episode of admitted care.

**Additional diagnosis:** is a condition or complaint that either coexists with the principal diagnosis or arises during the episode of care.

**Procedure:** is a term used to describe a clinical intervention that is surgical in nature, carries an anaesthetic risk, requires specialised training and/or requires special facilities or services available only in an acute care setting. Thus, procedures encompass surgical procedures and non-surgical investigations and therapeutic procedures. Client support interventions that are neither investigative nor therapeutic (such as anaesthesia) are also included.

# Hospitalisations of females for breast cancer

In 2009–10, there were 113,132 hospitalisations of females due to breast cancer (Table 8.1). These accounted for 27% of all cancer-related hospitalisations of females and 3% of all hospitalisations of females in Australia.

Of the total number of hospitalisations of females due to breast cancer, 83% were same-day hospitalisations (93,775), while the rest were overnight (19,357).

The age-standardised hospitalisation rate for breast-cancer related hospitalisations was 10 episodes per 1,000 females.

**Table 8.1: Hospitalisation for breast cancer[(a)], all cancers[(b)] and all causes, females, Australia, 2009–10**

| Cause of hospitalisation | Number | Age-standardised rate[(c)] | 95% confidence interval |
|---|---|---|---|
| Breast cancer[(a)] | 113,132 | 9.6 | 9.0–10.2 |
| All cancers[(b)] | 417,109 | 34.6 | 33.6–35.7 |
| **All hospitalisations** | **4,488,869** | **385.8** | **382.2–389.4** |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

(b) Pertain to hospitalisations in which i) the principal diagnosis is cancer (ICD-10-AM codes C00–C97, D45, D47.1 and D47.3), or (ii) the principal diagnosis is a health service or treatment that may be related to treatment of cancer (see Cancer in Australia: an overview, 2010).

(c) The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 1,000 females.

*Source*: AIHW National Hospital Morbidity Database.

In 2009–10, the age-standardised average length of stay for breast cancer-related hospitalisations among females that involved an overnight stay was 4.4 days. This was shorter than the corresponding average for all overnight cancer-related hospitalisations of females (7.4 days) and all hospitalisations of females (6.6 days) (Table 8.2).

**Table 8.2: Average length of stay (ALOS) for overnight hospitalisations for breast cancer[(a)], all cancers[(b)] and all causes, females, Australia, 2009–10**

| Cause of hospitalisation | Crude ALOS | Age-standardised ALOS[(c)] |
|---|---|---|
| Breast cancer[(a)] | 4.0 | 4.4 |
| All cancers[(b)] | 7.4 | 7.4 |
| **All hospitalisations** | **5.8** | **6.6** |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

(b) Pertain to hospitalisations in which i) the principal diagnosis is cancer (ICD-10-AM codes C00–C97, D45, D47.1 and D47.3), or (ii) the principal diagnosis is a health service or treatment that may be related to treatment of cancer, as defined in Cancer in Australia 2010.

(c) Directly age-standardised to the national distribution of overnight hospitalisations due to all cancers combined (ICD-10-AM codes of C00–C97, D45, D47.1 and D47.3) in 2009–10.

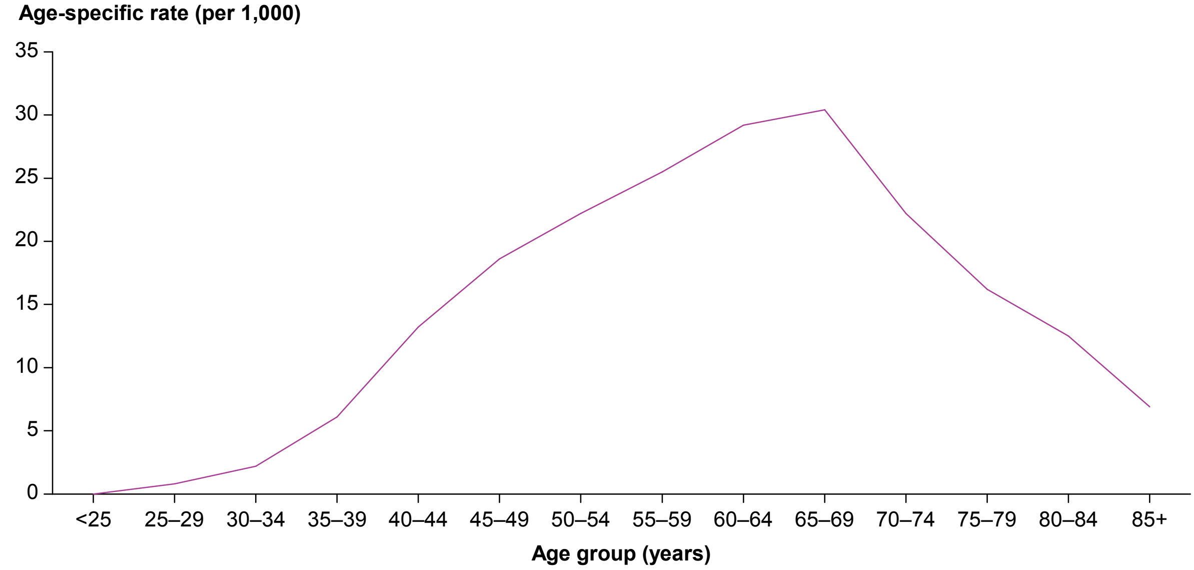
*Source*: AIHW National Hospital Morbidity Database.

## Does hospitalisation differ by age?

Of all hospitalisations of females for breast cancer in 2009–10, more than half (56%) were for those aged 50–69. In addition, 29% were for those younger than 50, while 15% were for those aged 70 and over (Appendix Table D8.1).

Figure 8.1 presents differences in the hospitalisation rate for breast cancer according to age. The hospitalisation rate was less than 3 per 1,000 for those younger than 35, but rose sharply to a high of 30 per 1,000 for those aged 65–69. This was followed by a sharp drop in the rate until the age of 85 and over.

In 2009–10, the average length of stay for overnight hospitalisations due to breast cancer increased from 2.9 days in females younger than 30 to 6.7 days in females aged 80 and over (Table 8.3).



*Notes*

1. Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2, Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.
2. The data for this figure are in Appendix Table D8.1.

*Source:* AIHW National Hospital Morbidity Database.

**Figure 8.1: Hospitalisations for breast cancer, by age group, females, Australia, 2009–10**

**Table 8.3: Average length of stay (ALOS) for overnight hospitalisations due to breast cancer[(a)], by age group, females, Australia, 2009–10**

| Age group (years) | Crude ALOS |
|---|---|
| <30 | 2.9 |
| 30–39 | 3.4 |
| 40–49 | 3.5 |
| 50–59 | 3.5 |
| 60–69 | 3.6 |
| 70–79 | 4.9 |
| 80+ | 6.7 |
| **All ages** | **4.0** |
| **All ages (age-standardised)[(b)]** | **4.4** |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

(b) Directly age-standardised to the national distribution of overnight hospitalisations due to all cancers combined (ICD-10-AM codes of C00–C97, D45, D47.1 and D47.3) in 2009–10.

*Source:* AIHW National Hospital Morbidity Database.

## Does admitted patient activity differ by hospital sector?

In this section, breast cancer-related hospitalisations are presented according to hospital sector. Note that the comparison might be affected by differences in admission practices between public and private hospitals. For example, public hospitals in New South Wales, South Australia and the Australian Capital Territory do not admit patients for same-day chemotherapy.

In 2009–10, 62% of all female breast cancer-related hospitalisations were in private hospitals, while 38% were in public hospitals (Table 8.4).

The age-standardised rate of female breast cancer-related hospitalisations was 1.7 times higher for private than public hospitals (6 and 4 per 1,000 females, respectively).

**Table 8.4: Hospitalisations for breast cancer[(a)], by hospital sector, females Australia, 2009–10**

| Hospital sector | Number | Age-standardised rate[(b)] | 95% confidence interval |
|---|---|---|---|
| Public[(c)] | 42,763 | 3.6 | 3.6–3.7 |
| Private | 70,369 | 6.0 | 5.9–6.0 |
| **Total** | **113,132** | **9.6** | **9.0–10.2** |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z292 ,Z4000, Z421, Z443, Z451, Z452, Z458, Z510, Z511, Z541 and Z542) and breast cancer is recorded as an additional diagnosis.

(b) The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 1,000 females.

(c) The estimates may be underestimated as public hospitals in New South Wales, South Australia and the Australian Capital Territory report same-day chemotherapy patients as receiving treatment on an outpatient basis.

*Source*: AIHW National Hospital Morbidity Database.

The age-standardised average length of stay for overnight hospitalisations due to breast cancer among females was 7.8 days for public hospitals, which was more than twice as long as the average length of stay for private hospitals (3.6 days) (Table 8.5).

**Table 8.5: Average length of stay (ALOS) for overnight hospitalisations due to breast cancer[(a)], by hospital sector, females Australia, 2009–10**

| Hospital sector | Crude ALOS | Age-standardised ALOS[(b)] |
|---|---|---|
| Public | 4.9 | 7.8 |
| Private | 3.3 | 3.6 |
| **Total** | **4.0** | **4.4** |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z292 ,Z4000, Z421, Z443, Z451, Z452, Z458, Z510, Z511, Z541 and Z542) and breast cancer is recorded as an additional diagnosis.

(b) Directly age-standardised to the national distribution of overnight hospitalisations due to all cancers combined (ICD-10-AM codes of C00–C97, D45, D47.1 and D47.3) in 2009–10.

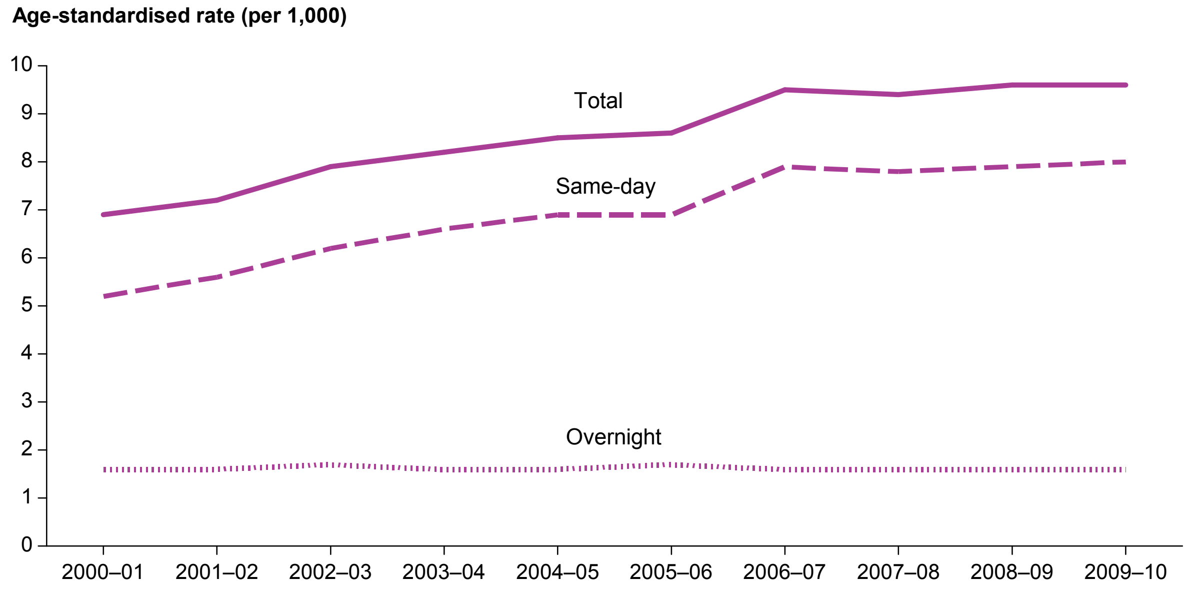
*Source*: AIHW National Hospital Morbidity Database.

## Has the hospitalisation rate for breast cancer changed over time?

The total number of hospitalisations of females for breast cancer increased by 72% from 65,970 in 2000–01 to 113,132 in 2009–10. Most of this increase related to a substantial increase (88%) in the number of same-day hospitalisations, from 49,985 to 93,775 over the 10-year period (Appendix Table D8.2). This increase happened despite the gradual reclassification of chemotherapy patients from admitted patients to non-admitted patients (outpatients) in public hospitals in New South Wales, South Australia and the Australian Capital Territory over the past few years (see Appendix E for more information)

Figure 8.2 shows that the rate of breast cancer-related hospitalisations of females increased by 40% between 2000–01 and 2009–10. The trend in the rate of breast cancer-related hospitalisations was mostly driven by changes in the rate of same-day hospitalisations, while the rate of overnight hospitalisations remained stable.

Between 2000–01 and 2009–10, the age-standardised average length of stay for overnight hospitalisations due to breast cancer among females decreased from 5.6 days to 4.4 days (Appendix Table D8.3).



*Notes*

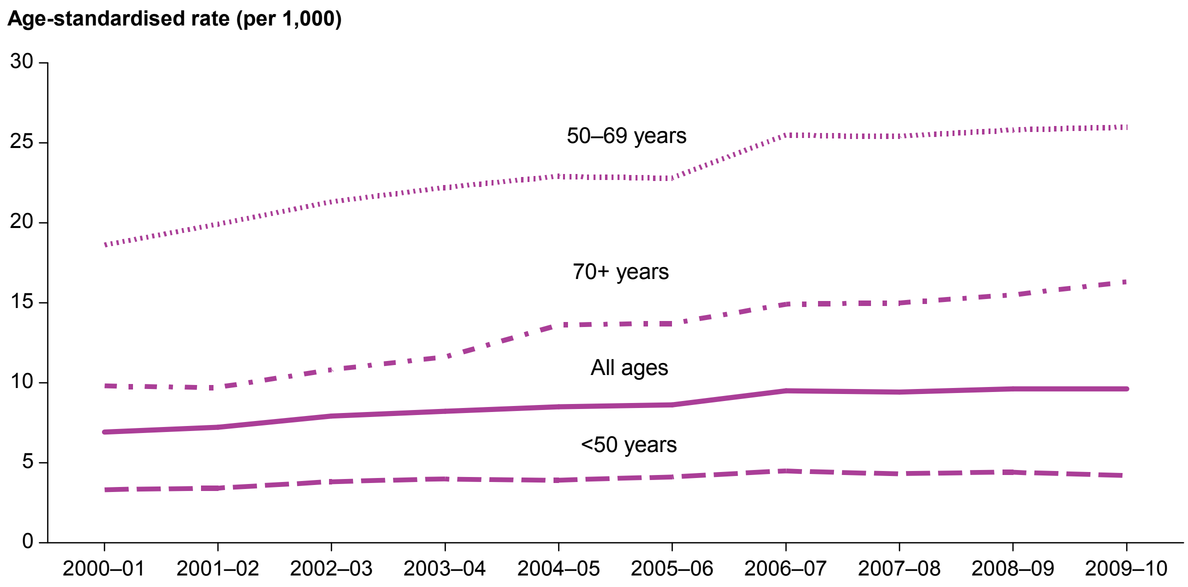
1. Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2, Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.
2. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 1,000 females.
3. The data for this figure are in Appendix Table D8.2.

*Source*: AIHW National Hospital Morbidity Database.

**Figure 8.2: Hospitalisations for breast cancer, by same-day and overnight status, females, Australia, 2000–01 to 2009–10**

## Do trends in hospitalisations rates differ by age at hospitalisation?

Trends in the rate of breast cancer-related hospitalisations of females by age group are shown in Figure 8.3. For each of the age groups, the rate increased from 2000–01 to 2009–10, with the largest increase in relative terms for females aged 70 and over (a 66% increase).



*Notes*

1. Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2, Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.
2. The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 1,000 females.
3. The data for this figure are in Appendix Table D8.4

*Source*: AIHW National Hospital Morbidity Database.

**Figure 8.3: Hospitalisations for breast cancer, by age group, females, Australia, 2000–01 to 2009–10**

## Which procedures were most commonly undertaken during hospitalisations for breast cancer?

Procedures undertaken in hospitals are a mix of surgical procedures, non-surgical procedures for investigative and therapeutic purposes (such as X-rays and chemotherapy), and client support interventions (for example, anaesthesia). One or more procedures can be reported for each hospitalisation, but procedures are not undertaken during all hospitalisations. Thus, only some hospitalisations include data on procedures. The classification system used to code the 2009–10 data on procedures was the 6th edition of the Australian Classification of Health Interventions (ACHI) (see Appendix A) (NCCH 2008c).

Tables 8.6 and 8.7 shows the 5 most common procedures undertaken for same-day and overnight breast cancer-related hospitalisations of females. Note that data for the 20 most commonly undertaken procedures are in Appendix Tables D8.5–D8.7.

In 2009–10, the majority (91%) of same-day hospitalisations included *administration of pharmacotherapy*. In addition, 4% of the same-day hospitalisations involved supportive procedure of *cerebral anaesthesia* and 3% involved *excision of lesion of breast.*

## Table 8.6: Most common procedures for same-day hospitalisations due to breast cancer[(a)], females, Australia, 2009–10

| Procedure description (ACHI[(b)] block code) | Number[(c)(d)] | Per cent[(d)] |
|---|---|---|
| Administration of pharmacotherapy (1920) | 85,338 | 91.0 |
| Cerebral anaesthesia (1910) | 3,586 | 3.8 |
| Excision of lesion of breast (1744) | 2,568 | 2.7 |
| Other procedures related to pharmacotherapy (1922) | 2,188 | 2.3 |
| Administration of blood and blood products (1893) | 1,544 | 1.6 |
| **Total number of same-day breast cancer-related hospitalisations** | **93,775** | **100.0** |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z292 ,Z4000, Z421, Z443, Z451, Z452, Z458, Z510, Z511, Z541 and Z542) and breast cancer is recorded as an additional diagnosis.

(b) Australian Classification of Health Interventions, 6th edition.

(c) Indicates the number of hospitalisations in which the listed procedure was undertaken.

(d) The sum of the count of hospitalisations does not equal the total number of hospitalisations since no procedures, or multiple procedures, may be undertaken during each hospitalisation. For the same reason, the sum of the percentages does not equal 100. Furthermore, if multiple procedures were recorded from the same block number, only one procedure was counted.

*Source*: AIHW National Hospital Morbidity Database.

In 2009–10, the most commonly reported procedure for overnight hospitalisation of females for breast cancer was *cerebral anaesthesia,* undertaken in 78% of all overnight hospitalisations. In addition, 64% of overnight hospitalisations involved *excision procedures on lymph nodes*, 46% involved *generalised allied health interventions*, 40% involved *excision of lesion of breast* and 29% involved *simple mastectomy*. Note that *cerebral anaesthesia* and *generalised allied health interventions* are companion procedures that are commonly provided for patients admitted for medical and surgical procedures.

## Table 8.7: Most common procedures for overnight hospitalisations due to breast cancer[(a)], females, Australia, 2009–10

| Procedure description (ACHI block code)[(b)] | Number[(c)(d)] | Per cent[(d)] |
|---|---|---|
| Cerebral anaesthesia (1910) | 15,037 | 77.7 |
| Excision procedures on lymph node of axilla (808) | 12,358 | 63.8 |
| Generalised allied health interventions (1916) | 8,941 | 46.2 |
| Excision of lesion of breast (1744) | 7,766 | 40.1 |
| Simple mastectomy (1748) | 5,657 | 29.2 |
| **Total number of overnight breast cancer-related hospitalisations** | **19,357** | **100.0** |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z292 ,Z4000, Z421, Z443, Z451, Z452, Z458, Z510, Z511, Z541 and Z542) and breast cancer is recorded as an additional diagnosis.

(b) Australian Classification of Health Interventions, 6th edition.

(c) Indicates the number of hospitalisations in which the listed procedure was undertaken.

(d) The sum of the count of hospitalisations does not equal the total number of hospitalisations since no procedures, or multiple procedures, may be undertaken during each hospitalisation. For the same reason, the sum of the percentages does not equal 100. Furthermore, if multiple procedures were recorded from the same block number, only one procedure was counted.

*Source*: AIHW National Hospital Morbidity Database.

## How many surgical procedures were undertaken for females with breast cancer?

Treatment for breast cancer may include surgery, radiotherapy, chemotherapy, hormone therapy and targeted therapies. The treatments used and the order in which they are given vary depending on the stage and type of breast cancer, levels of co-morbidity, clinical preference and other factors.

In this section, information is provided on the number of overnight hospitalisations of females for breast cancer in which:

- Excision procedures on lymph node of axilla,
- Excision of lesion of breast,
- Simple mastectomy,
- Reconstruction procedures on breast,
- Subcutaneous mastectomy,
- Biopsy of breast and/or
- Other excision procedures on breast

were undertaken in 2009–10. These selected surgical procedures were determined by Cancer Australia. Note that this is not a complete list of surgical procedures related to breast cancer.

In 2009–10, a total of 14,552 breast cancer-related hospitalisations of females that involved an overnight stay had at least one of the selected surgical procedure reported (75% of all overnight hospitalisations) (Table 8.8). The most commonly reported surgical procedure was *excision procedures on lymph node of axilla* (64% of all overnight hospitalisations), followed by *excision of lesion of breast* (40%), *simple mastectomy* (29%), *reconstruction procedures on breast* (5%), *subcutaneous mastectomy* (3%), *biopsy of the breast* (1%) and *other excision procedures on breast* (0.1%).

### Does the number of surgical procedures vary by hospital sector?

Data on the proportion of overnight hospitalisations of females for breast cancer that involved at least one selected surgical procedure are in Table 8.8, according to hospital sector. In 2009–10, 77% of the overnight hospitalisations for breast cancer in public hospitals involved at least one of the selected surgical procedures, compared with 74% in private hospitals.

In both public and private hospitals, the most commonly reported surgical procedure for females was *excision procedures on lymph node of axilla*, which was undertaken in 65% of all overnight hospitalisations for breast cancer in public hospitals and 63% in private hospitals. *Excision of lesion of breast* was the second most common surgical procedure for females in both public and private hospitals (38% and 42% of overnight hospitalisations, respectively), while *simple mastectomy* was the third (34% and 25%, respectively).

**Table 8.8: Selected surgical procedures[a] for overnight hospitalisations for breast cancer[b], females Australia, 2009–10**

| Surgical procedure (ACHI block)[c] | Public | | Private | | Total[e] | |
|---|---|---|---|---|---|---|
| | No.[d][e] | Per cent[e] | No.[d][e] | Per cent[e] | No.[d][e] | Per cent[e] |
| Excision procedures on lymph node of axilla (808) | 5,532 | 65.3 | 6,826 | 62.7 | 12,358 | 63.8 |
| Excision of lesion of breast (1744) | 3,186 | 37.6 | 4,580 | 42.1 | 7,766 | 40.1 |
| Simple mastectomy (1748) | 2,896 | 34.2 | 2,761 | 25.4 | 5,657 | 29.2 |
| Reconstruction procedures on breast (1756) | 332 | 3.9 | 648 | 6.0 | 980 | 5.1 |
| Subcutaneous mastectomy (1747) | 102 | 1.2 | 389 | 3.6 | 491 | 2.5 |
| Biopsy of breast (1743) | 122 | 1.4 | 48 | 0.4 | 170 | 0.9 |
| Other excision procedures on breast (1752) | 4 | 0.0 | 12 | 0.1 | 16 | 0.1 |
| **Total overnight hospitalisations involving at least one selected surgical procedure** | **6,489** | **76.6** | **8,063** | **74.1** | **14,552** | **75.2** |
| **Total overnight breast cancer-related hospitalisations** | **8,472** | **100.0** | **10,885** | **100.0** | **19,357** | **100.0** |

(a) The selected surgical procedures were determined by Cancer Australia.

(b) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z292 ,Z4000, Z421, Z443, Z451, Z452, Z458, Z510, Z511, Z541 and Z542) and breast cancer is recorded as an additional diagnosis.

(c) Australian Classification of Health Interventions, 6th edition.

(d) Indicates the number of hospitalisations in which the indicated procedure block was undertaken.

(e) A hospitalisation was counted once for the block if it had at least one procedure reported within the block. As more than one procedure can be reported for each hospitalisation, the data are not additive and therefore the totals in the tables may not equal the sum of the counts in the rows. For the same reason, the sum of the percentages does not equal 100.

*Source*: AIHW National Hospital Morbidity Database.

## Does the number of surgical procedures vary by remoteness area?

In 2009–10, the proportion of overnight hospitalisations for breast cancer that involved at least one of the selected surgical procedures increased with remoteness; from 74% in *Major cities* to 81% in *Remote and very remote* areas (Table 8.9).

For all remoteness areas, *excision procedures on lymph node of the axilla* was the most common surgical procedure for overnight hospitalisations due to breast cancer. However, the proportion of all overnight hospitalisations that involved this procedure increased from 63% in *Major cities* to 67% in *Remote and very remote* areas. The proportion of overnight hospitalisations that involved *simple mastectomy* also increased by remoteness (from 27% in *Major cities* to 40% in *Remote and very remote areas*), while the proportion of hospitalisations that involved *excision of lesion of breast* decreased slightly by remoteness (from 41% to 37%).

**Table 8.9: Selected surgical procedures[a] for overnight hospitalisations for breast cancer[b], by remoteness area, females, Australia, 2009–10**

| | Remoteness area[c] | | | | |
|---|---|---|---|---|---|
| **Surgical procedure (ACHI block)[d]** | **MC** | **IR** | **OR** | **R+VR** | **Total** |
| | | | **Number[e][f]** | | |
| Excision procedures on lymph node of axilla (808) | 8,435 | 2,645 | 1,060 | 199 | 12,358 |
| Excision of lesion of breast (1744) | 5,396 | 1,639 | 613 | 109 | 7,766 |
| Simple mastectomy (1748) | 3,648 | 1,316 | 560 | 120 | 5,657 |
| Reconstruction procedures on breast (1756) | 748 | 139 | 79 | 12 | 980 |
| Subcutaneous mastectomy (1747) | 404 | 57 | 28 | 2 | 491 |
| Biopsy of breast (1743) | 117 | 28 | 19 | 4 | 170 |
| Other excision procedures on breast (1752) | 13 | 1 | 1 | 1 | 16 |
| **Total overnight hospitalisations involving at least one selected surgical procedure** | 9,865 | 3,147 | 1,278 | 240 | 14,552 |
| **Total overnight breast cancer-related hospitalisations** | **13,333** | **4,074** | **1,629** | **298** | **19,357** |
| | | | **Per cent[f]** | | |
| Excision procedures on lymph node of axilla (808) | 63.3 | 64.9 | 65.1 | 66.8 | 63.8 |
| Excision of lesion of breast (1744) | 40.5 | 40.2 | 37.6 | 36.6 | 40.1 |
| Simple mastectomy (1748) | 27.4 | 32.3 | 34.4 | 40.3 | 29.2 |
| Reconstruction procedures on breast (1756) | 5.6 | 3.4 | 4.8 | 4.0 | 5.1 |
| Subcutaneous mastectomy (1747) | 3.0 | 1.4 | 1.7 | 0.7 | 2.5 |
| Biopsy of breast (1743) | 0.9 | 0.7 | 1.2 | 1.3 | 0.9 |
| Other excision procedures on breast (1752) | 0.1 | 0.0 | 0.1 | 0.3 | 0.1 |
| **Total overnight hospitalisations involving at least one selected surgical procedure** | **74.0** | **77.2** | **78.5** | **80.5** | **75.2** |
| **Total overnight breast cancer-related hospitalisations** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

(a) The selected surgical procedures were determined by Cancer Australia.

(b) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z292 ,Z4000, Z421, Z443, Z451, Z452, Z458, Z510, Z511, Z541 and Z542) and breast cancer is recorded as an additional diagnosis.

(c) Remoteness was classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (See Appendix A), showing 'MC' as *Major cities*, 'IR' as *Inner regional*, 'OR' as *Outer regional* and 'R+VR' as *Remote and very remote* areas.

(d) Australian Classification of Health Interventions, 6th edition.

(e) Indicates the number of hospitalisations in which the listed procedure block was undertaken.

(f) A hospitalisation was counted once for the block if it had at least one procedure reported within the block. As more than one procedure can be reported for each hospitalisation, the data are not additive and therefore the totals in the tables may not equal the sum of the counts in the rows. For the same reason, the sum of the percentages does not equal 100.

*Source*: AIHW National Hospital Morbidity Database.

## Does the number of surgical procedures vary by socioeconomic status?

Table 8.10 shows that the proportion of overnight hospitalisations of females for breast cancer that involved a surgical procedure tended to decrease slightly with improving socioeconomic status in 2009–10; from 78% in the lowest socioeconomic status group (group 1) to 72% in the highest group (group 5).

*Excision procedures on lymph node of axilla* was the most common surgical procedure for all socioeconomic status groups, although the proportion of hospitalisations that involved this procedure tended to decrease slightly with improving socioeconomic status. The proportion of overnight hospitalisations that involved *simple mastectomy* also decreased with improving socioeconomic status, while the proportion of overnight hospitalisations that involved *reconstruction procedures on breast* and *subcutaneous mastectomy* increased with improving socioeconomic status.

**Table 8.10: Selected surgical procedures[(a)] for overnight hospitalisations for breast cancer[(b)], by socioeconomic status, females, Australia, 2009–10**

| | Socioeconomic status[(c)] | | | | | |
|---|---|---|---|---|---|---|
| **Surgical procedure (ACHI block)[(d)]** | **1 (lowest)** | **2** | **3** | **4** | **5 (highest)** | **Total** |
| | | | **Number[(e)(f)]** | | | |
| Excision procedures on lymph node of axilla (808) | 2,257 | 2,469 | 2,336 | 2,446 | 2,829 | 12,358 |
| Excision of lesion of breast (1744) | 1,349 | 1,494 | 1,463 | 1,625 | 1,824 | 7,766 |
| Simple mastectomy (1748) | 1,170 | 1,216 | 1,099 | 1,048 | 1,111 | 5,657 |
| Reconstruction procedures on breast (1756) | 128 | 146 | 191 | 223 | 290 | 980 |
| Subcutaneous mastectomy (1747) | 44 | 53 | 91 | 104 | 199 | 491 |
| Biopsy of breast (1743) | 36 | 35 | 29 | 35 | 33 | 170 |
| Other excision procedures on breast (1752) | 3 | 3 | 0 | 4 | 6 | 16 |
| **Total overnight hospitalisations involving at least one selected surgical procedure** | **2,700** | **2,902** | **2,764** | **2,905** | **3,257** | **14,552** |
| **Total overnight breast cancer hospitalisations** | **3,460** | **3,778** | **3,566** | **3,970** | **4,558** | **19,357** |
| | | | **Per cent[(f)]** | | | |
| Excision procedures on lymph node of axilla (808) | 65.2 | 65.4 | 65.5 | 61.6 | 62.1 | 63.8 |
| Excision of lesion of breast (1744) | 39.0 | 39.5 | 41.0 | 40.9 | 40.0 | 40.1 |
| Simple mastectomy (1748) | 33.8 | 32.2 | 30.8 | 26.4 | 24.4 | 29.2 |
| Reconstruction procedures on breast (1756) | 3.7 | 3.9 | 5.4 | 5.6 | 6.4 | 5.1 |
| Subcutaneous mastectomy (1747) | 1.3 | 1.4 | 2.6 | 2.6 | 4.4 | 2.5 |
| Biopsy of breast (1743) | 1.0 | 0.9 | 0.8 | 0.9 | 0.7 | 0.9 |
| Other excision procedures on breast (1752) | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 |
| **Total overnight hospitalisations involving at least one selected surgical procedure** | **78.0** | **76.8** | **77.5** | **73.2** | **71.5** | **75.2** |
| **Total overnight breast cancer hospitalisations** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

(a) The selected surgical procedures were determined by Cancer Australia.

(b) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z292 ,Z4000, Z421, Z443, Z451, Z452, Z458, Z510, Z511, Z541 and Z542) and breast cancer is recorded as an additional diagnosis.

(c) Socioeconomic status was classified using the ABS Index of Relative Socio-economic Disadvantage (see Appendix A).

(d) Australian Classification of Health Interventions, 6th edition.

(e) Indicates the number of hospitalisations in which the listed procedure block was undertaken.

(f) A hospitalisation is counted once for the block if it has at least one procedure reported within the block. As more than one procedure can be reported for each hospitalisation, the data are not additive and therefore the totals in the tables may not equal the sum of the counts in the rows. For the same reason, the sum of the percentages does not equal 100.

*Source*: AIHW National Hospital Morbidity Database.

### Does the number of surgical procedures vary by Aboriginal and Torres Strait Islander status?

In 2009–10, the proportion of overnight breast cancer-related hospitalisations that involved at least one selected surgical procedure was 67% for Aboriginal and Torres Strait Islander females, compared with 75% for other females (Table 8.11). For both Aboriginal and Torres Strait Islander females and non-Indigenous females, *excision procedures on lymph node of axilla* was the most commonly reported surgical procedure for overnight hospitalisations for breast cancer (59% and 64% of all overnight hospitalisations, respectively).

## What are the most common comorbidities in hospitalisations for breast cancer?

In this section, comorbidity in relation to hospitalisations of females for breast cancer is examined by looking at the most common additional diagnoses in females admitted to hospital with a principal diagnosis of breast cancer. Note that a disease or condition is recorded as an additional diagnosis if it is known to affect the treatment of breast cancer or if it arose during the treatment. Therefore, the additional diagnoses in the hospital morbidity data would not be a complete list of all comorbidities occurring with breast cancer. The data are likely to be indicative, however, of the types of comorbidity experienced by breast cancer patients.

In 2009–10, there were 25,578 hospitalisations of females with breast cancer recorded as the principal diagnosis (Table 8.12 & Table E.1). Of these, 40% had one or more cancer sites (other than breast cancer) recorded as an additional diagnosis, with cancer of *secondary sites* (C77–C79) being the most common additional diagnosis within this group. The most common type of secondary cancer was *axillary and upper limb lymph nodes, pectoral lymph nodes*.

The second most common recorded additional diagnosis was *diseases of the blood and blood forming organs* (6% of hospitalisations). Within this group, *anaemia in neoplastic disease* was the most common.

Other common additional diagnoses included *diseases of the circulatory system* (5%), *endocrine, nutritional and metabolic diseases* (4%) and *diseases of the genitourinary system* (4%).

**Table 8.11: Selected surgical procedures[a] for overnight hospitalisations for breast cancer[b], by Aboriginal and Torres Strait Islander status, females, New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory[c], 2009–10**

| | Indigenous status | | |
|---|---|---|---|
| **Surgical procedure (ACHI block)[d]** | **Indigenous Australians** | **Other Australians[e]** | **Total** |
| | | **Number[f][g]** | |
| Excision procedures on lymph node of axilla (808) | 102 | 11,652 | 11,754 |
| Excision of lesion of breast (1744) | 58 | 7,328 | 7,386 |
| Simple mastectomy (1748) | 51 | 5,283 | 5,334 |
| Reconstruction procedures on breast (1756) | 1–4 | 950–953 | 954 |
| Subcutaneous mastectomy (1747) | 0 | 480 | 480 |
| Biopsy of breast (1743) | 1–4 | 157–160 | 161 |
| Other excision procedures on breast (1752) | 0 | 15 | 15 |
| **Total overnight hospitalisations involving at least one selected surgical procedure** | **116** | **13,697** | **13,813** |
| **Total overnight breast cancer hospitalisations** | **172** | **18,288** | **18,460** |
| | | **Per cent[g]** | |
| Excision procedures on lymph node of axilla (808) | 59.3 | 63.7 | 63.7 |
| Excision of lesion of breast (1744) | 33.7 | 40.1 | 40.0 |
| Simple mastectomy (1748) | 29.7 | 28.9 | 28.9 |
| Reconstruction procedures on breast (1756) | n.p. | n.p. | 2.6 |
| Subcutaneous mastectomy (1747) | 0.0. | 2.6. | 0.9 |
| Biopsy of breast (1743) | n.p. | n.p. | 0.9 |
| Other excision procedures on breast (1752) | 0.0. | 0.1 | 0.1 |
| **Total overnight hospitalisations involving at least one selected surgical procedure** | **67.4** | **74.9** | **74.8** |
| **Total overnight breast cancer hospitalisations** | **100.0** | **100.0** | **100.0** |

n.p. Not published (data cannot be released due to quality issues)

(a) The selected surgical procedures were determined by Cancer Australia.

(b) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z292 ,Z4000, Z421, Z443, Z451, Z452, Z458, Z510, Z511, Z541 and Z542) and breast cancer is recorded as an additional diagnosis.

(c) Data restricted to hospitals in NSW, Vic, Qld, WA, SA and public hospitals in the NT only.

(d) Australian Classification of Health Interventions, 6th edition.

(e) Includes hospitalisations for which Aboriginal and Torres Strait Islander status was not reported.

(f) Indicates the number of hospitalisations in which the listed procedure block was undertaken.

(g) A hospitalisation is counted once for the block if it has at least one procedure reported within the block. As more than one procedure can be reported for each hospitalisation, the data are not additive and therefore the totals in the tables may not equal the sum of the counts in the rows. For the same reason, the sum of the percentages does not equal 100.

*Source*: AIHW National Hospital Morbidity Database.

**Table 8.12: Hospitalisations with a principal diagnosis of breast cancer[(a)], by disease groups, females, Australia, 2009–10**

| Additional diagnosis (ICD-10-AM codes) | Number[(a)(b)] | Per cent[(c)] |
|---|---|---|
| Cancer (C00-C97, D45,D46,D471,D473) excluding C50 | 10,234 | 40.0 |
| *Secondary sites (C77–C79)* | *10,097* | *39.5* |
| *Axillary and upper limb lymph nodes, pectoral lymph nodes (C77.3)* | *7,525* | *29.4* |
| Diseases of the blood and blood-forming organs (D50-D89) | 1,440 | 5.6 |
| *Aplastic and other anaemias (D60–D64)* | *1,359* | *5.3* |
| *Anaemia in neoplastic disease (D63.0)* | *1,160* | *4.5* |
| Diseases of the circulatory system (I00-I99) | 1,210 | 4.7 |
| *Essential (primary) hypertension (I10)* | *549* | *2.1* |
| Endocrine, nutritional and metabolic diseases (E00-E89) | 980 | 3.8 |
| Diseases of the genitourinary system (N00-N99) | 960 | 3.8 |
| Injury, poisoning and other external (S00-T98) | 831 | 3.2 |
| Diseases of the digestive system (K00-K93) | 655 | 2.6 |
| Diseases of the skin and subcutaneous tissue (L00-L99) | 481 | 1.9 |
| Diseases of the respiratory system (J00-J99) | 456 | 1.8 |
| Certain infectious and parasitic diseases (A00–B99) | 452 | 1.8 |
| Mental and behavioural disorders (F00-F99) | 375 | 1.5 |
| Diseases of the musculoskeletal system (M00-M99) | 362 | 1.4 |
| Diseases of the nervous system (G00-G99) | 291 | 1.1 |
| Diseases of the eye and ear (H00-H95) | 138 | 0.5 |
| Congenital malformations (Q00-Q99) | 5 | 0.0 |
| Pregnancy, childbirth and the puerperium (O00-O99) | 2 | 0.0 |
| **Other diseases and conditions** | | |
| Factors influencing health and contact with health services (Z00-Z99) | 7,940 | 31.0 |
| Symptoms,NEC (R00-R99) | 1,882 | 7.4 |
| **Total number of hospitalisations with breast cancer as the principal diagnosis** | **25,578** | **100.0** |

(a) Pertain to hospitalisations in which the principal diagnosis was breast cancer (ICD-10-AM code of C50).

(b) Indicates the number of hospitalisations in which the listed additional diagnosis was recorded.

(c) A hospitalisation is counted once for the group if it had at least one additional diagnosis reported within the group. As more than one additional diagnosis can be reported for each hospitalisation, the data are not additive and therefore the totals in the tables may not equal the sum of the counts in the rows. For the same reason, the sum of the percentages does not equal 100.

*Source*: AIHW National Hospital Morbidity Database.

# Hospitalisations of males for breast cancer

There were 549 breast cancer-related hospitalisations of males in 2009–10. This equates to 5 hospitalisations per 100,000 males. More than 3 in 4 (77%) of the hospitalisations were classified as same-day, while the remainder (23%) were classified as overnight.

**Table 8.13: Hospitalisation for breast cancer[a], all cancers[b] and all causes, males, Australia, 2009–10**

| Principal diagnosis | Number | Age-standardised rate[c] | 95% confidence interval |
|---|---|---|---|
| Breast cancer[a] | 549 | 4.9 | 4.5–5.3 |
| All cancers[b] | 456,613 | 4124.5 | 4,112.4–4,136.5 |
| **All hospitalisations** | **4,042,026** | **36892.15** | **36,856.0–36,928.4** |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

(b) Pertain to hospitalisations in which i) the principal diagnosis is cancer (ICD-10-AM codes C00–C97, D45, D47.1 and D47.3), or (ii) the principal diagnosis is a health service or treatment that may be related to treatment of cancer, as defined in Cancer in Australia 2010.

(c) The rates were standardised to the Australian population as at 30 June 2001 and expressed per 100,000 males.

*Source*: AIHW National Hospital Morbidity Database.

## Does hospitalisation differ by age?

Hospitalisations of males for breast cancer by age group are shown in Table 8.14. In 2009–10, 14% of the hospitalisations of males for breast cancer were among those younger than 50, 55% were among those aged 50–59 and 31% were among those aged 70 and over.

The highest age-standardised hospitalisation rate was for those aged 70 and over, at 19 per 100,000 males, with the rate considerably lower for males aged 50–69 (12 per 100,000 males) and aged less than 50 (1 per 100,000 males).

**Table 8.14: Hospitalisations for breast cancer[a], by age group, males, Australia, 2009–10**

| Age group | Number | Age-specific rates | 95% CI |
|---|---|---|---|
| <50 | 78 | 1.0 | 0.9–1.2 |
| 50–59 | 299 | 12.4 | 12.1–12.7 |
| 70+ | 172 | 19.1 | 18.9–19.4 |
| **Total** | **549** | **4.9** | **4.5–5.3** |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

*Source*: AIHW National Hospital Morbidity Database.

## Has the hospitalisation rate for breast cancer changed over time?

Change over time in breast cancer-related hospitalisations for males is shown in Table 8.15. Over the 10 year period considered, the number of hospitalisations ranged from a low of 293 in 2000–01 to a high of 558 in 2008–09.

### Table 8.15: Hospitalisations for breast cancer[(a)], males, Australia, 2000–01 to 2009–10

| Year | Number | Age-standardised rate[(b)] | 95% confidence interval |
|---|---|---|---|
| 2000–01 | 309 | 3.1 | 2.8–3.5 |
| 2001–02 | 293 | 2.9 | 2.6–3.3 |
| 2002–03 | 396 | 3.9 | 3.5–4.3 |
| 2003–04 | 432 | 4.2 | 3.8–4.6 |
| 2004–05 | 501 | 4.7 | 4.3–5.1 |
| 2005–06 | 449 | 4.1 | 3.7–4.5 |
| 2006–07 | 543 | 4.8 | 4.4–5.2 |
| 2007–08 | 420 | 3.6 | 3.3–4.0 |
| 2008–09 | 558 | 4.8 | 4.4–5.2 |
| 2009–10 | 549 | 4.9 | 4.5–5.3 |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

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

*Source*: AIHW National Hospital Morbidity Database.

# 9 Expenditure on breast cancer

**Key findings**

**Females**

In the 2004–05 financial year in Australia:

- The health expenditure on breast cancer for females was estimated to be $331 million.
- The total health expenditure on breast cancer for females comprised 24% of all cancer expenditure for females and 1.4% of expenditure for all diseases for females.
- Of the total allocated expenditure on breast cancer for females, 36% was spent on screening mammography services through the BreastScreen Australia Program ($118 million), 28% on hospital admitted patient services ($92 million), 21% on out-of-hospital medical expenses ($68 million) and 16% on prescription pharmaceuticals ($53 million).

Between 2000–01 and 2004–05 in Australia:

- The expenditure on breast cancer grew by 32% from $252 in 2000-01million to $331 million in 2004-05 after adjustment for inflation.

**Males**

In the 2004–05 financial year in Australia:

- The health expenditure on breast cancer for males was estimated to be $8 million, with most of this funding directed to prescription pharmaceuticals ($7 million).

## About expenditure on breast cancer

Due to the large number of people diagnosed with breast cancer and the high burden of disease related to it, breast cancer is associated with substantial health-care costs. Such costs can be divided into four broad categories:

- direct health-care costs, which include recurrent and capital expenditure on hospital treatment, medications, visits to general practitioners, allied health and specialist care, use of screening and diagnostic services, and medical research
- direct non-health-care costs, including transport to and from medical services, child care and home care
- indirect costs, such as lost productivity and income, disability and lost years of life
- intangible costs, including the effect on quality of life.

The focus of this chapter is on direct health-care costs for breast cancer—that is, money spent by all levels of government, private health insurers, companies, households and individuals to screen for, diagnose and treat breast cancer. Very little information is available on the other types of costs (e.g. direct non-health-care costs and indirect costs) associated with breast cancer and, therefore, no data on the total economic effect of breast cancer in Australia can be presented. Furthermore, only information on *recurrent* health expenditure (i.e. expenditure on health goods and services) and not on capital health expenditure (i.e. health-related investment) is shown.

The latest data available in regard to expenditure on breast cancer pertain to the 2004–05 financial year, with comparable data available for 2000–01 financial year. The data presented in this chapter were sourced from the Disease Expenditure Database which is maintained by the AIHW. Appendix C provides further information about this data set.

It is not possible to allocate all expenditure on health goods and services to a specific disease such as breast cancer. For example, data on cancer research are not available for separate types of cancers. In addition, expenditure on non-admitted patient hospital services, over-the-counter drugs and services by 'other health practitioners' are not allocated by disease in the Disease Expenditure Database. Thus, the expenditure figures presented in this chapter provide a minimum estimate of all direct health-care costs for breast cancer.

The specific sectors of health expenditure which are covered in this chapter are as follows:

- hospital admitted patient services—expenditure on services provided to an admitted patient in a hospital, including medical services delivered to privately admitted patients in hospitals
- out-of-hospital medical expenses—expenditure on medical services funded under the Medicare Benefits Schedule, such as visits to general practitioners and specialists, as well as pathology and imaging services
- prescription pharmaceuticals—expenditure on prescriptions subsidised under government schemes (such as the Pharmaceutical Benefits Scheme) and those that are paid for privately; excludes pharmaceuticals dispensed in hospitals (these are included in the 'hospital admitted patient services' category)
- cancer screening—expenditure by the Australian Government and state and territory governments for mammographic screening through the BreastScreen Australia Program and cervical screening through the National Cervical Screening Program.

To allow for meaningful comparisons, only expenditure for these four sectors is considered when comparisons are made in this chapter between expenditure on breast cancer and expenditure on all cancers and then all diseases.

In the Disease Expenditure Database (and unlike the approach taken in Chapter 8 of this report), breast cancer hospitalisations are defined as those hospitalisations for which the principal diagnosis was invasive breast cancer. Therefore, hospitalisations that involved same-day chemotherapy administration for breast cancer patients (with invasive breast cancer coded as an additional diagnosis rather than a principal diagnosis) are not included. In turn, any spending related to those hospitalisations is not included in the expenditure data for hospital admitted patient services for breast cancer. Thus, the data shown are a minimum estimate of total admitted patient services expenditure on breast cancer patients.

Further information about each of the four sectors considered in this chapter, as well as the Disease Expenditure Database and how the expenditure estimates were derived, can be found in the health expenditure reports which are produced annually by the AIHW (AIHW 2005, 2010a).

# Expenditure on breast cancer for females

## How much was spent on breast cancer in 2004–05?

Considering the four health expenditure sectors shown in Table 9.1, allocated health expenditure on breast cancer for females was estimated to be $331 million in the 2004–05 financial year. The corresponding value for expenditure for females for all cancers was $1,403 million and for all diseases it was $24,274 million. Hence, expenditure on breast cancer for females comprised almost a quarter (24%) of all cancer expenditure for females and 1.4% of expenditure for all diseases for females.

Table 9.1: Allocated health expenditure, by disease and by sector, females, Australia, 2004–05

| | Breast cancer | | All cancers[a] | | All diseases | |
|---|---|---|---|---|---|---|
| Sector | $ (million) | Per cent | $ (million) | Per cent | $ (million) | Per cent |
| Hospital admitted patient services[b] | 92 | 27.8 | 884 | 63.0 | 12,688 | 52.3 |
| Out-of-hospital medical expenses | 68 | 20.6 | 218 | 15.5 | 6,921 | 28.5 |
| Prescription pharmaceuticals | 53 | 16.0 | 80 | 5.7 | 4,443 | 18.3 |
| Cancer screening | 118 | 35.7 | 222 | 15.8 | 222 | 0.9 |
| **Total allocated expenditure[c]** | **331** | **100.0** | **1,403** | **100.0** | **24,274** | **100.0** |

(a) Includes cancers coded in the International Statistical Classification of Diseases and Related Health Problems, 10th edition (ICD-10) as C00–C97. Does not include cancers coded as D45, D46, D47.1 and D47.3.

(b) Expenditure for hospital admitted patient services for breast cancer pertains to those hospitalisations for which the principal diagnosis was breast cancer (ICD-10 code of C50). It does not pertain to hospitalisations for which breast cancer was an additional diagnosis and the principal diagnosis related specifically to the type of cancer treatment or care received.

(c) Values may not sum to the total due to rounding.

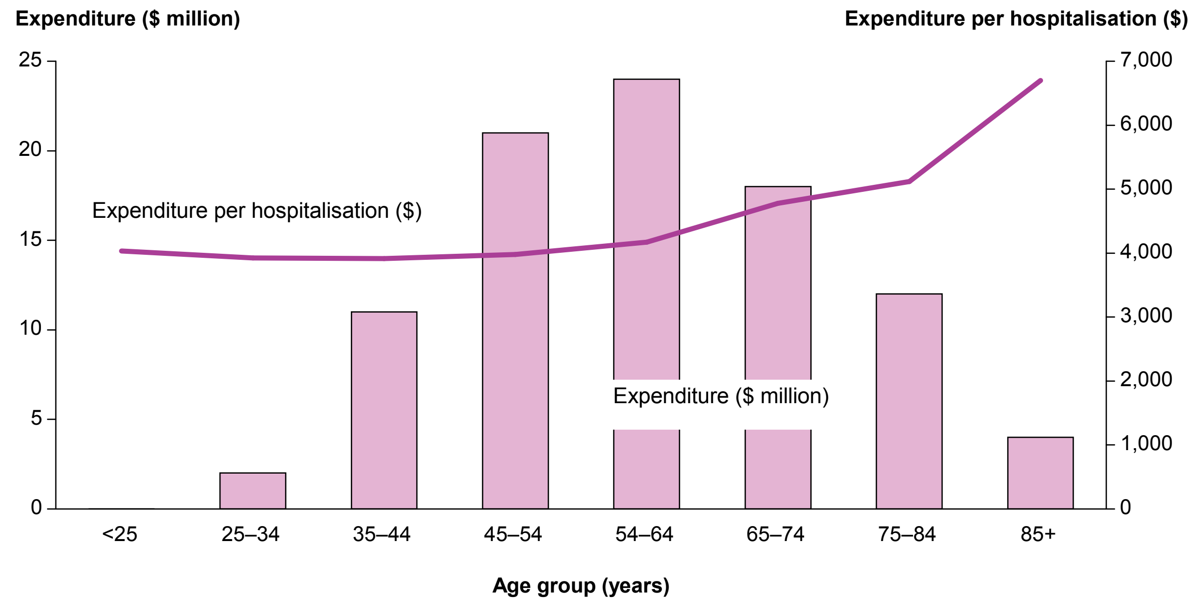
*Source:* AIHW Disease Expenditure Database.

Of the total allocated expenditure on breast cancer for females, 36% was spent on screening mammography services ($118 million) through the BreastScreen Australia Program, 28% on hospital admitted patient services ($92 million) and 21% on out-of-hospital medical expenses ($68 million). The amount spent on prescription pharmaceuticals for breast cancer for females was $53 million, which made up two-thirds (66%) of expenditure on prescription pharmaceuticals for all cancers for females ($80 million) and 1.2% for all diseases for females ($4,443 million).

The proportion of health expenditure for females that consisted of hospital admitted patient services differed markedly for breast cancer compared with all cancers and with all diseases. It equalled 28% of health expenditure on breast cancer compared with 63% for all cancers and 52% for all diseases.

## Does expenditure differ by age?

Information is available to describe age-related differences in expenditure for hospital admitted patient services for females with breast cancers (Figure 9.1). Of the total $92 million expended for admitted hospital patient services on females for breast cancer in 2004–05, $24 million (26%) was spent on women aged 54–64; with an additional $21 million (23%) spent on women aged 45–54 and $18 million (20%) on those aged 65–74.



*Notes*

1. Includes those hospitalisations for which the principal diagnosis was breast cancer (ICD-10 code of C50). Does not include hospitalisations for which breast cancer was an additional diagnosis and the principal diagnosis related specifically to the type of cancer treatment or care received.
2. The data for this figure are shown in Appendix Table D9.1.

*Source:* AIHW Disease Expenditure Database.

**Figure 9.1: Hospital admitted patient expenditure on breast cancer, by age group, females, Australia, 2004–05**

Average expenditure on breast cancer per hospitalisation in 2004–05 was highest for women in the older age groups. In particular, average expenditure for those aged 85 and over was $6,701 per hospitalisation and for those aged 75–84 years, it was $5,119. In comparison, expenditure was lowest for those women aged 35–44 ($3,913 per hospitalisation), and those aged 25–34 ($3,926).

## Have there been changes over time in expenditure on breast cancer?

Change over time in health expenditure on breast cancer for females is in Table 9.2. After prices were adjusted for inflation (with all prices shown in 2004–05 dollars), the data indicate that expenditure on breast cancer grew by 32% from $252 million in 2000–01 to $331 million in 2004–05. While growth in expenditure on hospital admitted patient services was relatively modest (10%), there was a particularly large increase in expenditure in the areas of out-of-hospital medical expenses (173%) and prescription pharmaceuticals (71%). This finding is likely related to changes in admission procedures in some states and territories in regard to the administration of chemotherapy. As discussed in Chapter 8, in three states and territories, there has been a move away from admitting patients to hospital for same-day chemotherapy services and, instead, providing such services as an outpatient basis—either as a public or private outpatient service.

Table 9.2 also shows that the overall increase in expenditure on breast cancer for females (32%) is in line with the increase for all cancers (31%) but larger than the increase observed in expenditure (in the four sectors considered) for all diseases (20%).

**Table 9.2: Allocated health expenditure[(a)], by disease and sector, constant prices[(b)], females, Australia, 2000–01 and 2004–05**

| Sector | 2000–01 $ (million)[(b)] | 2004–05 $ (million) | Change (%) |
|---|---|---|---|
| Breast cancer | | | |
| Hospital admitted patient services[(c)] | 84 | 92 | 9.7 |
| Out-of-hospital medical expenses | 25 | 68 | 172.5 |
| Prescription pharmaceuticals | 31 | 53 | 70.9 |
| Cancer screening | 112 | 118 | 5.5 |
| **Total allocated expenditure on breast cancer[(d)]** | **252** | **331** | **31.5** |
| All cancers[(e)] | 2,199 | 2,876 | 30.8 |
| All diseases | 37,176 | 44,486 | 19.7 |

(a) Comprised of 'hospital admitted patient services', 'out-of-hospital medical expenses', 'prescription pharmaceuticals' and 'cancer screening'.

(b) Constant price health expenditure for 2000–01 is shown in terms of 2004–05 dollars.

(c) Pertains to those hospitalisations for which the principal diagnosis was breast cancer (ICD10 code of C50). It does not pertain to hospitalisations for which breast cancer was an additional diagnosis and the principal diagnosis related specifically to the type of cancer treatment or care received.

(d) Values may not sum to the total due to rounding.

(e) Includes cancers coded in ICD-10 as C00–C97. Does not include cancers coded as D45, D46, D47.1 and D47.3.

*Source:* Disease Expenditure Database, AIHW.

# Expenditure on breast cancer for males

In 2004–05, health expenditure on breast cancer for males was $8 million, with most of this funding being directed to prescription pharmaceuticals ($7 million) (Table 9.3).

Considering the four health expenditure sectors shown in Table 9.3, allocated health expenditure on breast cancer for both males and females was $340 million in 2004–05.

**Table 9.3: Allocated health expenditure on breast cancer, by sector and by sex, Australia, 2004–05**

| | Males | | Females | | Total | |
|---|---|---|---|---|---|---|
| Sector | $ (million) | Per cent | $ (million) | Per cent | $ (million) | Per cent |
| Hospital admitted patient services[(a)] | 1 | 9.7 | 92 | 27.8 | 93 | 27.3 |
| Out-of-hospital medical expenses | 0 | 5.8 | 68 | 20.6 | 69 | 20.2 |
| Prescription pharmaceuticals | 7 | 84.5 | 53 | 16.0 | 60 | 17.7 |
| Cancer screening | . . | . . | 118 | 35.7 | 118 | 34.8 |
| **Total allocated expenditure[(b)]** | **8** | **100.0** | **331** | **100.0** | **340** | **100.0** |

(a) Pertains to those hospitalisations for which the principal diagnosis was breast cancer (ICD10 code of C50). It does not pertain to hospitalisations for which breast cancer was an additional diagnosis and the principal diagnosis related specifically to the type of cancer treatment or care received.

(b) Values may not sum to the total due to rounding.

*Source:* Disease Expenditure Database, AIHW.

# Appendix A: Classifications

## Australian Standard Geographical Classification Remoteness Areas

The Australian Standard Geographical Classification (ASGC) Remoteness Areas was used to assign areas across Australia to a remoteness category (ABS 2006). This classification allocates one in five remoteness categories to areas depending on their distance from different-sized urban centres, where the population size of the urban centre is considered to govern the range and type of services available.

Areas are classified as *Major cities*, *Inner regional*, *Outer regional*, *Remote* and *Very remote* (AIHW 2004). The category *Major cities* includes Australia's capital cities, with the exceptions of Hobart and Darwin, which are classified as *Inner regional.* For this report, the categories of *Remote* and *Very remote* were collapsed due to the small number of cases in these two subgroups.

The remoteness category was assigned to a cancer case according to the postal areas of residence at the time of diagnosis, while it was assigned to a cancer death according to the statistical local area (SLA) of residence at time of death.

For the hospitalisation chapter, the data source was the National Hospital Morbidity Database. In this database, the area of residence data for each separation was mapped to 2009 SLA code and to remoteness area categories based on ABS's ASGC Remoteness Structure 2006. This was undertaken on a probabilistic basis as necessary, using ABS concordance information describing the distribution of the population by postcode, remoteness area and SLAs (for 2008 and previous years).

Because of the probabilistic nature of this mapping, the SLA and remoteness area data for individual records may not be accurate; however, the overall distribution of records by geographical areas is considered useful.

## Index of Relative Socio-economic Disadvantage

The Index of Relative Socio-economic Disadvantage (IRSD) is one of four Socio-Economic Indexes for Areas (SEIFAs) developed by the Australian Bureau of Statistics (ABS 2008b). This index is based on factors such as average household income, education levels and unemployment rates. Rather than being a person-based measure, the IRSD is an area-based measure of socioeconomic status in which small areas of Australia are classified on a continuum from disadvantaged to affluent. This information is used as a proxy for the socioeconomic status of people living in those areas and may not be correct for each person in that area.

Socioeconomic status quintiles were assigned to cancer cases and deaths according to the IRSD of the statistical local area (SLA) of residence at the time of diagnosis or death.

In this report, the first socioeconomic status group (labelled '1') corresponds to geographical areas containing the 20% of the population with the lowest socioeconomic status according to the IRSD, and the fifth group (labelled '5') corresponds to the 20% of the population with the highest socioeconomic status.

## 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. The use of a standard classification system enables the storage and retrieval of diagnostic information for clinical and epidemiological purposes that is comparable between different service providers, across countries and over time.

In 1903, Australia adopted the ICD to classify causes of death and it was fully phased in by 1906. Since 1906, the ICD has been revised nine times in response to the recognition of new diseases (for example, Acquired Immunodeficiency Syndrome (AIDS)), increased knowledge of diseases, and changing terminology in the description of diseases. The version currently in use, ICD-10 (WHO 1992), was endorsed by the 43rd World Health Assembly in May 1990 and officially came into use in World Health Organization (WHO) member states from 1994.

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

The Australian modification of ICD-10, which is referred to as the ICD-10-AM (NCCH 2008b), is based on ICD-10. ICD-10 was modified for the Australian setting by the National Centre for Classification in Health (NCCH) with assistance from clinicians and clinical coders. Despite the modifications, compatibility with ICD-10 at the higher levels (that is, up to 4 character codes) of the classification has been maintained. ICD-10-AM has been used for classifying diagnoses in hospital records in all states and territories since 1999–00 (AIHW 2000).

## Australian Classification of Health Interventions

The current version of the ICD does not incorporate a classification system for coding health interventions (that is, procedures). In Australia, a health intervention classification system was designed to be implemented at the same time as the ICD-10-AM in July 1998. The system was based on the Medicare Benefits Schedule (MBS) coding system and originally called MBS-Extended. The name was changed to the Australian Classification of Health Interventions (ACHI) with the release of the third revision of the ICD-10-AM in July 2002 (NCCH 2008a). ACHI and ICD-10-AM are used together for classifying morbidity, surgical procedures and other health interventions in Australian hospital records.

## Standard Australian Classification of Countries

The Standard Australian Classification of Countries (SACC) is the Australian statistical standard for statistics classified by country (ABS 2008a). It is a classification of countries that is essentially based on the concept of geographic proximity, grouping neighbouring countries into progressively broader geographical areas on the basis of their similarity in terms of social, cultural, economic and political characteristics. The first edition of the SACC was published in 1998 and the second—the one used in this report—was released by the ABS in 2008.

# 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 events occurring in each specified age group by the corresponding 'at-risk' population in the same age group and then multiplying the result by a constant (for example, 100,000). Age-specific rates are often expressed per 100,000 population.

## Age-standardised rates

A crude rate provides information on the number of cases of breast cancer indicators (such as incidence, mortality and hospitalisation) relative to the number of people in the population at risk in a specified period. No age adjustments are made when calculating a crude rate. Since the risk of developing breast cancer depends heavily on age, crude rates are not suitable for looking at trends or making comparisons across groups in cancer incidence and mortality.

More meaningful comparisons can be made by the use of age-standardised rates, with such rates adjusted for age in order to facilitate comparisons between populations that have different age structures (for example between the Aboriginal and Torres Strait Islander population and other Australians). This standardisation process effectively removes the influence of age structure on the summary rate.

There are two methods commonly used to adjust for age: direct and indirect standardisation. In this report, the direct standardisation approach presented by Jensen and colleagues (1991) is used. To age-standardise using the direct method, the first step is to obtain 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 in a certain socioeconomic status group or 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 can be converted to a rate per 1,000 or 100,000 as appropriate.

## Age-standardised average length of stay

Information on crude average length of stay (ALOS) is presented in Chapter 8, together with age-standardised ALOSs. The use of age-standardised ALOS enables comparisons between groups and within groups over time taking into account differences in the age structure and size of the population.

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 distribution of overnight hospitalisations due to all cancers combined (ICD-10-AM codes of C00–C97, D45, D47.1 and D47.3) in 2009–10. The third step is to multiply the crude ALOS with the corresponding weights and then sum up to obtain the total age-standardised ALOS.

## Confidence intervals

An observed value of a rate may vary due to chance, even where there is no variation in the underlying value of the rate. A confidence interval provides a range of values that has a specified probability of containing the true rate or trend. The 95% (*p*-value = 0.05) confidence interval is used in this report; thus, there is a 95% likelihood that the true value of the rate is somewhere within the stated range. Confidence intervals can be used as a guide to whether or not differences are consistent with chance variation. In cases where no values within the confidence intervals overlap, the difference between rates is greater than that which could be readily explained by chance and is regarded as statistically significant. Note, however, that overlapping confidence intervals do not necessarily mean that the difference between two rates is definitely due to chance. Instead, an overlapping confidence interval represents a difference in rates that is too small to allow differentiation between a real difference and one that is due to chance variation. It can, therefore, only be stated that no statistically significant differences were found, and not that no differences exist. The approximate comparisons presented might understate the statistical significance of some differences, but they are sufficiently accurate for the purposes of this report.

As with all statistical comparisons, care should be exercised in interpreting the results of the comparison of rates. If two rates are statistically significantly different from each other, this means that the difference is unlikely to have arisen by chance. Judgment should, however, be exercised in deciding whether or not the difference is in fact due to chance or whether it is of any practical significance.

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, the confidence intervals of the age-standardised rates in this report were calculated using a method developed by Dobson et al. (1991). This method calculates approximate confidence intervals for a weighted sum of Poisson parameters.

The one exception applies to the confidence intervals that were calculated for the international comparisons of incidence and mortality data using GLOBOCAN data. For those data, the lack of the required data meant that the Dobson method could not be used and the AIHW approximated the confidence intervals using the following formula:

$$95\%\ \text{CI approximation} = \text{AS rate} \pm 1.96 \times \frac{\text{AS rate}}{\sqrt{\text{Number of cases}}}$$

Since the GLOBOCAN data are based on the estimates of the number of new cases and deaths from cancer, the associated confidence intervals indicate the range of random variation that might be expected, should those estimates be 100% accurate.

Note that statistical independence of observations is assumed in the calculations of the confidence intervals for this report. This assumption may not always be valid for episode-based data (such as data from the National Hospital Morbidity Database).

### The use of confidence intervals for non-sample data

The AIHW is reviewing the provision of confidence intervals when data arises from sources that provide information on all subjects rather than from a sample survey. This review will include analysis of the methods used to calculate confidence intervals, as well as the appropriateness of reporting confidence intervals for such data. It aims to ensure that statistical methods used in AIHW reporting appropriately inform understanding and decision making.

## Mortality-to-incidence ratio

Both mortality-to-incidence ratios (MIRs) and relative survival ratios can be used to estimate survival from a particular disease, such as breast cancer, for a population. Although MIRs are the cruder of the two ratios, MIRs do not have the same comparability and interpretation problems associated with them when attempting to make international comparisons (see Chapter 4). Thus, the MIR is considered to be a better measure when comparing survival between countries.

The MIR is defined as the age-standardised mortality rate divided by the age-standardised incidence rate. If people tend to die relatively soon after diagnosis from a particular cancer (that is, the death rate is nearly as high as the incidence rate for that cancer), then the MIR will be close to 1.00. In contrast, if people tend to survive a long time after being diagnosed, then the MIR will be close 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
- the incidence rate, mortality rate and survival proportion are not undergoing rapid change.

The incidence and mortality data used to calculate the MIRs in Chapter 4 were extracted from the 2008 GLOBOCAN database (Ferlay et al. 2010).

## Prevalence

Limited-duration prevalence is expressed as *N-year prevalence* throughout this report. *N-year prevalence* on a given index date (31 December 2008), where *N* is any number 1, 2, 3 etc., is defined as the number of people alive at the end of that day who had been diagnosed with breast cancer in the past *N* years. For example:

- 1-year prevalence is the number of living people who were diagnosed in the past year to 31 December 2008.
- 5-year prevalence is the number of living people who were diagnosed in the past 5 years to 31 December 2008. This includes the people defined by 1-year prevalence.

In this report, 27-year prevalence is the longest duration that can be calculated based on the earliest (1982) and latest (2008) years of available incidence data. People who were diagnosed with breast cancer between 1982 and 2008 and who were alive on 31 December 2008 would be counted in 27-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. Twenty-seven years was deemed a sufficiently long period for approximating complete prevalence, especially given that most breast cancers are diagnosed in the later years of life.

Prevalence can be expressed as a proportion of the total population as at the index date. In this report, the prevalence proportion is converted to a rate per 10,000 population due to the relative size of the numerator and denominator. These are crude rates and have not been standardised.

Differences in limited-duration prevalence are presented according to age in the report. Note that while age for survival and incidence statistics refers to the age at diagnosis, prevalence age refers to the age at the point in time from which prevalence was calculated, or 31 December 2008, in this report. Therefore, a person diagnosed with cancer in 1982 when they turned 50 that year would be counted as age 76 in the prevalence statistics (as at the end of 2008).

# Projection method

National cancer incidence data from the Australian Cancer Database (ACD) and national cancer mortality data from the National Mortality Database (NMD) were used to develop the underlying model for the breast cancer projections. At the time of analysis, national incidence statistics were available for all years from 1982 to 2007, while national mortality statistics were available for all years from 1968 to 2007.

ABS Estimated Resident Population data by age and sex were used to calculate age-specific incidence and mortality rates for breast cancer for the given years.

The projected rates were then applied to the ABS's projected age-specific populations, *Population projections, Australia, 2006 to 2101* (series B) to obtain projected incidence and mortality counts. Series B largely reflects current trends in fertility, life expectancy at birth and net overseas migration (ABS 2008).

In producing projections to 2020, a number of assumptions had to be made about trends in cancer incidence and mortality as well as demographic factors that must be considered in interpreting the results. The projections in this report are based on the following assumptions about underlying cancer rates:

1. Trends in age-sex-cancer specific incidence and mortality rates are nationally homogeneous.
2. The age effect will remain stable.
3. Past trends used to develop the model will continue to 2020.
4. The chosen model is an adequate representation of those trends.

These assumptions are discussed further in the AIHW report *Cancer incidence projections, Australia 2011 to 2020* (AIHW 2012a).

To determine the most recent national trend, variations in trends of incidence and mortality for breast cancer were analysed by fitting piece-wise linear models to the age-standardised incidence rate from 1982 to 2007 and mortality rate from 1968 to 2007 using Joinpoint[1] software. Where statistically significant changes in the magnitude and/or direction of the trend were detected, the most recent trend was used as the base data.

National models for both incidence and mortality were then developed using national data for breast cancer as follows:

- An ordinary least squares linear regression model was developed for each age-sex group using rates from the most recent trend.
- The significance of time as a predictor was determined at the 5% level by applying a two-tailed test to the slope coefficient. In age groups where the slope coefficient was not significant, the projection rate was set to the mean rate over the most recent trend.
- Where a significant decreasing trend was detected, it was assumed the rate is decaying over time (but never reaching zero) and ordinary least squares linear regression model with a log transformation was used instead.
- For each of the age-sex-cancer models developed, projected rates were applied to the projected population data to obtain projected counts. The predicted age-sex-cancer counts were then summed to obtain national cancer-specific predicted for females. Age-standardised rates for breast cancer incidence and mortality were calculated from the age-sex specific predicted counts.
- Prediction intervals to indicate the range of uncertainty around each projection were calculated. All estimated counts are rounded to the nearest 10. For counts less than 1,000, estimates are rounded to the nearest 5. Calculations of percentage and numeric change, proportions and rates are based on unrounded data.

A mathematical explanation of the model is provided in the AIHW report *Cancer incidence projections, Australia 2011 to 2020* (AIHW 2012a), along with notes on model accuracy and validation.

# Rate ratio

This measure indicates the relative incidence rate, mortality rate or hospitalisation rate between two population groups (for example, Aboriginal and Torres Strait Islander people and non-Indigenous people). It can be calculated based on crude rates, age-standardised

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[1] Joinpoint is statistical software for the analysis of trends using joinpoint models.

rates and cumulative rates. In this publication it is calculated using the age-standardised rates as:

Rate ratio = ASR of population group A / ASR of population group B

Ratios greater than 1 indicate an excess in population group A, while ratios less than 1 indicate an excess in population group B.

## Relative survival

Relative survival is a measure of the survival of people with breast cancer compared with that of the general population. It is the standard approach used by cancer registries to produce population-level survival statistics and is commonly used as it does not require information on cause of death. Instead, relative survival reflects the net survival (or excess mortality) associated with cancer by adjusting the survival experience of those with cancer for the underlying mortality that they would have experienced in the general population.

Relative survival is calculated by dividing observed survival by expected survival, where the numerator and denominator have been matched for age, sex, calendar year, and where applicable, remoteness and socioeconomic status.

A simplified example of how relative survival is interpreted is shown in Figure B.1. Given that 6 in 10 people with breast cancer are alive 5 years after their diagnosis (observed survival of 0.6) and that 9 in 10 people from the general population are alive after the same 5 years (expected survival of 0.9), the relative survival of people with breast cancer would be calculated as 0.6 divided by 0.9, or 0.67. This means that people with breast cancer are 67% as likely to be alive for at least 5 years after their diagnosis compared with their counterparts in the general population.

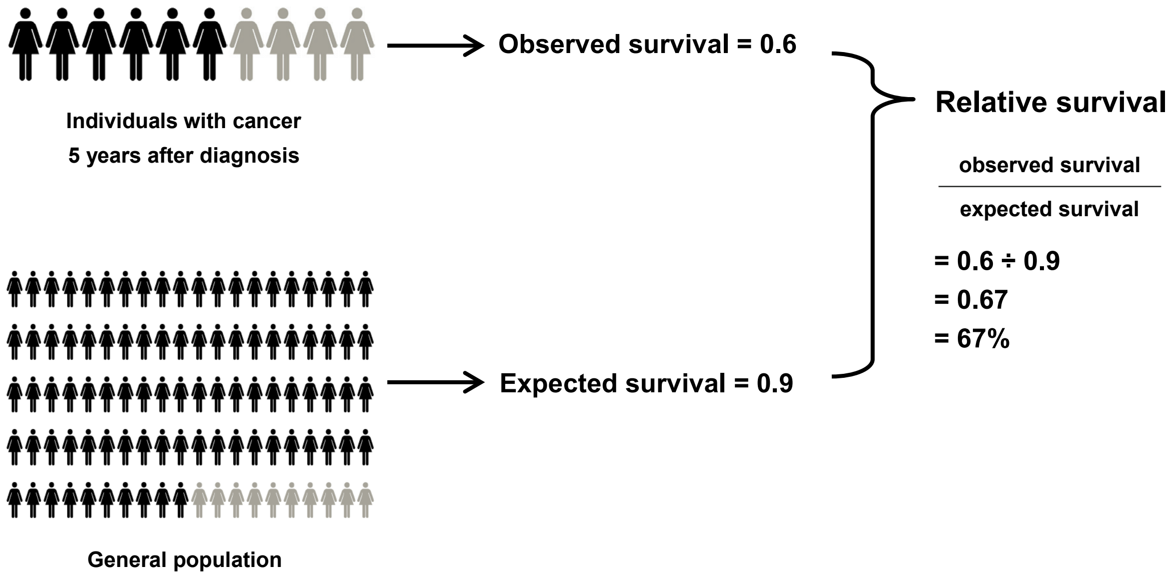

**Figure B.1: A simplified example of how relative survival is calculated**

All observed survival was calculated from data in the ACD. Expected survival was calculated from the life tables of the entire Australian population, as well as the Australian population stratified by remoteness area and socioeconomic status quintile. The Ederer II method was used to determine how long people in the general population are considered 'at risk'. It is the default approach whereby matched people in the general population are considered to be at risk until the corresponding cancer patient dies or is censored (Ederer & Heise 1959).

The survival analysis was based on records of primary and invasive breast cancers diagnosed between 1982 and 2008, with the exception of analyses by remoteness area and socioeconomic status that were based on records between 1982 and 2007. At the time of analysis, these cases had been followed for deaths (from any cause) to the end of 2010. Therefore, the censor date selected for survival analysis was 31 December 2010.

In this report, the period method was used to calculate the survival estimates (Brenner & Gefeller 1996), in which estimates are based on the survival experience during a given at-risk or follow-up period. Time at risk is left truncated at the start of the period and right censored at the end so that anyone who is diagnosed before this period and whose survival experience overlaps with this period would be included in the analysis.

The main follow-up period in this report was for the 5-year period 2006–2010, which was used for the most up-to-date estimates of survival by age, histological subtype, remoteness and socioeconomic status. Note that 29-year survival is the longest duration that can be calculated for the period 2006–2010 based on the years of data available in the ACD at the time of analysis (1982–2008).

Trends are also analysed by five periods of follow-up: 1982–1987, 1988–1993, 1994–1999, 2000–2005 and 2006–2010. In each period, five or six years of follow-up have been combined to draw upon a greater number of cases to produce more precise estimates. Note that using the period method it is possible to calculate survival estimates for up to 6 years for the period 1982–1987, for up to 12 years for the period 1988–1993, for up to 18 years for the period 1994– 1999, for up to 24 years for the period 2000–2005 and for up to 29 years for the period 2006–2010. The number of years after diagnosis that cancer patients can be followed for each period varies because the maximal follow-up time varies. For example, using the period method, the survival estimates for the 1982–1987 period were based on cases of people who were diagnosed with breast cancer between 1982 and the end of 1987 (and who were at risk of dying during this period), whereas the survival estimates for 1988–1993 were based on cases of people diagnosed from 1982 to the end of 1993 (and who were at risk of dying during this period).

All survival statistics in this report were produced using SAS statistical software and calculated using software written by Dickman (2004). Further details on the approach used to calculate the relative survival estimates, including rules which were applied during data preparation, can be found in AIHW publication *Cancer survival and prevalence in Australia, period estimates from 1982 to 2010* (AIHW 2012d).

## Risk to age 85

The calculations of risk shown in this report are measures that approximate the risk of developing (or dying from) breast cancer before the age of 85, assuming that the risks at the time of estimation remained throughout life. It is based on a mathematical relationship with the cumulative rate.

The cumulative rate is calculated by summing the age-specific rates for all specific age groups:

$$\text{Cumulative rate} = \frac{5 \text{ x (Sum of the age-specific rates) x } 100}{100{,}000}$$

The factor of 5 is used to indicate the 5 years of life in each age group and the factor of 100 is used to present the result as a percentage. As age-specific rates are presented per 100,000 population, the result is divided by 100,000 to return the age-specific rates to a division of cases by population. Cumulative risk is related to cumulative rate by the expression:

$$\text{Cumulative risk} = 1 - e^{-rate/100}$$

where the rate is expressed as a percentage.

The risk is expressed as a '1 in *n*' proportion by taking the inverse of the above formula:

$$n = \frac{1}{\left(1 - e^{-rate/100}\right)}$$

For example, if *n* equals 3, then the risk of a person in the general population being diagnosed with cancer before the age of 85 years is 1 in 3. Note that these figures are average risks for the total Australian population. An individual person's risk may be higher or lower than the estimated figures, depending on their particular risk factors.

# Appendix C: Data sources

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

## Australian Cancer Database

The Australian Cancer Database (ACD) holds information on about 1.8 million cancer cases of Australians who were diagnosed with cancer (other than basal cell and squamous cell carcinomas of the skin) between 1982 and 2007. Data from this source are used in chapters 2, 4 and 5.

The AIHW compiles and maintains the ACD, in partnership with the Australasian Association of Cancer Registries (AACR), whose member registries provide data to the AIHW on an annual basis. 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. Pathology laboratories and Registrars of Births, Deaths and Marriages across Australia must report on cancer cases, as do hospitals, radiation oncology units and nursing homes in some (but not all) jurisdictions.

The data provided to the AIHW by the state and territory cancer registries include, at a minimum, an agreed set of items that provide information about the individual with the cancer, the characteristics of the cancer and, where relevant, deaths from malignant tumours (see Table C.1). In addition to the agreed set of items, registries often provide other data that are also included in the ACD. For example, data on ductal carcinoma in situ (DCIS) are not part of the agreed ACD data set but are regularly provided by the state and territory registries.

Once the data are received from the state and territory cancer registries, the AIHW assembles the data into the ACD. Internal linking checks are undertaken to identify those who had tumours diagnosed in more than one state or territory, reducing the degree of duplication within the ACD to a negligible rate. The ACD is also linked with information on deaths (from the National Death Index) to add information on which people with cancer have died (from any cause). Any conflicting information and other issues with the cancer data are resolved through consultation with the relevant state or territory cancer registry.

The registration of cancer cases is a dynamic process and 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 updated as required. For these changes to be incorporated into the ACD, a new complete file for all years of cancer data is provided by each of the jurisdictions annually. As a result, the number of cancer cases reported by the AIHW for any particular year may change slightly over time and, in addition, data published by a cancer registry at a certain point in time may differ to some extent from what is published by the AIHW (AIHW 2009b).

The data in the ACD are protected both physically, with built-in computer security systems, and legislatively under the *Australian Institute of Health and Welfare Act 1987* as well as agreements with the state and territory cancer registries. More information about physical security and legislative protection of the ACD can be found in the National Cancer Statistics Clearing House protocol (AIHW 2009).

**Table C.1: Agreed set of items to be provided by the states and territories to the AIHW for inclusion in the Australian Cancer Database**

| Person-level attributes | Tumour-level attributes |
|---|---|
| Person identification number (assigned by the state/territory) | Tumour identification number (assigned by the state/territory) |
| Surname | Date of diagnosis |
| First given name | Date of diagnosis flag |
| Second given name | Age at diagnosis |
| Third given name | ICD-O-3[(a)] topography code |
| Sex | ICD-O-3[(a)] morphology code |
| Date of birth | ICD-10[(b)] disease code |
| Date of birth flag | Most valid basis of diagnosis |
| Aboriginal and Torres Strait Islander status | Statistical local area at diagnosis |
| Country of birth | Postcode at diagnosis |
| Date of death | Melanoma thickness (mm) |
| Age at death | |
| Cause of death | |

(a) International Classification of Diseases for Oncology, 3rd edition.

(b) International Statistical Classification of Diseases and Related Health Problems, 10th revision.

*Source*: AIHW 2009.

## Data Quality Statement: Australian Cancer Database

### Important note

In order to avoid excessive repetition in what follows, the word 'cancer' is used to mean 'cancer, excluding basal cell carcinomas of the skin and squamous cell carcinomas of the skin'. In most states and territories these two very common skin cancers are not notifiable diseases and as such are not in the scope of the Australian Cancer Database (ACD).

### Summary of Key Issues

- All states and territories maintain a population-based cancer registry to which all cancer cases and deaths must be reported.
- The AIHW compiles the Australian Cancer Database using information from state and territory registers.
- Some duplication may occur where the same person and cancer have been registered in two or more jurisdictions. AIHW temporarily resolves these instances, but full resolution usually occurs with the following year's release.
- The level of duplication is small, about 0.17% of all records.
- Cancer registry databases change every day, adding new records and improving the quality of existing records as new information becomes available. Information on ACD records may therefore change from year to year.

### Description

All states and territories have legislation that makes cancer a notifiable disease. All hospitals, pathology laboratories, radiotherapy centres and registries of births, deaths and marriages must report cancer cases and deaths to the state or territory population-based cancer registry.

Each registry supplies incidence data annually to the AIHW under an agreement between the registries and the AIHW. These data are compiled into the only repository of national cancer incidence data—the Australian Cancer Database (ACD).

### Institutional environment

The Australian Institute of Health and Welfare (AIHW) is a major national agency set up by the Australian Government under the *Australian Institute of Health and Welfare Act* 1987 to provide reliable, regular and relevant information and statistics on Australia's health and welfare. It is an independent statutory authority established in 1987, governed by a management Board, and accountable to the Australian Parliament through the Health and Ageing portfolio.

The AIHW aims to improve the health and wellbeing of Australians through better health and welfare information and statistics. It collects and reports information on a wide range of topics and issues, ranging from health and welfare expenditure, hospitals, disease and injury, and mental health, to ageing, homelessness, disability and child protection.

The Institute also plays a role in developing and maintaining national metadata standards. This work contributes to improving the quality and consistency of national health and welfare statistics. The Institute works closely with governments and non-government organisations to achieve greater adherence to these standards in administrative data collections to promote national consistency and comparability of data and reporting.

One of the main functions of the AIHW is to work with the states and territories to improve the quality of administrative data and, where possible, to compile national datasets based on data from each jurisdiction, to analyse these datasets and disseminate information and statistics.

The *Australian Institute of Health and Welfare Act* 1987, in conjunction with compliance to the *Privacy Act* 1988 (Cth), ensures that the data collections managed by the AIHW are kept securely and under the strictest conditions with respect to privacy and confidentiality.

For further information see the AIHW website <www.aihw.gov.au>.

The AIHW has been maintaining the ACD since 1986.

### Timeliness

The present version of the ACD contains data on all cancer cases diagnosed between 1982 and 2008.

Each jurisdictional cancer registry supplies data annually to the AIHW. Because each jurisdiction operates on its own data compilation and reporting cycle, the ACD cannot be fully compiled until the final jurisdiction supplies its data.

### Accessibility

The AIHW website provides cancer incidence and mortality data which can be downloaded free of charge. Numerous reports, including the biennial *Cancer In Australia* are published and are available on the AIHW website where they can be downloaded without charge.

Users can request data not available online or in reports via the Cancer and Screening Unit Australian Institute of Health and Welfare on (02) 6244 1000 or via email to <cancer@aihw.gov.au>. Requests that take longer than half an hour to compile are charged for on a cost-recovery basis. General enquiries about AIHW publications can be made to the Communications, Media and Marketing Unit on (02) 6244 1032 or via email to <info@aihw.gov.au>.

Researchers who are following a cohort of people enrolled in a longitudinal study of health outcomes can request the AIHW to undertake data linkage of their cohort to the ACD. Such requests must be approved by the AIHW Ethics Committee as well as the ethics committees governing access to the state or territory cancer registries.

**Interpretability**

Information on the ACD is available on the AIHW website.

While numbers of new cancers are easy to interpret, other statistical calculations (e.g. calculations of age-standardised rates and confidence intervals) are more complex and their concepts may be confusing to some users. In most publications there is an appendix on statistical methods as well as technical notes.

**Relevance**

The ACD is highly relevant for monitoring trends in cancer incidence. The data are used for many purposes: by policy-makers to evaluate health intervention programs and as background data for health labour force planning, health expenditure, etc.; by pharmaceutical companies to assess the size of the market for new drugs; by researchers to explore the epidemiology of cancer; by insurance companies to evaluate the risk of people being diagnosed with cancer.

The ACD contains information on all reported cancer cases and deaths in Australia. Data can be provided at state and territory level and at Remoteness Area level.

The 3rd edition of the International Classification of Diseases for Oncology (ICD-O-3) is used to classify cancer cases. Data can also be provided classified according to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10).

While all state and territory cancer registries collect information on Indigenous status, in some jurisdictions the level of identification of Indigenous Australians is not considered to be sufficient to enable analysis.

The ACD also contains the name and date of birth of each person who has been diagnosed with cancer. This allows researchers who have enrolled people in a study to link their database to the ACD in order to find out which of their enrolees have been diagnosed with cancer, what kind of cancer, and when. (Such data linkage can only be undertaken after receiving approvals from various ethics committees.) This kind of research gives insight into cancer risk factors. Data linkage is also undertaken when a researcher has been contracted to investigate a potential cancer cluster in a workplace or small area.

**Accuracy**

The publication *Cancer incidence in five continents* is issued approximately every five years as a collaborative effort by the International Agency for Research on Cancer (IARC) and the worldwide network of cancer registries. Australia's cancer registries continue to pass IARC's numerous tests for data quality. Details of the tests and Australia's cancer registries' results in them can be found in the above-mentioned book and appendices of the registries' annual incidence reports.

Each year when all the registries' new data have been compiled into the new ACD, a data linkage process called the national deduplication is undertaken. This process detects instances where the same person and cancer have been registered in two or more jurisdictions. This could happen, for example, when a person attends hospitals in different jurisdictions. All such instances that are found are temporarily resolved at the AIHW by removing one record while the relevant jurisdictions are notified of the situation so that they can determine in which jurisdiction the person was a usual resident at the time of diagnosis. Their resolution will flow through to the ACD in the next year's data supply. In recent years the national deduplication has resulted in the removal of about 3,500 records from the ACD, which is about 0.17% of all records supplied by the jurisdictions.

Although all state and territory cancer registries collect information on Indigenous status, in some jurisdictions the level of identification of Indigenous Australians is not considered to be sufficient to enable analysis. Data for four states and territories—New South Wales, Queensland, Western Australia and the Northern Territory—are considered suitable for analysis.

Cancer registry databases change every day, and not just because new records are added. Existing records are changed if new, more precise, information about the diagnosis becomes available. Also, any typographical errors that are discovered by routine data checking procedures are corrected by referring to the source documentation. Finally, existing records can be deleted if it is discovered that the initial diagnosis of cancer was incorrect, e.g. the tumour was in fact benign, or the person is found to be not a resident of that state or territory. As a result of all these issues, the number of cancer cases reported by AIHW for any particular year may change slightly over time, and data published by a cancer registry at a certain point in time may differ slightly from what is published by the AIHW at a different time.

### Coherence

Cancer data are reported and published annually by the AIHW. Although there are sometimes changes to coding for particular cancers, it is possible to map coding changes to make meaningful comparisons over time.

## Burden of disease data

Information on the burden of disease from breast cancer is in Chapter 6.

The first study that provided an overview of disease and injury burden in Australia was published in 1999 (AIHW: Mathers et al. 1999). The second and most recent study was published in 2007 and provides burden of disease information in relation to 2003 as well as backwards and forwards projections from 1993 to 2023 (Begg et al. 2007). The summary measure used in that study is the disability-adjusted life year, or DALY, with this term used interchangeably with 'burden of disease'. The 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 such that:

$$\text{DALY} = \text{YLL} + \text{YLD}$$

where

YLL = number of deaths x standard life expectancy at age of death, and

YLD = incidence x duration x severity weight.

Further information about how the DALY was derived, as well as further information on interpretation of burden of disease data, can be found in Begg et al. (2007).

This report presents the projected burden of disease due to breast cancer for 2012. These data were estimated by Begg et al. and associates using 2003 baseline data. More information about how these projection estimates were derived can be found in the report by Begg et al. (2007).

## Disease Expenditure Database

Expenditure data are used in Chapter 9 to describe health expenditure on breast cancers. These data were obtained from the Disease Expenditure Database, which is maintained by the AIHW.

Since 1984, the AIHW has had the responsibility for developing estimates of national health expenditure. Data are obtained from a variety of sources in the public and private sectors, with most provided by the ABS, the Australian Government Department of Health and Ageing, and state and territory health authorities. Other major sources are the Department of Veterans' Affairs, the Private Health Insurance Administration Council, Comcare, and the major worker's compensation and compulsory third-party motor vehicle insurers in each state and territory.

The definition of 'all cancers' used in Chapter 9 is somewhat different from that used in earlier chapters, as it only includes the ICD-10 'C' codes and excludes those malignant cancers with the ICD-10 'D' codes (such as polycythaemia vera). Separate expenditure data were not readily available for the required subset of ICD-10 'D' cancers. Since the forms of malignant cancers covered by the ICD-10 'D' codes are not common (AIHW & AACR 2010), their exclusion is not expected to have a large effect on the health expenditure estimates shown in this report.

Further information about the Disease Expenditure Database can be found in the annual health expenditure reports published by the AIHW (AIHW 2005, 2010a).

## GLOBOCAN

One of the main sources of internationally comparable data on cancer is the GLOBOCAN database, which is prepared by the International Agency for Research on Cancer (IARC) (Ferlay et al. 2010). The IARC collates cancer incidence and mortality data from cancer registries around the world and uses those data to produce estimates for a 'common year'. The most recent GLOBOCAN estimates for which data could be obtained are for 2008. GLOBOCAN data are in Chapters 2, 3 and 4.

In the GLOBOCAN database, age-standardised incidence and mortality rates are provided, with the data standardised to the 1966 WHO World Standard Population. However, the database does not include confidence intervals. To provide some guidance as to whether the differences were statistically significant, the AIHW calculated 'approximate' confidence intervals (with the methodology for doing so explained in Appendix B).

# National Death Index

Cancer incidence data were linked to the National Death Index (NDI) to provide survival and prevalence information (Chapters 4 and 5). The NDI is a database maintained by the AIHW; it contains information on all deaths in Australia since 1980.

The NDI database comprises the following variables for each deceased person: name; alternative names (including maiden names); date of birth (or estimated year of birth), age at death, sex, date of death, marital status, Aboriginal and Torres Strait Islander status, and state or territory of registration. Cause of death information in a coded form is also available. For records to 1996, only the code for underlying cause of death is available. For records from 1997, the codes for the underlying cause of death and all other causes of death mentioned on the death certificate are available.

This database exists solely for research linkage purposes, such as to gain epidemiological 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.

## Data Quality Statement: National Death Index (NDI)

### Summary of Key Issues

- Deaths occurring in Australia are registered and maintained by the Registrars of Births, Deaths and Marriages in each state and territory. These registration details are then provided to the AIHW and are assumed to be as correct as possible. The AIHW has no ability to confirm the correctness and completeness of these data.
- It is expected that some death registration details may contain errors and some information that is critical might be missing. The AIHW uses a probabilistic data linking technique to link researchers' data to the NDI. Consequently, the linkage result is an indication or index of death, rather than an absolute fact of death.
- Incorrect linkages can result because of errors or incorrect details in personal information supplied when deaths are registered. Examples of such errors are: the changed surname when women marry is not provided; given names are transposed, incorrectly spelt, or partly replaced by nicknames; the date of birth is wrong, the birth day of an elderly relative might be known, but not the year of birth.
- Linkages are tailored to the needs of the researcher, in terms of the matching tightness.

**Description**

The National Death Index (NDI) is a database, housed at the Australian Institute of Health and Welfare (AIHW), which contains records of all deaths occurring in Australia since 1980. The data are obtained from the Registrars of Births, Deaths and Marriages in each state and territory. The Index is designed to facilitate the conduct of epidemiological studies and its use is strictly confined to medical research.

Researchers undertaking such studies need to follow up groups of persons who, for example take part in clinical trials, or who have suffered from particular diseases, or are known to have been exposed to specific hazards, in order to determine, whether death has occurred, and if so to analyse the survival rate and causes of death.

Each Registry records only those deaths that occur in its own state or territory, and if a person dies in a state or territory other than the one in which the circumstances being studied were experienced, without the NDI the researchers would have to contact every Registry to determine whether or not a death has been registered.

### Institutional environment

The Australian Institute of Health and Welfare (AIHW) is a major national agency set up by the Australian Government under the *Australian Institute of Health and Welfare Act 1987* to provide reliable, regular and relevant information and statistics on Australia's health and welfare. It is an independent statutory authority established in 1987, governed by a management Board, and accountable to the Australian Parliament through the Health and Ageing portfolio.

The AIHW aims to improve the health and wellbeing of Australians through better health and welfare information and statistics. It collects and reports information on a wide range of topics and issues, ranging from health and welfare expenditure, hospitals, disease and injury, and mental health, to ageing, homelessness, disability and child protection.

The Institute also plays a role in developing and maintaining national metadata standards. This work contributes to improving the quality and consistency of national health and welfare statistics. The Institute works closely with governments and non-government organisations to achieve greater adherence to these standards in administrative data collections to promote national consistency and comparability of data and reporting.

One of the main functions of the AIHW is to work with the states and territories to improve the quality of administrative data and, where possible, to compile national datasets based on data from each jurisdiction, to analyse these datasets and disseminate information and statistics.

The *Australian Institute of Health and Welfare Act 1987*, in conjunction with compliance to the *Privacy Act 1988*, (Cth) ensures that the data collections managed by the AIHW are kept securely and under the strictest conditions with respect to privacy and confidentiality.

For further information see the AIHW website <www.aihw.gov.au>.

### Timeliness

The Registrars of Births, Deaths and Marriages in each state and territory provide to the AIHW on a monthly basis, the details of deaths registered in a given month, as soon as that month ends, usually within the first two weeks of the following month.

In most cases, deaths that were registered in a given month did happen in that month, however some deaths are registered many years after death occurs, for example in cases when the remains are found.

Cause of death information is derived from the National Mortality Database, which records the underlying and other causes of death as ICD10 codes derived by the Australian Bureau of Statistics from the death certificates. This information is generally not available for the most recent two years of data.

The latest and the most current NDI data are available to link to the researchers' cohort.

**Accessibility**

Researchers can access the National Death Index if their study generally meets the following set of conditions:

- the study focuses on health issues
- the study has been approved by the researcher's host institution ethics committee and the AIHW Ethics Committee. Typically this review concentrates on the issues of public interest and use of confidential information
- the study is scientifically valid (as judged by a peer review process)
- the study results will be placed in the public domain (e.g. published papers or books, conference presentations, feedback to patients)
- the study will not break confidentiality provisions
- the study investigators comply with the AIHW legislation under which the data are released
- the data will be secured in an environment that guarantees confidentiality of individual's data.

Given that the study can meet these conditions, it can be best progressed by researchers discussing feasibility and likely costs with one of the contact officers in the AIHW. To formally apply for NDI use, researchers can obtain from the Institute's web page <www.aihw.gov.au/national-death-index/>, an *NDI data provision package*. This package gives instructions as to what data formats are required, a description of the NDI, the legislation covering the use of NDI data and the AIHW Ethics Committee application forms. These forms contain questions relating to the objectives of the project, the security of the confidential information, the intended release of the study results and the public benefit that might be gained from conducting the study. The Ethics Committee will consider these factors in determining whether to grant approval to the project. The Committee meets four times a year. Once a study is given an Ethics Committee certificate, the project can proceed.

**Interpretability**

The NDI database held by the AIHW comprises such variables for each deceased person as: name, alternative names (including maiden names), dates of birth (or estimated year of birth), age at death, sex, date of death, marital status, Indigenous status, state or territory of registration. In some records the additional information of address and the text related to cause of death is available.

Cause of death information in a coded form is derived by linking the National Death Index registration numbers for deaths with the National Mortality Database. This latter database records underlying cause of death in ICD10 codes as derived by Australian Bureau of Statistics from the death certificates. This information is generally not available for the most recent two years of data.

A description of the NDI is included in the application package that researchers use when applying to link their data to the NDI. The researchers are made aware of the probabilistic nature of the data linkage method and are instructed to treat the linkage results as indication or index of death, rather than as an absolute fact.

**Relevance**

The National Death Index contains records of all deaths that occurred in Australia since 1980 and up to the most recent month past.

Researchers are made aware of the limitation of the probabilistic data linkage method and that they need to provide sufficient details of their subjects for the technique to be effective.

**Accuracy**

Deaths occurring in Australia are registered and maintained by the Registrars of Births, Deaths and Marriages in each state and territory. These registration details are then provided to the AIHW and are assumed to be as correct as possible. The AIHW has no ability to confirm the correctness and completeness of these data.

It is expected that some death registration details may contain errors and some information that is critical might be missing. The AIHW uses a probabilistic data linking technique to link researchers' data to the NDI. Consequently, the linkage result is an indication or index of death, rather than an absolute fact of death. These issues are communicated to the researchers.

Incorrect linkages can result because of errors or incorrect details in personal information supplied when deaths are registered. Examples of such errors are: the changed surname when women marry is not provided; given names are transposed, incorrectly spelt, or partly replaced by nicknames; the date of birth is wrong, the birth day of an elderly relative might be known, but not the year of birth.

Linkages are tailored to the needs of the researcher, in terms of the matching tightness. For example, some studies require that the matching be very precise and the researchers will only accept matches that are identical in terms of name, date of birth/death and sex, whereas others will allow for variations in names and dates at least. These scenarios are catered for by using probabilistic record linkage software. The AIHW undertakes the linkage and in some cases clerical reviews of marginal matches. Reports of the final matches are then provided to the researchers. The linkage result is an indication or index of death, rather than an absolute fact of death.

**Coherence**

Only a small number of variables such as: names, sex, date of birth, date of death and components of address are used from the NDI for the linking purpose. Although the file formats in which data are provided by the Registrars changes from time to time, the contents of data remain constant. To ensure consistency, a substantial cleaning and standardisation of data takes place before loading to the database. For example, names are converted to upper case, dates are standardised to 'yyyymmdd' format and gender is set to '1' for males and '2' for females.

The one serious exception from the consistency over time is coded cause of death. This field was derived by Australian Bureau of Statistics from the death certificates and is obtained from the National Mortality Database, by linking it to the NDI. The causes of death are coded using the International Classification of Diseases (ICD) which originated in the 1800s and undergoes revisions from time to time. The current version is ICD-10. It is critical to know the version of the ICD that relates to given data. This information and the description of data items are provided to the researchers with the linking results.

## National Hospital Morbidity Database

Data from the National Hospital Morbidity Database (NHMD) are used in Chapter 8 to examine the number of hospitalisations due to breast cancer. The NHMD contains demographic, diagnostic, procedural and duration of stay information on episodes of care for patients admitted to hospital. This annual collection is compiled and maintained by the AIHW, using data supplied by state and territory health authorities. Information from almost all hospitals in Australia is included in the database: public acute and public psychiatric hospitals, private acute and private psychiatric hospitals, and private free-standing day hospital facilities. Hospitals operated by the Australian Defence Force, corrections authorities and in Australia's offshore territories are not in scope but some are included.

The database is episode-based and it is not possible to count patients individually. A record is included for each separation, not for each patient, so patients who separated more than once in the year have more than one record in the NHMD. Separation is the term used to refer to the episode of admitted patient care, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute care to rehabilitation).

For 2009–10, all public hospitals were included except for a small mothercraft hospital in the Australian Capital Territory. Private hospital data were not provided for private free-standing day facilities in the Australian Capital Territory and the Northern Territory, and for one private free-standing day facility in Tasmania.

The majority of private hospitals were also included. Most of the private facilities that did not report to the NHMD were free-standing day hospitals. For 2009–10, data were not provided for private day hospitals in the Australian Capital Territory and the Northern Territory, and for a small private hospital in Victoria. Victoria estimated that its data were essentially complete. Counts of private hospital hospitalisations in this report are therefore likely to be underestimates of the actual counts.

The quality of the data reported for Indigenous status are of sufficient quality for statistical reporting purposes for NSW, Vic, Qld, SA, WA and NT (public hospitals only). National totals include these six jurisdictions only. Indigenous status data reported for public hospitals in Tasmania and the ACT should be interpreted with caution until further assessment of Indigenous identification is completed.

Comprehensive hospital statistics from this database are released by the AIHW annually (AIHW 2011c). Further information about this data source is available in those reports.

Data are held in the NHMD for the years from 1993–94 to 2009–10. In this report, data on cancer-related hospitalisations are presented for 2009–2010, with time trends going back to 2000–01.

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.

## National Mortality Database

Data from the AIHW National Mortality Database (NMD) are used in Chapter 3 to provide statistical information on mortality in Australia due to cancer.

The NMD is maintained by the AIHW and comprises de-identified information for all deaths in Australia from 1964 to 2007. Information on the characteristics of the deceased and the causes of death are provided by the Registrars of Births, Deaths and Marriages and the National Coronial Information System to the ABS for compilation of national data. In this report, data for the 26 years from 1982 to 2007 and data for deriving projection estimates were sourced from the AIHW NMD.

The information on cause of death is coded by the Australian Bureau of Statistics (ABS) to an international standard, *the International Classification of Disease and Related Health Problems*, currently the tenth version (ICD-10). Deaths are coded to reflect the underlying cause of death. Since 1997, multiple causes of death have been available in the NMD.

The NMD indicates the year of *registration* of death and also the year of *occurrence* of death. For this report, mortality data are shown based on the year of *occurrence* of death, except for the most recent year (namely, 2007) where the number of people whose death was *registered* is used. Previous investigation has shown that the year of death and its registration coincide for the most part.

The most recent mortality data for Australia are readily available in tabulated format (ABS 2011). However, for some analyses of mortality, data are required at the unit-record level, that is, where information about each individual death is available for analysis. This enables grouping of records by specific causes, specific age categories and other characteristics, such as Indigenous status. Due to changes in the process for releasing unit-record mortality data to users (including the AIHW), the most recent unit-record-level data available at the time of writing were for deaths reported in 2007. As a result, the timeliness of some mortality analyses has diminished substantially in Australia (AIHW 2012b).

Information about an individual's socioeconomic status is not available in Australian mortality data. Where possible, national profiles of differences in mortality by socioeconomic status are undertaken using a proxy measure that describes the socioeconomic status of the area that the deceased person usually lived in, rather than the socioeconomic status of the individual (AIHW 2012b).

## Population data

Throughout this report, population data were used to derive rates of, for example, breast cancer incidence and mortality. The data were sourced from the ABS Demography section using the most up-to-date estimates available at the time of analysis.

To derive their estimates of the resident populations, the ABS uses the 5-yearly Census of Population and Housing data and adjusts it as follows:

- all respondents in the Census are placed in their state or territory, statistical local area and postcode of usual residence; overseas visitors are excluded
- an adjustment is made for persons missed in the Census (about 2%)

- Australians temporarily overseas on Census night are added to the usual residence Census count.

Estimated resident populations are then updated each year from the census data using indicators of population change, such as births, deaths and net migration. More information is available from the ABS website <www.abs.gov.au>.

For the Aboriginal and Torres Strait Islander comparisons in this report (Chapter 2, 3, 4 and 8), the most recently released Indigenous experimental estimated resident populations from the ABS were used (ABS 2009a). Those were based on the 2006 Census of Population and Housing.

# Appendix D: Additional tables

## Additional tables for Chapter 2: Incidence of breast cancer

**Table D2.1: Incidence of breast cancer, by age at diagnosis, females, Australia, 2008**

| Age group (years) | Number of cases | Age-specific rate[(a)] | 95% confidence interval |
|---|---:|---:|---:|
| <20 | 1 | 0.0 | 0.0–0.2 |
| 20–24 | 13 | 1.7 | 0.9–2.9 |
| 25–29 | 52 | 6.9 | 5.2–9.0 |
| 30–34 | 195 | 26.3 | 22.7–30.3 |
| 35–39 | 510 | 63.2 | 57.8–68.9 |
| 40–44 | 992 | 129.9 | 121.9–138.2 |
| 45–49 | 1,445 | 184.3 | 174.9–194.0 |
| 50–54 | 1,759 | 247.3 | 235.8–259.1 |
| 55–59 | 1,712 | 264.5 | 252.1–277.3 |
| 60–64 | 1,887 | 334.9 | 320.0–350.4 |
| 65–69 | 1,590 | 378.3 | 360.0–397.4 |
| 70–74 | 1,035 | 301.0 | 283.0–320.0 |
| 75–79 | 915 | 307.9 | 288.3–328.5 |
| 80–84 | 729 | 296.3 | 275.1–318.6 |
| 85+ | 732 | 306.9 | 285.1–330.0 |
| **Total[(b)]** | **13,567** | **115.4** | **113.5–117.4** |

(a) Number of new cases per 100,000 females.

(b) The rate shown in this row is age-standardised to the Australian population as at 30 June 2001; it is expressed per 100,000 females.

*Source:* AIHW Australian Cancer Database 2008.

## Table D2.2: Incidence of breast cancer, females, Australia, 1982 to 2008

| Year | Number of cases | Percentage of all cancers in females | Age-standardised rate[(a)] | 95% confidence interval |
|---|---|---|---|---|
| 1982 | 5,310 | 24.1 | 81.1 | 78.9–83.3 |
| 1983 | 5,374 | 23.7 | 80.8 | 78.7–83.1 |
| 1984 | 5,731 | 24.1 | 83.9 | 81.7–86.1 |
| 1985 | 5,934 | 24.2 | 84.6 | 82.5–86.9 |
| 1986 | 6,098 | 24.2 | 85.3 | 83.2–87.5 |
| 1987 | 6,716 | 25.1 | 91.5 | 89.3–93.8 |
| 1988 | 6,764 | 24.8 | 90.0 | 87.9–92.2 |
| 1989 | 7,209 | 25.8 | 94.0 | 91.8–96.2 |
| 1990 | 7,457 | 25.8 | 95.3 | 93.2–97.5 |
| 1991 | 8,077 | 26.4 | 100.8 | 98.6–103.1 |
| 1992 | 8,059 | 25.6 | 98.6 | 96.4–100.8 |
| 1993 | 8,814 | 27.1 | 105.6 | 103.4–107.9 |
| 1994 | 9,782 | 28.5 | 114.6 | 112.3–116.9 |
| 1995 | 10,083 | 28.4 | 116.0 | 113.7–118.3 |
| 1996 | 9,783 | 27.5 | 109.7 | 107.5–111.9 |
| 1997 | 10,223 | 27.7 | 111.8 | 109.6–114.0 |
| 1998 | 10,765 | 28.4 | 114.9 | 112.8–117.1 |
| 1999 | 10,673 | 27.7 | 111.4 | 109.3–113.5 |
| 2000 | 11,401 | 28.4 | 116.1 | 114.0–118.3 |
| 2001 | 11,838 | 28.7 | 117.6 | 115.5–119.8 |
| 2002 | 12,093 | 28.2 | 117.5 | 115.4–119.6 |
| 2003 | 11,869 | 27.8 | 112.6 | 110.6–114.7 |
| 2004 | 12,208 | 27.7 | 113.5 | 111.5–115.5 |
| 2005 | 12,258 | 27.0 | 111.6 | 109.6–113.6 |
| 2006 | 12,681 | 27.5 | 112.9 | 111.0–114.9 |
| 2007 | 12,608 | 27.0 | 109.5 | 107.6–111.5 |
| 2008 | 13,567 | 28.2 | 115.4 | 113.5–117.4 |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW Australian Cancer Database 2008.

## Table D2.3: Incidence of breast cancer, by age at diagnosis, females, Australia, 1982 to 2008

| | <40 | | 40–49 | | 50–69 | | 70+ | | All ages | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | ASR[(a)] | 95% CI | ASR[(a)] | 95% CI | ASR[(a)] | 95% CI | ASR[(a)] | 95% CI | ASR[(a)] | 95% CI |
| 1982 | 11.9 | 10.9–13.0 | 118.8 | 111.3–126.7 | 174.9 | 168.0–182.1 | 250.0 | 237.2–263.3 | 81.1 | 78.9–83.3 |
| 1983 | 11.4 | 10.5–12.5 | 124.0 | 116.4–132.0 | 167.3 | 160.4–174.3 | 258.6 | 245.8–271.9 | 80.8 | 78.7–83.1 |
| 1984 | 11.0 | 10.1–12.1 | 123.6 | 116.1–131.3 | 179.8 | 172.8–187.1 | 268.1 | 255.4–281.3 | 83.9 | 81.7–86.1 |
| 1985 | 12.0 | 11.0–13.1 | 123.6 | 116.3–131.3 | 181.6 | 174.5–188.8 | 266.8 | 254.3–279.8 | 84.6 | 82.5–86.9 |
| 1986 | 11.0 | 10.1–12.0 | 119.1 | 112.0–126.5 | 185.0 | 177.9–192.4 | 280.1 | 267.5–293.1 | 85.3 | 83.2–87.5 |
| 1987 | 13.1 | 12.1–14.2 | 136.1 | 128.7–143.7 | 197.7 | 190.5–205.2 | 280.7 | 268.3–293.6 | 91.5 | 89.3–93.8 |
| 1988 | 11.8 | 10.8–12.8 | 134.8 | 127.6–142.3 | 195.4 | 188.2–202.8 | 280.1 | 267.8–292.8 | 90.0 | 87.9–92.2 |
| 1989 | 11.8 | 10.8–12.8 | 137.3 | 130.2–144.7 | 209.6 | 202.2–217.2 | 288.8 | 276.5–301.5 | 94.0 | 91.8–96.2 |
| 1990 | 12.2 | 11.2–13.2 | 140.0 | 133.0–147.3 | 210.8 | 203.4–218.4 | 293.9 | 281.6–306.5 | 95.3 | 93.2–97.5 |
| 1991 | 12.7 | 11.8–13.7 | 140.6 | 133.7–147.7 | 231.3 | 223.6–239.2 | 305.8 | 293.5–318.5 | 100.8 | 98.6–103.1 |
| 1992 | 12.0 | 11.1–13.0 | 148.2 | 141.3–155.3 | 223.2 | 215.7–230.9 | 290.6 | 278.8–302.7 | 98.6 | 96.4–100.8 |
| 1993 | 12.5 | 11.6–13.5 | 148.8 | 142.0–155.8 | 251.3 | 243.4–259.5 | 303.3 | 291.4–315.5 | 105.6 | 103.4–107.9 |
| 1994 | 12.6 | 11.6–13.6 | 153.3 | 146.5–160.3 | 283.9 | 275.6–292.5 | 323.8 | 311.7–336.2 | 114.6 | 112.3–116.9 |
| 1995 | 12.5 | 11.5–13.4 | 154.9 | 148.2–161.9 | 286.3 | 277.9–294.8 | 332.6 | 320.5–345.0 | 116.0 | 113.7–118.3 |
| 1996 | 12.4 | 11.5–13.4 | 148.2 | 141.7–154.9 | 270.1 | 262.2–278.3 | 308.7 | 297.3–320.5 | 109.7 | 107.5–111.9 |
| 1997 | 12.5 | 11.6–13.5 | 144.7 | 138.4–151.3 | 278.1 | 270.1–286.2 | 320.2 | 308.7–332.1 | 111.8 | 109.6–114.0 |
| 1998 | 12.6 | 11.7–13.5 | 148.6 | 142.2–155.2 | 289.2 | 281.2–297.3 | 324.2 | 312.7–335.9 | 114.9 | 112.8–117.1 |
| 1999 | 12.4 | 11.5–13.4 | 142.4 | 136.2–148.9 | 287.6 | 279.8–295.6 | 299.3 | 288.5–310.5 | 111.4 | 109.3–113.5 |
| 2000 | 12.6 | 11.7–13.6 | 150.8 | 144.4–157.3 | 296.4 | 288.6–304.4 | 318.3 | 307.2–329.7 | 116.1 | 114.0–118.3 |
| 2001 | 12.3 | 11.4–13.2 | 150.5 | 144.2–157.0 | 305.5 | 297.6–313.4 | 317.6 | 306.7–328.9 | 117.6 | 115.5–119.8 |

*(continued)*

## Table D2.3 (continued): Incidence of breast cancer, by age at diagnosis, females, Australia, 1982 to 2008

| | <40 | | 40–49 | | 50–69 | | 70+ | | All ages | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **ASR[(a)]** | **95% CI** | **ASR[(a)]** | **95% CI** | **ASR[(a)]** | **95% CI** | **ASR[(a)]** | **95% CI** | **ASR[(a)]** | **95% CI** |
| 2002 | 12.6 | 11.6–13.5 | 153.1 | 146.8–159.6 | 304.9 | 297.3–312.8 | 310.7 | 300.0–321.8 | 117.5 | 115.4–119.6 |
| 2003 | 13.0 | 12.1–14.0 | 150.7 | 144.5–157.1 | 286.2 | 278.8–293.6 | 298.6 | 288.1–309.4 | 112.6 | 110.6–114.7 |
| 2004 | 12.7 | 11.7–13.6 | 149.2 | 143.1–155.5 | 289.2 | 282.0–296.6 | 306.3 | 295.7–317.1 | 113.5 | 111.5–115.5 |
| 2005 | 13.0 | 12.1–14.0 | 157.2 | 151.0–163.6 | 280.5 | 273.5–287.7 | 289.3 | 279.0–299.8 | 111.6 | 109.6–113.6 |
| 2006 | 13.0 | 12.1–14.0 | 154.2 | 148.0–160.5 | 288.4 | 281.4–295.6 | 291.8 | 281.6–302.4 | 112.9 | 111.0–114.9 |
| 2007 | 11.9 | 11.1–12.9 | 154.1 | 148.0–160.4 | 274.7 | 268.0–281.6 | 291.0 | 280.8–301.4 | 109.5 | 107.6–111.5 |
| 2008 | 13.2 | 12.3–14.1 | 155.9 | 149.8–162.3 | 294.2 | 287.3–301.2 | 303.1 | 292.8–313.6 | 115.4 | 113.5–117.4 |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source*: AIHW Australian Cancer Database 2008.

## Table D2.4: Projected[(a)] breast cancer incidence, females, Australia, 2011 to 2020

| | Estimated number of new cases | | | Estimated age-standardised rate | | |
|---|---|---|---|---|---|---|
| Year | Cases | Lower 95% PI | Upper 95% PI | Rate | Lower 95% PI | Upper 95% PI |
| 2011 | 14,290 | 13,820 | 14,750 | 113.4 | 109.8 | 116.9 |
| 2012 | 14,610 | 14,130 | 15,100 | 113.4 | 109.7 | 117.0 |
| 2013 | 14,940 | 14,440 | 15,450 | 113.4 | 109.7 | 117.2 |
| 2014 | 15,270 | 14,740 | 15,800 | 113.5 | 109.7 | 117.3 |
| 2015 | 15,600 | 15,050 | 16,150 | 113.5 | 109.6 | 117.4 |
| 2016 | 15,930 | 15,360 | 16,510 | 113.6 | 109.6 | 117.5 |
| 2017 | 16,250 | 15,650 | 16,850 | 113.6 | 109.6 | 117.7 |
| 2018 | 16,570 | 15,950 | 17,200 | 113.7 | 109.5 | 117.8 |
| 2019 | 16,890 | 16,240 | 17,550 | 113.7 | 109.5 | 118.0 |
| 2020 | 17,210 | 16,530 | 17,890 | 113.8 | 109.5 | 118.1 |

(a) The projections are based on breast cancer incidence data for females for 1995 to 2007.

(b) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW 2012a.

### Table D2.5: Incidence of breast cancer, by histology group and type[(a)], Australia, females, 2008

| Type of breast cancer (ICD-O-3 codes) | Number of cases | Percentage of total breast cancers |
|---|---|---|
| **Group 1: Invasive ductal carcinoma** | **10,527** | **77.6** |
| Infiltrating duct carcinoma, not otherwise specified (8500) | 9,947 | 73.3 |
| Infiltrating duct and lobular carcinoma (8522) | 342 | 2.5 |
| Infiltrating duct mixed with other types of carcinoma (8523) | 140 | 1.0 |
| Paget disease and intraductal carcinoma of breast (8543) | 48 | 0.4 |
| Paget disease and infiltrating duct carcinoma of breast (8541) | 45 | 0.3 |
| Infiltrating ductular carcinoma (8521) | 5 | 0.0 |
| Carcinoma simplex (8231)[(b)] | 0 | 0.0 |
| **Group 2: Invasive lobular carcinoma** | **1,457** | **10.7** |
| Lobular carcinoma, not otherwise specified (8520) | 1,435 | 10.6 |
| Infiltrating lobular mixed with other types of carcinoma (8524) | 22 | 0.2 |
| **Group 3: Medullary carcinoma and atypical medullary carcinoma** | **68** | **0.5** |
| Medullary carcinoma, not otherwise specified (8510) | 43 | 0.3 |
| Atypical medullary carcinoma (8513) | 25 | 0.2 |
| Medullary carcinoma with lymphoid stroma (8512) | 0 | 0.0 |
| **Group 4: Tubular carcinoma and invasive cribriform carcinoma** | **215** | **1.6** |
| Tubular adenocarcinoma (8211) | 192 | 1.4 |
| Cribriform carcinoma, not otherwise specified (8201) | 23 | 0.2 |
| **Group 5: Mucinous carcinoma** | **277** | **2.0** |
| Mucinous adenocarcinoma (8480) | 271 | 2.0 |
| Mucin-producing adenocarcinoma (8481) | 3 | 0.0 |
| Signet ring cell carcinoma (8490) AND Mucoepidermoid carcinoma (8430) | 3 | 0.0 |
| **Group 6: Invasive papillary carcinoma** | **81** | **0.6** |
| Intraductal papillary adenocarcinoma with invasion (8503) | 53 | 0.4 |
| Papillary adenocarcinoma, not otherwise specified (8260) | 14 | 0.1 |
| Papillary carcinoma, not otherwise specified (8050) | 14 | 0.1 |
| Papillary cystadenocarcinoma, not otherwise specified (8450) | 0 | 0.0 |
| **Group 7: Inflammatory carcinoma** | **15** | **0.1** |
| Inflammatory carcinoma (8530) | 15 | 0.1 |
| **Group 8: Other—specified** | **304** | **2.2** |
| Adenocarcinoma, not otherwise specified (8140) | 79 | 0.6 |
| Metaplastic carcinoma, not otherwise specified (8575) | 51 | 0.4 |
| Phyllodes tumour, malignant (9020) | 22 | 0.2 |
| Paget disease, mammary (8540) | 16 | 0.1 |
| Intraductal micropapillary carcinoma, invasive (8507) | 43 | 0.3 |
| Intracystic carcinoma, not otherwise specified (8504) | 19 | 0.1 |
| Apocrine adenocarcinoma (8401) | 26 | 0.2 |
| Neuroendocrine carcinoma, not otherwise specified (8246) | 4 | 0.0 |
| Other[(c)] | 44 | 0.3 |

*(continued)*

## Table D2.5 (continued): Incidence of breast cancer by histology group and type[(a)], females, Australia, 2008

| Type of breast cancer (ICD-O-3 codes) | Number of cases | Percentage of total breast cancers |
|---|---|---|
| **Group 9: Unspecified** | **623** | **4.6** |
| Carcinoma, not otherwise specified (8010) | 439 | 3.2 |
| Neoplasm, malignant (8000) | 183 | 1.3 |
| Tumour cells, malignant (8001) | 1 | 0.0 |
| **Total** | **13,567** | **100.0** |

(a) For the purpose of this study, breast cancer histology types have been categorised by National Breast and Ovarian Cancer Centre (NBOCC) as shown in this table. The relevant ICD-O-3 histology codes are indicated. All cases were coded by cancer registries as primary site breast cancers. A number of the histology types shown are no longer in general use but were employed in cancer registration in earlier years. All were used by the registries for invasive cancer.

(b) About 100 breast cancer cases were assigned this code each year in the early 1980s, but it has been infrequently assigned since the mid-1980s.

(c) Includes all other specified histology types that are not included elsewhere.

*Source:* AIHW Australian Cancer Database 2008.

## Table D2.6: Incidence of breast cancer, by remoteness area[(a)], females, Australia, 2004–2008

| Remoteness area[(a)] | Number of cases | Age-standardised rate[(b)] | 95% confidence interval |
|---|---|---|---|
| Major cities | 43,146 | 113.9 | 112.8–115.0 |
| Inner regional | 13,383 | 111.5 | 109.6–113.4 |
| Outer regional | 5,672 | 105.8 | 103.0–108.6 |
| Remote and very remote | 957 | 94.1 | 88.1–100.3 |
| Not stated | 165 | . . | . . |
| **Total** | **63,322** | **112.6** | **111.7–113.5** |

(a) Measured using the Australian Standard Geographical Classification Remoteness Area classification (See Appendix A).

(b) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW Australian Cancer Database 2008.

## Table D2.7: Incidence of breast cancer, by socioeconomic status[a], females, Australia, 2004–2008

| Socioeconomic status[a] | Number of cases | Age-standardised rate[b] | 95% confidence interval |
|---|---|---|---|
| 1 (lowest) | 11,851 | 103.3 | 101.5–105.2 |
| 2 | 12,699 | 110.0 | 108.1–112.0 |
| 3 | 12,487 | 111.7 | 109.7–113.7 |
| 4 | 12,394 | 114.7 | 112.6–116.7 |
| 5 (highest) | 13,722 | 121.8 | 119.7–123.8 |
| Not stated | 169 | . . | . . |
| **Total** | **63,322** | **112.6** | **111.7–113.5** |

(a) Measured using the ABS Socio-Economic Index for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix A).

(b) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW Australian Cancer Database 2008.

## Table D2.8: Incidence of breast cancer, by Aboriginal and Torres Strait Islander status, females, New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, 2004–2008

| Indigenous status | Number of cases | Age-standardised rate[a] | 95% confidence interval |
|---|---|---|---|
| Indigenous | 432 | 81.2 | 72.9–90.1 |
| Non-Indigenous | 35,663 | 103.1 | 102.0–104.2 |
| Not stated | 3,552 | . . | . . |
| **Total** | **39,647** | **112.6** | **111.5–113.7** |

(a) Age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Note:* Some states and territories use an imputation method for determining Aboriginal and Torres Strait Islander cancers, which may lead to differences between these data and those shown in jurisdictional cancer incidence reports.

*Source:* AIHW Australian Cancer Database 2008.

## Table D2.9: Incidence of breast cancer, by country/region of birth[(a)], females, Australia, 2004–2008

| Country/region of birth[(a)] | Number of cases | Age-standardised rate[(b)] | 95% confidence interval |
|---|---|---|---|
| Australia | 40,922 | 108.8 | 107.8–109.8 |
| New Zealand (NZ) | 1,252 | 108.7 | 102.5–115.2 |
| Oceania and Antarctica excl. Australia and NZ | 394 | 118.3 | 106.5–131.1 |
| United Kingdom (UK) and Ireland | 5,981 | 111.0 | 105.9–116.1 |
| North-West Europe, excl. UK and Ireland | 1,598 | 104.9 | 95.0–115.2 |
| Southern and Eastern Europe | 3,572 | 83.4 | 77.9–89.0 |
| North Africa and the Middle East | 824 | 100.6 | 92.5–109.1 |
| South-East Asia | 1,547 | 76.5 | 72.3–80.9 |
| North-East Asia | 879 | 71.2 | 66.8–75.8 |
| Southern and Central Asia | 598 | 83.7 | 77.3–90.5 |
| Sub-Saharan Africa | 573 | 106.6 | 98.1–115.6 |
| United States of America (USA) and Canada | 324 | 119.8 | 107.4–133.3 |
| Americas, excl. USA and Canada | 324 | 107.7 | 94.1–122.6 |
| Inadequately described, not stated or unknown | 4,534 | . . | . . |
| **Total** | **63,322** | **112.7** | **111.8–113.7** |

(a) Country of birth is classified according to the Standard Australian Classification of Countries, 2nd edition (see Appendix A).

(b) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW Australian Cancer Database 2008.

## Table D2.10: Incidence of ductal carcinoma in situ, females, Australia, 1997 to 2008

| Year | Number of cases | Age-standardised rate[(a)] | 95% confidence interval |
|---|---|---|---|
| 1997 | 998 | 11.1 | 10.5–11.8 |
| 1998 | 1,125 | 12.2 | 11.5–12.9 |
| 1999 | 1,135 | 12.1 | 11.4–12.8 |
| 2000 | 1,276 | 13.2 | 12.5–13.9 |
| 2001 | 1,410 | 14.2 | 13.5–15.0 |
| 2002 | 1,361 | 13.4 | 12.7–14.1 |
| 2003 | 1,412 | 13.5 | 12.8–14.2 |
| 2004 | 1,513 | 14.2 | 13.5–14.9 |
| 2005 | 1,516 | 13.9 | 13.2–14.6 |
| 2006 | 1,488 | 13.3 | 12.7–14.0 |
| 2007 | 1,581 | 13.8 | 13.2–14.5 |
| 2008 | 1,724 | 14.7 | 14.0–15.4 |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW analyses of data supplied by state/territory cancer registries.

**Table D2.11: Incidence of ductal carcinoma in situ, by age at diagnosis, females, Australia, 1997 to 2008**

| | <50 | | 50–69 | | 70+ | | All ages | |
|---|---|---|---|---|---|---|---|---|
| Year | ASR[(a)] | 95% CI | ASR[(a)] | 95% CI | ASR[(a)] | 95% CI | ASR[(a)] | 95% CI |
| 1997 | 4.2 | 3.7–4.8 | 33.3 | 30.6–36.2 | 17.7 | 15.1–20.7 | 11.1 | 10.5–11.8 |
| 1998 | 4.0 | 3.5–4.5 | 37.0 | 34.2–40.0 | 23.2 | 20.2–26.5 | 12.2 | 11.5–12.9 |
| 1999 | 4.0 | 3.5–4.5 | 38.1 | 35.3–41.1 | 19.5 | 16.8–22.5 | 12.1 | 11.4–12.8 |
| 2000 | 4.2 | 3.7–4.7 | 40.8 | 38.0–43.9 | 24.0 | 21.1–27.3 | 13.2 | 12.5–13.9 |
| 2001 | 4.3 | 3.9–4.9 | 45.7 | 42.7–48.9 | 23.6 | 20.7–26.8 | 14.2 | 13.5–15.0 |
| 2002 | 4.3 | 3.9–4.8 | 42.5 | 39.6–45.5 | 21.6 | 18.9–24.7 | 13.4 | 12.7–14.1 |
| 2003 | 4.1 | 3.6–4.6 | 42.1 | 39.3–45.0 | 25.9 | 22.9–29.1 | 13.5 | 12.8–14.2 |
| 2004 | 4.5 | 4.0–5.0 | 44.4 | 41.6–47.3 | 24.7 | 21.8–27.9 | 14.2 | 13.5–14.9 |
| 2005 | 4.4 | 3.9–4.9 | 43.3 | 40.6–46.2 | 24.7 | 21.8–27.9 | 13.9 | 13.2–14.6 |
| 2006 | 4.3 | 3.8–4.8 | 43.1 | 40.4–45.9 | 20.2 | 17.6–23.1 | 13.3 | 12.7–14.0 |
| 2007 | 4.6 | 4.1–5.1 | 43.4 | 40.8–46.2 | 22.7 | 20.0–25.7 | 13.8 | 13.2–14.5 |
| 2008 | 4.9 | 4.4–5.4 | 47.1 | 44.4–50.0 | 21.9 | 19.3–24.9 | 14.7 | 14.0–15.4 |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW analyses of data supplied by state/territory cancer registries.

## Table D2.12: International comparison of estimated incidence of breast cancer, females, 2008[(a)]

| Region or country | Estimated number of cases | Age-standardised rate[(b)] | 95% confidence interval[(c)] |
|---|---:|---:|---:|
| Western Europe | 148,940 | 89.7 | 89.2–90.2 |
| New Zealand | 2,734 | 89.4 | 86.0–92.8 |
| Northern Europe | 70,515 | 85.0 | 84.4–85.6 |
| **Australia** | **13,384** | **84.8** | **83.4–86.2** |
| Northern America | 205,515 | 76.7 | 76.4–77.0 |
| Southern Europe | 91,118 | 68.9 | 68.5–69.3 |
| Polynesia | 167 | 59.1 | 50.1–68.1 |
| Micronesia | 132 | 57.0 | 47.3–66.7 |
| Central and Eastern Europe | 114,574 | 45.4 | 45.1–45.7 |
| South America | 88,400 | 44.3 | 44.0–44.6 |
| Caribbean | 8,996 | 39.1 | 38.3–39.9 |
| **World** | **1,384,155** | **38.9** | **38.8–39.0** |
| Southern Africa | 9,012 | 38.1 | 37.3–38.9 |
| Western Asia | 28,694 | 32.7 | 32.3–33.1 |
| Northern Africa | 27,993 | 32.7 | 32.3–33.1 |
| Western Africa | 29,436 | 31.8 | 31.4–32.2 |
| Eastern Asia | 240,318 | 31.5 | 31.4–31.6 |
| South-Eastern Asia | 86,940 | 31.0 | 30.8–31.2 |
| Central America | 17,502 | 26.0 | 25.6–26.4 |
| South-Central Asia | 172,975 | 24.1 | 24.0–24.2 |
| Melanesia | 637 | 22.8 | 21.0–24.6 |
| Middle Africa | 8,276 | 21.3 | 20.8–21.8 |
| Eastern Africa | 17,896 | 19.3 | 19.0–19.6 |

(a) The data were estimated for 2008 and are based on data from approximately 3 to 5 years earlier.

(b) The rates were standardised by the IARC using the Doll et al. (1966) World Standard Population and expressed per 100,000 females.

(c) The confidence intervals are approximations and were calculated by the AIHW (see Appendix B).

*Source*: Ferlay et al. 2010.

## Table D2.13: Incidence of breast cancer, by type of breast cancer[(a)], males, Australia, 2004–2008

| Type of breast cancer | Number of cases[(b)] | Percentage of total breast cancers |
|---|---|---|
| Invasive ductal carcinoma | 441 | 84.6 |
| *Infiltrating duct carcinoma, not otherwise specified* | *420* | *80.6* |
| Invasive lobular carcinoma | 7 | 1.3 |
| Medullary carcinoma and atypical medullary carcinoma | 0 | 0.0 |
| Tubular carcinoma and invasive cribriform carcinoma | 3 | 0.6 |
| Mucinous carcinoma | 6 | 1.2 |
| Invasive papillary carcinoma | 19 | 3.7 |
| Inflammatory carcinoma | 0 | 0.0 |
| Other–specified | 25 | 4.8 |
| Unspecified | 20 | 3.8 |
| **Total** | **521** | **100.0** |

(a) Appendix Table D2.5 provides a list of the histology types included in each group.

(b) Numbers may not sum to the total due to rounding.

*Source:* AIHW Australian Cancer Database 2008.

# Additional tables for Chapter 3: Mortality from breast cancer

**Table D3.1: Mortality from breast cancer and all cancers, by age at death, females, Australia, 2007**

| | Breast cancer | | | All cancers | | |
|---|---|---|---|---|---|---|
| **Age group (years)** | **Number of deaths** | **Age-specific rate[(a)]** | **95% confidence interval** | **Number of deaths** | **Age-specific rate[(a)]** | **95% confidence interval** |
| <20 | 0 | 0.0 | 0.0–0.1 | 64 | 2.4 | 1.8–3.0 |
| 20–24 | 0 | 0.0 | 0.0–0.4 | 27 | 3.7 | 2.4–5.3 |
| 25–29 | 7 | 1.0 | 0.4–2.0 | 49 | 6.8 | 5.0–9.0 |
| 30–34 | 13 | 1.8 | 0.9–3.0 | 82 | 11.1 | 8.8–13.8 |
| 35–39 | 69 | 8.7 | 6.8–11.0 | 184 | 23.3 | 20.0–26.9 |
| 40–44 | 98 | 12.8 | 10.4–15.6 | 314 | 41.0 | 36.6–45.8 |
| 45–49 | 155 | 20.1 | 17.1–23.6 | 551 | 71.6 | 65.7–77.8 |
| 50–54 | 221 | 31.6 | 27.6–36.1 | 823 | 117.8 | 109.9–126.1 |
| 55–59 | 285 | 44.8 | 39.7–50.3 | 1,173 | 184.2 | 173.8–195.0 |
| 60–64 | 296 | 55.7 | 49.5–62.4 | 1,575 | 296.3 | 281.9–311.3 |
| 65–69 | 281 | 68.9 | 61.1–77.4 | 1,708 | 418.7 | 399.1–439.0 |
| 70–74 | 254 | 75.8 | 66.8–85.7 | 2,003 | 597.6 | 571.7–624.4 |
| 75–79 | 262 | 87.7 | 77.4–99.0 | 2,453 | 820.9 | 788.7–854.0 |
| 80–84 | 327 | 134.7 | 120.5–150.1 | 2,786 | 1147.5 | 1,105.3–1,191.0 |
| 85+ | 412 | 179.8 | 162.9–198.1 | 3,530 | 1540.9 | 1,490.5–1,592.6 |
| **Total[(b)]** | **2,680** | **22.1** | **21.2–22.9** | **17,322** | **139.1** | **137.0–141.2** |

(a) Number of deaths per 100,000 females.

(b) The rates shown in this row are age-standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW National Mortality Database.

Table D3.2: Mortality from breast cancer, by year of death registration[(a)], females, Australia, 1907 to 2007

| Year | ASR[(b)] | Year | ASR[(b)] | Year | ASR[(b)] |
|---|---|---|---|---|---|
| 1907 | 21.8 | 1941 | 34.3 | 1975 | 29.2 |
| 1908 | 22.3 | 1942 | 32.0 | 1976 | 30.3 |
| 1909 | 20.4 | 1943 | 35.0 | 1977 | 30.0 |
| 1910 | 22.1 | 1944 | 31.5 | 1978 | 28.0 |
| 1911 | 21.8 | 1945 | 32.0 | 1979 | 28.7 |
| 1912 | 26.0 | 1946 | 32.5 | 1980 | 28.8 |
| 1913 | 23.0 | 1947 | 33.1 | 1981 | 29.5 |
| 1914 | 22.6 | 1948 | 33.1 | 1982 | 30.4 |
| 1915 | 20.4 | 1949 | 31.9 | 1983 | 30.1 |
| 1916 | 24.4 | 1950 | 30.5 | 1984 | 30.4 |
| 1917 | 22.1 | 1951 | 29.2 | 1985 | 31.3 |
| 1918 | 22.1 | 1952 | 32.6 | 1986 | 30.8 |
| 1919 | 23.9 | 1953 | 31.9 | 1987 | 30.6 |
| 1920 | 22.2 | 1954 | 31.8 | 1988 | 31.1 |
| 1921 | 24.7 | 1955 | 31.2 | 1989 | 31.4 |
| 1922 | 27.8 | 1956 | 30.4 | 1990 | 31.0 |
| 1923 | 27.4 | 1957 | 29.0 | 1991 | 31.1 |
| 1924 | 26.3 | 1958 | 28.8 | 1992 | 29.4 |
| 1925 | 28.0 | 1959 | 30.5 | 1993 | 31.1 |
| 1926 | 26.2 | 1960 | 28.8 | 1994 | 30.6 |
| 1927 | 29.2 | 1961 | 30.7 | 1995 | 29.5 |
| 1928 | 29.7 | 1962 | 27.8 | 1996 | 28.7 |
| 1929 | 28.3 | 1963 | 29.9 | 1997 | 27.8 |
| 1930 | 26.4 | 1964 | 30.9 | 1998 | 26.5 |
| 1931 | 29.6 | 1965 | 28.3 | 1999 | 25.4 |
| 1932 | 29.3 | 1966 | 28.9 | 2000 | 24.7 |
| 1933 | 28.8 | 1967 | 30.2 | 2001 | 24.7 |
| 1934 | 30.9 | 1968 | 29.8 | 2002 | 25.2 |
| 1935 | 30.7 | 1969 | 29.7 | 2003 | 24.7 |
| 1936 | 32.4 | 1970 | 29.7 | 2004 | 23.5 |
| 1937 | 29.3 | 1971 | 31.0 | 2005 | 23.7 |
| 1938 | 32.6 | 1972 | 29.0 | 2006 | 22.1 |
| 1939 | 30.8 | 1973 | 29.8 | 2007 | 22.1 |
| 1940 | 31.3 | 1974 | 30.0 | | |

(a) These data are based on year of registration of death rather than year of death.

(b) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW National General Record of Incidence and Mortality, 2007.

## Table D3.3: Mortality from breast cancer, females, Australia, 1982 to 2007

| Year | Number of deaths | Percentage of all cancer deaths in females | Percentage of all deaths in females | Age-standardised rate[(a)] | 95% confidence interval |
|---|---|---|---|---|---|
| 1982 | 1,987 | 18.5 | 3.9 | 30.4 | 29.0–31.7 |
| 1983 | 2,040 | 18.2 | 4.1 | 30.2 | 28.9–31.6 |
| 1984 | 2,166 | 18.6 | 4.2 | 31.6 | 30.3–33.0 |
| 1985 | 2,197 | 18.5 | 4.1 | 31.2 | 29.8–32.5 |
| 1986 | 2,166 | 17.9 | 4.1 | 29.9 | 28.7–31.2 |
| 1987 | 2,293 | 18.4 | 4.2 | 31.1 | 29.9–32.5 |
| 1988 | 2,361 | 18.6 | 4.3 | 31.2 | 30.0–32.5 |
| 1989 | 2,449 | 18.7 | 4.2 | 31.6 | 30.4–32.9 |
| 1990 | 2,422 | 18.4 | 4.4 | 30.6 | 29.4–31.9 |
| 1991 | 2,526 | 18.3 | 4.6 | 31.3 | 30.0–32.5 |
| 1992 | 2,429 | 17.6 | 4.2 | 29.3 | 28.2–30.5 |
| 1993 | 2,611 | 18.3 | 4.6 | 30.8 | 29.6–32.0 |
| 1994 | 2,669 | 18.3 | 4.5 | 30.8 | 29.6–32.0 |
| 1995 | 2,635 | 17.7 | 4.5 | 29.6 | 28.4–30.7 |
| 1996 | 2,620 | 17.2 | 4.3 | 28.7 | 27.6–29.8 |
| 1997 | 2,604 | 17.0 | 4.2 | 27.8 | 26.7–28.9 |
| 1998 | 2,541 | 16.6 | 4.2 | 26.4 | 25.3–27.4 |
| 1999 | 2,512 | 16.3 | 4.1 | 25.5 | 24.5–26.5 |
| 2000 | 2,521 | 16.0 | 4.1 | 24.7 | 23.8–25.7 |
| 2001 | 2,594 | 16.0 | 4.2 | 24.8 | 23.8–25.8 |
| 2002 | 2,681 | 16.1 | 4.2 | 25.0 | 24.0–26.0 |
| 2003 | 2,710 | 16.3 | 4.2 | 24.7 | 23.8–25.6 |
| 2004 | 2,665 | 15.8 | 4.2 | 23.7 | 22.8–24.7 |
| 2005 | 2,709 | 15.9 | 4.2 | 23.6 | 22.7–24.5 |
| 2006 | 2,625 | 15.3 | 4.0 | 22.2 | 21.4–23.1 |
| 2007 | 2,680 | 15.5 | 4.0 | 22.1 | 21.2–22.9 |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source*: AIHW National Mortality Database.

**Table D3.4: Mortality from breast cancer, by age at death, females, Australia, 1982 to 2007**

| | <50 | | 50–69 | | 70+ | | All ages | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **ASR(a)** | **95% CI** | **ASR(a)** | **95% CI** | **ASR(a)** | **95% CI** | **ASR(a)** | **95% CI** |
| 1982 | 7.6 | 6.8–8.5 | 66.9 | 62.6–71.4 | 130.2 | 120.9–140.0 | 30.4 | 29.0–31.7 |
| 1983 | 7.1 | 6.3–7.9 | 69.9 | 65.5–74.4 | 126.8 | 117.8–136.2 | 30.2 | 28.9–31.6 |
| 1984 | 8.0 | 7.2–8.9 | 69.2 | 64.8–73.7 | 136.6 | 127.5–146.2 | 31.6 | 30.3–33.0 |
| 1985 | 8.4 | 7.6–9.3 | 68.8 | 64.5–73.3 | 128.9 | 120.2–138.1 | 31.2 | 29.8–32.5 |
| 1986 | 7.7 | 6.9–8.5 | 66.6 | 62.4–71.0 | 125.6 | 117.2–134.5 | 29.9 | 28.7–31.2 |
| 1987 | 7.8 | 7.0–8.6 | 69.4 | 65.1–73.9 | 132.4 | 123.9–141.4 | 31.1 | 29.9–32.5 |
| 1988 | 7.3 | 6.6–8.1 | 69.6 | 65.4–74.1 | 136.3 | 127.7–145.3 | 31.2 | 30.0–32.5 |
| 1989 | 8.2 | 7.4–9.0 | 69.0 | 64.8–73.4 | 135.5 | 127.1–144.3 | 31.6 | 30.4–32.9 |
| 1990 | 7.5 | 6.8–8.3 | 68.7 | 64.5–73.0 | 130.5 | 122.4–139.1 | 30.6 | 29.4–31.9 |
| 1991 | 8.0 | 7.3–8.8 | 68.2 | 64.1–72.6 | 134.4 | 126.3–142.9 | 31.3 | 30.0–32.5 |
| 1992 | 7.9 | 7.2–8.6 | 61.2 | 57.3–65.3 | 129.4 | 121.6–137.6 | 29.3 | 28.2–30.5 |
| 1993 | 7.1 | 6.4–7.8 | 68.8 | 64.7–73.1 | 135.1 | 127.2–143.3 | 30.8 | 29.6–32.0 |
| 1994 | 7.6 | 6.9–8.3 | 66.7 | 62.7–70.9 | 135.5 | 127.7–143.6 | 30.8 | 29.6–32.0 |
| 1995 | 6.6 | 6.0–7.3 | 66.4 | 62.5–70.6 | 130.8 | 123.3–138.7 | 29.6 | 28.4–30.7 |
| 1996 | 7.2 | 6.5–7.8 | 62.6 | 58.8–66.6 | 124.8 | 117.5–132.3 | 28.7 | 27.6–29.8 |
| 1997 | 7.2 | 6.6–7.9 | 60.6 | 56.9–64.4 | 118.6 | 111.7–125.9 | 27.8 | 26.7–28.9 |
| 1998 | 6.4 | 5.8–7.0 | 56.6 | 53.1–60.3 | 118.1 | 111.3–125.2 | 26.4 | 25.3–27.4 |
| 1999 | 6.4 | 5.8–7.1 | 55.8 | 52.4–59.4 | 110.1 | 103.6–116.9 | 25.5 | 24.5–26.5 |
| 2000 | 5.9 | 5.4–6.5 | 51.7 | 48.5–55.1 | 114.7 | 108.1–121.5 | 24.7 | 23.8–25.7 |
| 2001 | 5.8 | 5.2–6.3 | 52.3 | 49.1–55.6 | 115.4 | 109.0–122.2 | 24.8 | 23.8–25.8 |
| 2002 | 5.3 | 4.8–5.9 | 56.5 | 53.2–59.9 | 111.9 | 105.6–118.5 | 25.0 | 24.0–26.0 |
| 2003 | 5.5 | 5.0–6.1 | 54.1 | 51.0–57.4 | 111.9 | 105.6–118.4 | 24.7 | 23.8–25.6 |
| 2004 | 5.3 | 4.8–5.9 | 51.8 | 48.8–55.0 | 108.1 | 102.0–114.5 | 23.7 | 22.8–24.7 |
| 2005 | 5.5 | 5.0–6.0 | 51.6 | 48.6–54.7 | 105.5 | 99.5–111.7 | 23.6 | 22.7–24.5 |
| 2006 | 4.5 | 4.1–5.0 | 47.4 | 44.6–50.4 | 106.9 | 100.9–113.2 | 22.2 | 21.4–23.1 |
| 2007 | 4.6 | 4.1–5.1 | 47.0 | 44.2–49.8 | 106.1 | 100.2–112.3 | 22.1 | 21.2–22.9 |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW National Mortality Database.

## Table D3.5: Projected number of deaths[(a)] and age-standardised rates with 95% prediction intervals, 2011–2020: breast cancer

| | Estimated number of deaths | | | Estimated age-standardised rate | | |
|---|---|---|---|---|---|---|
| | **Deaths** | **Lower 95% PI** | **Upper 95% PI** | **Rate** | **Lower 95% PI** | **Upper 95% PI** |
| 2011 | 2,690 | 2,580 | 2,790 | 20.0 | 19.2 | 20.7 |
| 2012 | 2,690 | 2,580 | 2,800 | 19.5 | 18.7 | 20.3 |
| 2013 | 2,700 | 2,580 | 2,820 | 19.1 | 18.3 | 19.9 |
| 2014 | 2,700 | 2,580 | 2,830 | 18.6 | 17.8 | 19.5 |
| 2015 | 2,710 | 2,580 | 2,840 | 18.2 | 17.4 | 19.1 |
| 2016 | 2,710 | 2,570 | 2,850 | 17.8 | 17.0 | 18.7 |
| 2017 | 2,720 | 2,570 | 2,870 | 17.4 | 16.5 | 18.3 |
| 2018 | 2,730 | 2,570 | 2,880 | 17.0 | 16.1 | 18.0 |
| 2019 | 2,730 | 2,570 | 2,890 | 16.7 | 15.7 | 17.6 |
| 2020 | 2,730 | 2,570 | 2,900 | 16.3 | 15.3 | 17.3 |

(a) Projected estimates are based on national cancer mortality data.

*Notes*

1. Breast cancer includes ICD-10 code C50.
2. Projected mortality estimates are based on mortality data for 1994 to 2007.
3. Counts are rounded to the nearest 10. For counts less than 1,000 estimates are rounded to the nearest 5.
4. Age-standardised rates are standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source*: AIHW National Mortality Database.

## Table D3.6: Mortality from breast cancer, by remoteness area[(a)], females, Australia, 2003–2007

| Remoteness area[(a)] | Number of deaths | Age-standardised rate[(b)] | 95% confidence interval |
|---|---|---|---|
| Major cities | 8,798 | 22.5 | 22.1-23.0 |
| Inner regional | 3,049 | 24.7 | 23.9-25.6 |
| Outer regional | 1,325 | 24.7 | 23.4-26.1 |
| Remote and very remote | 199 | 22.7 | 19.6-26.2 |
| **Total** | **13,389** | **23.2** | **22.8-23.6** |

(a) Measured using the Australian Standard Geographical Classification Remoteness Area classification (see Appendix A).

(b) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW National Mortality Database.

### Table D3.7: Mortality from breast cancer, by socioeconomic status[(a)], females, Australia, 2003–2007

| Socioeconomic status[(a)] | Number of deaths | Age-standardised rate[(b)] | 95% confidence interval |
|---|---|---|---|
| 1 (lowest) | 2,521 | 21.8 | 21.0-22.7 |
| 2 | 3,058 | 25.3 | 24.4-26.2 |
| 3 | 2,534 | 22.6 | 21.8-23.5 |
| 4 | 2,377 | 21.8 | 20.9-22.7 |
| 5 (highest) | 2,848 | 24.0 | 23.1-24.9 |
| **Total** | **13,389** | **23.2** | **22.8-23.6** |

(a) Measured using the ABS Socio-Economic Index for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix A).

(b) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW National Mortality Database.

### Table D3.8: Mortality from breast cancer, by Aboriginal and Torres Strait Islander status, females, New South Wales, Queensland, South Australia and the Northern Territory, 2003–2007

| Indigenous status | Number of deaths | Age-standardised rate[(a)] | 95% confidence interval |
|---|---|---|---|
| Indigenous | 89 | 21.3 | 16.6–26.8 |
| Non-Indigenous | 8,049 | 22.9 | 22.4–23.5 |
| Not stated | 80 | | |
| **Total** | **8,218** | **23.2** | **22.7–23.7** |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW National Mortality Database.

### Table D3.9: Mortality from breast cancer, by country/region of birth[a], females, Australia, 2003–2007

| Country/region of birth[a] | Number of deaths | Age-standardised rate[b] | 95% confidence interval |
|---|---|---|---|
| Australia | 9,345 | 24.2 | 23.7–24.7 |
| New Zealand (NZ) | 206 | 21.4 | 18.3–24.8 |
| Oceania and Antarctica, excl. Australia and NZ | 68 | 23.3 | 17.3–30.5 |
| United Kingdom (UK) and Ireland | 1,514 | 26.2 | 24.8–27.6 |
| North-West Europe, excl. UK and Ireland | 414 | 24.2 | 21.7–26.9 |
| Southern and Eastern Europe | 972 | 20.2 | 18.8–21.6 |
| North Africa and the Middle East | 156 | 21.3 | 18.0–24.9 |
| South-East Asia | 252 | 15.4 | 13.3–17.7 |
| North-East Asia | 115 | 11.6 | 9.5–14.1 |
| Southern and Central Asia | 105 | 16.4 | 13.4–19.9 |
| Sub-Saharan Africa | 95 | 21.6 | 17.3–26.6 |
| United States of America (USA) and Canada | 65 | 31.1 | 23.4–40.4 |
| Americas, excl. USA and Canada | 51 | 18.4 | 13.4–24.6 |
| Inadequately described, not stated or unknown | 31 | . . | . . |
| **Total** | **13,389** | **23.5** | **23.1–23.9** |

(a) Country of birth is classified according to the Standard Australian Classification of Countries, 2nd edition (see Appendix A).

(b) Standardised to the Australian population as at 30 June 2001 and expressed per 100,000 females.

*Source:* AIHW National Mortality Database.

## Table D3.10: International comparison of estimated mortality from breast cancer, females, 2008[(a)]

| Region or country | Estimated number of cases | Age-standardised rate[(b)] | 95% confidence interval[(c)] |
|---|---|---|---|
| Southern Africa | 4,465 | 19.3 | 18.7–19.9 |
| New Zealand | 650 | 19.0 | 17.5–20.5 |
| Western Africa | 16,342 | 18.9 | 18.6–19.2 |
| Northern Europe | 18,420 | 17.9 | 17.6–18.2 |
| Northern Africa | 14,564 | 17.8 | 17.5–18.1 |
| Western Europe | 37,458 | 17.5 | 17.3–17.7 |
| Central and Eastern Europe | 47,149 | 16.7 | 16.5–16.9 |
| Southern Europe | 25,710 | 15.3 | 15.1–15.5 |
| Northern America | 45,563 | 14.8 | 14.7–14.9 |
| **Australia** | **2,709** | **14.7** | **14.1–15.3** |
| Polynesia | 40 | 14.6 | 10.1–19.1 |
| Western Asia | 12,342 | 14.4 | 14.1–14.7 |
| Caribbean | 3,402 | 14.2 | 13.7–14.7 |
| South-Eastern Asia | 36,775 | 13.4 | 13.3–13.5 |
| South America | 27,060 | 13.2 | 13.0–13.4 |
| Melanesia | 337 | 13.2 | 11.8–14.6 |
| Middle Africa | 4,664 | 13.1 | 12.7–13.5 |
| **World** | **458,503** | **12.4** | **12.4–12.4** |
| South-Central Asia | 82,638 | 12.0 | 11.9–12.1 |
| Micronesia | 27 | 11.5 | 7.2–15.8 |
| Eastern Africa | 9,956 | 11.4 | 11.2–11.6 |
| Central America | 6,490 | 9.6 | 9.4–9.8 |
| Eastern Asia | 61,742 | 6.3 | 6.3–6.3 |

(a) The data were estimated for 2008 and are based on data from approximately 3 to 5 years earlier.

(b) Standardised and expressed per 100,000 females.

(c) The confidence intervals are approximations and were calculated by AIHW (see Appendix B).

*Source:* Ferlay et al. 2010.

# Additional tables for Chapter 4: Survival after a diagnosis of breast cancer

**Table D4.1: Relative survival (RS) from breast cancer, by age at diagnosis, females, Australia, 2006–2010**

| Age at diagnosis (years) | 1-year relative survival | | 5-year relative survival | | 10-year relative survival | |
|---|---|---|---|---|---|---|
| | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** |
| <30 | 99.6 | 96.9–100.0 | 87.6 | 83.3–90.9 | 76.6 | 71.3–81.1 |
| 30–39 | 98.6 | 98.0–99.0 | 86.9 | 85.6–88.0 | 77.3 | 75.8–78.8 |
| 40–49 | 99.2 | 99.0–99.4 | 91.9 | 91.3–92.4 | 84.8 | 84.1–85.5 |
| 50–59 | 98.8 | 98.6–99.0 | 91.4 | 90.9–91.9 | 85.7 | 85.1–86.3 |
| 60–69 | 98.6 | 98.3–98.8 | 92.6 | 92.0–93.1 | 87.4 | 86.6–88.2 |
| 70–79 | 96.3 | 95.8–96.9 | 86.2 | 85.2–87.2 | 79.4 | 77.9–80.8 |
| 80+ | 92.0 | 90.8–93.1 | 75.4 | 73.3–77.4 | 69.0 | 65.3–72.7 |
| **All ages** | **97.8** | **97.6–98.0** | **89.4** | **89.0–89.7** | **83.0** | **82.6–83.5** |

*Source:* AIHW Australian Cancer Database 2008.

## Table D4.2: Relative survival (RS) from breast cancer, by time period, females, Australia, 1982–1987 to 2006–2010

| Years after diagnosis | 1982–1987 | | 1988–1993 | | 1994–1999 | | 2000–2005 | | 2006–2010 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI |
| 1 | 93.7 | 93.4–94.0 | 95.6 | 95.3–95.8 | 96.6 | 96.4–96.8 | 97.3 | 97.2–97.5 | 97.8 | 97.6–98.0 |
| 2 | 86.9 | 86.4–87.3 | 90.4 | 90.1–90.7 | 93.0 | 92.7–93.2 | 94.6 | 94.4–94.8 | 95.7 | 95.4–95.9 |
| 3 | 80.5 | 79.9–81.1 | 85.1 | 84.7–85.5 | 89.2 | 88.8–89.5 | 92.0 | 91.7–92.2 | 93.4 | 93.1–93.6 |
| 4 | 75.4 | 74.7–76.1 | 80.7 | 80.2–81.1 | 85.9 | 85.6–86.3 | 89.7 | 89.4–89.9 | 91.3 | 91.0–91.6 |
| 5 | 72.0 | 71.1–72.8 | 76.7 | 76.2–77.2 | 83.1 | 82.7–83.5 | 87.4 | 87.1–87.8 | 89.4 | 89.0–89.7 |
| 6 | 68.0 | 66.7–69.2 | 73.3 | 72.8–73.8 | 80.6 | 80.1–81.0 | 85.4 | 85.0–85.7 | 87.8 | 87.4–88.1 |
| 7 | . . | . . | 70.5 | 69.9–71.1 | 78.4 | 77.9–78.8 | 83.7 | 83.3–84.1 | 86.4 | 86.0–86.8 |
| 8 | . . | . . | 67.9 | 67.3–68.5 | 76.2 | 75.7–76.7 | 82.2 | 81.8–82.6 | 85.2 | 84.8–85.6 |
| 9 | . . | . . | 65.6 | 64.9–66.3 | 74.2 | 73.7–74.7 | 80.7 | 80.3–81.1 | 84.0 | 83.6–84.4 |
| 10 | . . | . . | 64.1 | 63.3–64.8 | 72.3 | 71.8–72.9 | 79.4 | 78.9–79.8 | 83.0 | 82.6–83.5 |
| 11 | . . | . . | 62.3 | 61.4–63.2 | 70.7 | 70.1–71.2 | 78.3 | 77.8–78.7 | 82.0 | 81.5–82.4 |
| 12 | . . | . . | 60.8 | 59.6–61.9 | 69.2 | 68.6–69.8 | 77.0 | 76.5–77.5 | 81.0 | 80.5–81.5 |
| 13 | . . | . . | . . | . . | 68.0 | 67.4–68.7 | 75.7 | 75.1–76.2 | 79.9 | 79.4–80.4 |
| 14 | . . | . . | . . | . . | 66.9 | 66.2–67.6 | 74.5 | 73.9–75.0 | 78.9 | 78.4–79.5 |
| 15 | . . | . . | . . | . . | 65.8 | 65.0–66.5 | 73.3 | 72.7–73.9 | 78.1 | 77.5–78.6 |
| 16 | . . | . . | . . | . . | 64.9 | 64.1–65.8 | 72.3 | 71.7–72.9 | 77.3 | 76.7–77.9 |
| 17 | . . | . . | . . | . . | 64.0 | 63.0–65.0 | 71.3 | 70.6–72.0 | 76.4 | 75.8–77.0 |
| 18 | . . | . . | . . | . . | 63.1 | 61.8–64.4 | 70.5 | 69.8–71.2 | 75.7 | 75.0–76.4 |
| 19 | . . | . . | . . | . . | . . | . . | 69.9 | 69.1–70.6 | 74.9 | 74.2–75.6 |
| 20 | . . | . . | . . | . . | . . | . . | 69.4 | 68.6–70.2 | 74.2 | 73.5–75.0 |
| 21 | . . | . . | . . | . . | . . | . . | 68.9 | 68.1–69.8 | 73.6 | 72.8–74.3 |

*(continued)*

### Table D4.2 (continued): Relative survival (RS) from breast cancer, by time period, females, Australia, 1982–1987 to 2006–2010

| Years after diagnosis | 1982–1987 | | 1988–1993 | | 1994–1999 | | 2000–2005 | | 2006–2010 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** |
| 22 | . . | . . | . . | . . | . . | . . | 68.2 | 67.3–69.2 | 72.9 | 72.1–73.8 |
| 23 | . . | . . | . . | . . | . . | . . | 67.8 | 66.7–69.0 | 72.5 | 71.6–73.4 |
| 24 | . . | . . | . . | . . | . . | . . | 67.6 | 66.0–69.1 | 72.0 | 71.0–72.9 |
| 25 | . . | . . | . . | . . | . . | . . | . . | . . | 72.0 | 71.0–73.0 |
| 26 | . . | . . | . . | . . | . . | . . | . . | . . | 72.1 | 71.0–73.2 |
| 27 | . . | . . | . . | . . | . . | . . | . . | . . | 72.4 | 71.1–73.6 |
| 28 | . . | . . | . . | . . | . . | . . | . . | . . | 72.2 | 70.8–73.7 |
| 29 | . . | . . | . . | . . | . . | . . | . . | . . | 71.6 | 69.5–73.6 |

*Source:* AIHW Australian Cancer Database 2008.

**Table D4.3: Five-year relative survival (RS) from breast cancer, by age at diagnosis, females, Australia, 1982–1987 to 2006–2010**

| Age at diagnosis (years) | 1982–1987 | | 1988–1993 | | 1994–1999 | | 2000–2005 | | 2006–2010 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** |
| <30 | 71.8 | 63.9–78.2 | 71.8 | 66.6–76.3 | 72.3 | 67.5–76.6 | 81.7 | 77.3–85.4 | 87.6 | 83.3–90.9 |
| 30–39 | 71.8 | 69.2–74.2 | 76.0 | 74.5–77.5 | 79.7 | 78.3–81.0 | 83.9 | 82.7–85.0 | 86.9 | 85.6–88.0 |
| 40–49 | 76.6 | 74.9–78.1 | 79.8 | 78.9–80.7 | 85.3 | 84.6–86.0 | 89.2 | 88.6–89.7 | 91.9 | 91.3–92.4 |
| 50–59 | 70.2 | 68.6–71.8 | 76.7 | 75.7–77.6 | 85.4 | 84.7–86.1 | 89.8 | 89.4–90.3 | 91.4 | 90.9–91.9 |
| 60–69 | 72.1 | 70.4–73.7 | 78.8 | 77.8–79.7 | 85.6 | 84.8–86.3 | 90.2 | 89.6–90.8 | 92.6 | 92.0–93.1 |
| 70–79 | 71.1 | 68.8–73.4 | 75.1 | 73.7–76.4 | 82.4 | 81.4–83.5 | 85.1 | 84.2–86.1 | 86.2 | 85.2–87.2 |
| 80+ | 67.8 | 62.9–72.8 | 67.5 | 64.8–70.3 | 70.0 | 67.8–72.3 | 75.7 | 73.6–77.7 | 75.4 | 73.3–77.4 |
| **All ages** | **72.0** | **71.1–72.8** | **76.7** | **76.2–77.2** | **83.1** | **82.7–83.5** | **87.4** | **87.1–87.8** | **89.4** | **89.0–89.7** |

*Source*: AIHW Australian Cancer Database 2008.

## Table D4.4: Five-year relative survival (RS) from breast cancer, by histological type[(a)] and age at diagnosis, females, Australia, 1982–2010

| | <50 | | 50–59 | | 60–69 | | 70+ | | All ages | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Type of breast cancer[(a)]** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** | **RS (%)** | **95% CI** |
| Invasive ductal carcinoma | 84.8 | 84.5–85.2 | 86.6 | 86.3–87.0 | 87.5 | 87.1–87.9 | 83.4 | 82.8–84.0 | 85.6 | 85.4–85.8 |
| Invasive lobular carcinoma | 89.8 | 88.9–90.7 | 90.6 | 89.8–91.5 | 91.2 | 90.3–92.1 | 85.6 | 84.1–87.1 | 89.3 | 88.8–89.9 |
| Medullary carcinoma and atypical medullary carcinoma | 89.5 | 87.4–91.4 | 88.0 | 84.8–90.7 | 86.3 | 81.7–90.1 | 90.1 | 82.9–96.4 | 88.7 | 87.0–90.2 |
| Tubular carcinoma and invasive cribriform carcinoma | 99.3 | 98.4–99.9 | 100.4 | 99.7–100.9 | 98.7 | 97.2–100.0 | 99.8 | 96.4–102.8 | 99.6 | 98.8–100.3 |
| Mucinous carcinoma | 94.3 | 92.1–95.9 | 94.3 | 91.8–96.2 | 96.5 | 94.4–98.2 | 94.7 | 92.1–97.2 | 94.9 | 93.5–96.3 |
| Invasive papillary carcinoma | 90.0 | 83.8–94.0 | 90.3 | 84.2–94.4 | 97.7 | 93.3–100.6 | 96.1 | 90.6–101.0 | 94.6 | 91.7–97.1 |
| Inflammatory carcinoma | 39.0 | 28.4–49.5 | 45.3 | 32.8–57.0 | 38.8 | 20.5–57.3 | 23.2 | 7.9–45.1 | 39.2 | 32.2–46.2 |
| Other—specified | 72.8 | 71.2–74.4 | 69.9 | 68.0–71.6 | 67.9 | 66.0–69.8 | 59.5 | 57.5–61.5 | 67.0 | 66.0–67.9 |
| Unspecified | 75.8 | 74.0–77.6 | 66.8 | 64.7–68.9 | 59.8 | 57.6–61.9 | 39.8 | 38.3–41.4 | 54.5 | 53.5–55.5 |
| **Total** | **84.7** | **84.4–85.0** | **86.0** | **85.7–86.3** | **86.2** | **85.9–86.6** | **78.6** | **78.1–79.1** | **83.8** | **83.6–84.0** |

(a) Appendix Table D2.6 provides a list of the histology types included in each group.

*Source:* AIHW Australian Cancer Database 2008.

## Table D4.5: Five-year relative survival (RS) from breast cancer, by remoteness area[(a)] and age at diagnosis, females, Australia, 2006–2010

| Age at diagnosis (years) | Major cities | | Inner regional | | Outer regional | | Remote and Very remote | | Total[(b)] | |
|---|---|---|---|---|---|---|---|---|---|---|
| | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI |
| <50 | 91.1 | 90.4–91.7 | 90.2 | 88.9–91.4 | 89.1 | 87.0–90.9 | 86.8 | 81.1–90.0 | 90.7 | 90.1–91.2 |
| 50–59 | 91.8 | 91.2–92.4 | 91.3 | 90.1–92.4 | 89.6 | 87.5–91.4 | 85.5 | 79.3–90.3 | 91.4 | 90.8–91.9 |
| 60–69 | 92.3 | 91.6–93.0 | 93.4 | 92.1–94.6 | 92.8 | 90.6–94.6 | 85.8 | 77.5–92.0 | 92.6 | 92.0–93.2 |
| 70+ | 82.4 | 81.1–83.7 | 82.8 | 80.4–85.2 | 82.8 | 78.7–86.7 | 74.5 | 61.9–85.5 | 82.5 | 81.4–83.6 |
| **All ages** | **89.5** | **89.1–90.0** | **89.6** | **88.8–90.3** | **88.9** | **87.6–90.1** | **84.3** | **80.7–87.4** | **89.4** | **89.1–89.8** |

(a) Measured using the Australian Standard Geographical Classification Remoteness Area classification.

(b) Includes unknown remoteness area.

*Source:* AIHW Australian Cancer Database 2007.

## Table D4.6: Five-year relative survival from breast cancer, by socioeconomic status[(a)] and age at diagnosis, females, Australia, 2006–2010

| Age at diagnosis (years) | 1 (lowest) | | 2 | | 3 | | 4 | | 5 (highest) | | Total[(b)] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI | RS (%) | 95% CI |
| <50 | 90.3 | 89.0–91.5 | 89.3 | 87.9–90.5 | 90.3 | 89.0–91.4 | 90.9 | 89.7–92.0 | 92.2 | 91.2–93.2 | 90.7 | 90.1–91.2 |
| 50–59 | 90.8 | 89.5–92.0 | 90.7 | 89.4–91.8 | 91.0 | 89.7–92.1 | 91.8 | 90.6–92.9 | 92.5 | 91.4–93.4 | 91.4 | 90.8–91.9 |
| 60–69 | 91.6 | 90.1–93.0 | 92.1 | 90.7–93.4 | 92.5 | 91.0–93.8 | 92.8 | 91.3–94.1 | 93.6 | 92.4–94.8 | 92.6 | 92.0–93.2 |
| 70+ | 79.8 | 77.2–82.3 | 81.0 | 78.5–83.3 | 82.8 | 80.2–85.2 | 84.3 | 81.6–86.8 | 84.4 | 82.0–86.7 | 82.5 | 81.4–83.6 |
| **All ages** | **88.3** | **87.4–89.1** | **88.3** | **87.4–89.1** | **89.3** | **88.5–90.1** | **90.1** | **89.3–90.9** | **90.9** | **90.1–91.5** | **89.4** | **89.1–89.8** |

(a) Measured using the ABS Socio-Economic Index for Areas (SEIFA) Index of Relative Socio-economic Disadvantage.

(b) Includes unknown socioeconomic status.

*Source:* AIHW Australian Cancer Database 2007.

## Table D4.7: International comparison of mortality-to-incidence ratios for breast cancer, females, 2008[(a)]

| Region or country | Mortality: ASR[(b)] | Incidence: ASR[(b)] | Mortality-to-incidence ratio[(c)] |
|---|---|---|---|
| Middle Africa | 13.1 | 21.3 | 0.6 |
| Western Africa | 18.9 | 31.8 | 0.6 |
| Eastern Africa | 11.4 | 19.3 | 0.6 |
| Melanesia | 13.2 | 22.8 | 0.6 |
| Northern Africa | 17.8 | 32.7 | 0.5 |
| Southern Africa | 19.3 | 38.1 | 0.5 |
| South-Central Asia | 12.0 | 24.1 | 0.5 |
| Western Asia | 14.4 | 32.7 | 0.4 |
| South-Eastern Asia | 13.4 | 31.0 | 0.4 |
| Central America | 9.6 | 26.0 | 0.4 |
| Central and Eastern Europe | 16.7 | 45.4 | 0.4 |
| Caribbean | 14.2 | 39.1 | 0.4 |
| **World** | **12.4** | **38.9** | **0.3** |
| South America | 13.2 | 44.3 | 0.3 |
| Polynesia | 14.6 | 59.1 | 0.2 |
| New Zealand | 19.0 | 85.5 | 0.2 |
| Southern Europe | 15.3 | 68.9 | 0.2 |
| Northern Europe | 17.9 | 85.0 | 0.2 |
| Micronesia | 11.5 | 57.0 | 0.2 |
| Eastern Asia | 6.3 | 31.5 | 0.2 |
| Western Europe | 17.5 | 89.7 | 0.2 |
| Northern America | 14.8 | 76.7 | 0.2 |
| **Australia** | **14.7** | **76.9** | **0.2** |

(a) The mortality and incidence rates were derived from estimates of the number of new breast cancer cases and deaths for 2002; those estimates were based on data from approximately 3–5 years earlier.

(b) Standardised using the World Health Organization 1966 World Standard Population and expressed per 100,000 females.

(c) Equals the age-standardised mortality rate divided by the age-standardised incidence rate.

*Source:* Ferlay et al. 2010.

# Additional tables for Chapter 6: Burden of disease due to breast cancer

Table D6.1: Estimated[(a)] leading causes of burden of disease, by age group, females, Australia, 2012

| Age group (years) | Breast cancer | Type 2 diabetes | Anxiety and depression | Dementia | Asthma | Ischaemic heart disease | Stroke |
|---|---|---|---|---|---|---|---|
| | Number (Disability-adjusted life years) | | | | | | |
| <1 | 0 | 6 | 0 | 32 | 1,172 | 1 | 59 |
| 1–4 | 0 | 33 | 0 | 31 | 4,614 | 3 | 214 |
| 5–9 | 0 | 60 | 2,396 | 19 | 5,396 | 4 | 276 |
| 10–14 | 0 | 80 | 12,884 | 12 | 4,896 | 4 | 297 |
| 15–19 | 0 | 83 | 18,302 | 23 | 4,011 | 12 | 74 |
| 20–24 | 24 | 488 | 13,380 | 1 | 3,121 | 53 | 326 |
| 25–29 | 189 | 1,768 | 15,629 | 1 | 1,964 | 198 | 955 |
| 30–34 | 1,000 | 3,435 | 13,063 | 13 | 1,350 | 405 | 1,317 |
| 35–39 | 2,321 | 4,793 | 13,732 | 5 | 1,049 | 742 | 852 |
| 40–44 | 4,122 | 6,415 | 15,820 | 42 | 753 | 1,025 | 963 |
| 45–49 | 5,699 | 7,147 | 13,586 | 90 | 654 | 1,629 | 1,599 |
| 50–54 | 8,355 | 8,411 | 9,628 | 565 | 1,113 | 2,357 | 2,046 |
| 55–59 | 9,427 | 8,483 | 4,594 | 1,066 | 1,227 | 3,828 | 1,987 |
| 60–64 | 8,939 | 9,499 | 1,965 | 2,661 | 1,173 | 5,788 | 2,254 |
| 65–69 | 6,863 | 9,703 | 450 | 4,983 | 1,183 | 8,552 | 3,599 |
| 70–74 | 4,963 | 7,845 | 39 | 8,782 | 753 | 10,805 | 5,131 |
| 75–79 | 3,787 | 6,721 | 38 | 14,108 | 560 | 13,970 | 7,216 |
| 80–84 | 2,769 | 5,738 | 69 | 18,045 | 472 | 18,420 | 10,507 |
| 85–89 | 1,828 | 4,328 | 88 | 16,985 | 362 | 20,098 | 11,662 |
| 90–94 | 795 | 2,213 | 55 | 10,139 | 228 | 13,294 | 8,129 |
| 95–99 | 170 | 596 | 15 | 3,130 | 55 | 4,561 | 2,706 |
| 100+ | 32 | 121 | 4 | 755 | 11 | 1,342 | 636 |
| **All ages[(a)]** | **61,283** | **87,966** | **135,737** | **81,488** | **36,115** | **107,091** | **62,805** |

(a) The estimates are projected from a 2003 baseline. See Appendix C for further details.

*Source*: AIHW Burden of Disease database.

# Additional tables for Chapter 7: Mammography

**Table D7.1: Participation in BreastScreen Australia, women aged 50–69, 1999–00 to 2009–10[(a)]**

| Screening period[(a)] | Participants | Population | AS rate[(b)] | 95% CI |
|---|---|---|---|---|
| 1999–2000 | 1,012,184 | 1,809,735 | 55.9 | 55.8–56.1 |
| 2000–2001 | 1,064,246 | 1,868,832 | 57.0 | 56.8–57.1 |
| 2001–2002 | 1,102,642 | 1,928,878 | 57.1 | 57.0–57.3 |
| 2002–2003 | 1,118,823 | 1,989,802 | 56.2 | 56.1–56.3 |
| 2003–2004 | 1,144,008 | 2,051,480 | 55.7 | 55.6–55.8 |
| 2004–2005 | 1,188,955 | 2,114,036 | 56.1 | 56.0–56.2 |
| 2005–2006 | 1,242,210 | 2,177,660 | 56.9 | 56.8–57.0 |
| 2006–2007 | 1,262,334 | 2,242,133 | 56.1 | 56.0–56.2 |
| 2007–2008 | 1,273,317 | 2,308,680 | 54.9 | 54.8–55.0 |
| 2008–2009 | 1,319,771 | 2,376,559 | 55.2 | 55.1–55.3 |
| 2009–2010 | 1,352,112 | 2,444,680 | 55.0 | 54.9–55.0 |

(a) The screening periods cover 1 January of the initial year to 31 December of the latter year indicated.

(b) Rates were calculated as the number of women screened as a proportion of the average of the ABS estimated resident population in the respective 2-year period and standardised to the Australian population as at 30 June 2001. They are expressed per 100 women (i.e. as a percentage).

*Source:* AIHW analysis of BreastScreen Australia data.

## Table D7.2: Participation in BreastScreen Australia by remoteness area, women aged 50–69, 2009–2010[(a)]

| Remoteness area[(c)] | Number | ASR[(b)] | 95% CI |
|---|---|---|---|
| Major cities | 876,864 | 53.9 | 53.8–53.9 |
| Inner regional | 309,759 | 56.9 | 56.8–57.0 |
| Outer regional | 140,879 | 58.2 | 58.1–58.3 |
| Remote | 17,265 | 53.9 | 53.6–54.2 |
| Very remote | 6,710 | 47.2 | 46.7–47.6 |
| Unknown | 634 | . . | . . |
| **Australia** | **1,352,112** | **55.0** | **54.9–55.0** |

(a) The screening periods cover 1 January of the initial year to 31 December of the latter year indicated.

(b) Rates were calculated as the number of women screened to the average of the 2008 and 2009 ABS estimated resident population and standardised to the Australian population as at 30 June 2001. They are expressed per 100 women (i.e. as a percentage).

(c) The residential postcodes of women were mapped to remoteness areas in the Australian Standard Geographic Classification for 2006 through a postal area concordance. Those that could not be mapped were included in the 'Unknown' column.

*Source*: AIHW analysis of BreastScreen Australia data.

## Table D7.3: Participation in BreastScreen Australia by socioeconomic status, women aged 50–69, 2009–2010[(a)]

| Socioeconomic status[(c)] | Number | ASR[(b)] | 95% CI |
|---|---|---|---|
| 1 (lowest) | 261,771 | 53.3 | 53.2–53.4 |
| 2 | 277,338 | 54.6 | 54.5–54.7 |
| 3 | 269,680 | 55.0 | 54.9–55.1 |
| 4 | 262,143 | 55.2 | 55.1–55.3 |
| 5 (highest) | 275,581 | 55.6 | 55.5–55.7 |
| Unknown | 5,599 | . . | . . |
| **Australia** | **1,352,112** | **55.0** | **54.9–55.0** |

(a) The screening periods cover 1 January of the initial year to 31 December of the latter year indicated.

(b) Rates were calculated as the number of women screened to the average of the 2008 and 2009 ABS estimated resident population and standardised to the Australian population as at 30 June 2001. They are expressed per 100 women (i.e. as a percentage).

(c) A woman's socioeconomic status area was classified by mapping their residential postcode (through a postal area) to the ABS IRSD for 2006. Those that could not be mapped were included in the 'Unknown' column.

*Source*: AIHW analysis of BreastScreen Australia data.

### Table D7.4: Participation in BreastScreen Australia by Aboriginal and Torres Strait Islander status, women aged 50–69, 2009–2010[(a)]

| Indigenous status[(c)] | Number | ASR[(b)] | 95% CI |
|---|---|---|---|
| Indigenous | 11,374 | 36.2 | 35.9–36.5 |
| Non-Indigenous | 1,332,597 | 54.9 | 54.8–54.9 |
| Not stated | 8,141 | . . | . . |
| **Australia** | **1,352,112** | **55.0** | **54.9–55.0** |

(a) The screening periods cover 1 January of the initial year to 31 December of the latter year indicated.

(b) Rates were calculated as the number of women screened to the average of the 2008 and 2009 ABS estimated resident population and standardised to the Australian population as at 30 June 2001. They are expressed per 100 women (i.e. as a percentage).

(c) Defined by whether or not a woman self-identified as being of Aboriginal and/or Torres Strait Islander descent.

*Source*: AIHW analysis of BreastScreen Australia data.

### Table D7.5: Medicare Benefits Schedule–funded mammography services by age group, women, 2011

| Age group (years) | Mammography of both breasts | | | Mammography of one breast | | | Total mammography | | |
|---|---|---|---|---|---|---|---|---|---|
| | No. of services | Rate[(a)] | 95% CI | No. of services | Rate[(a)] | 95% CI | No. of services | Rate[(a)] | 95% CI |
| <25 | 669 | 0.2 | 0.2–0.2 | 91 | 0.0 | 0.0–0.0 | 760 | 0.2 | 0.2–0.2 |
| 25–34 | 9,578 | 5.9 | 5.8–6.0 | 594 | 0.4 | 0.3–0.4 | 10,172 | 6.3 | 6.2–6.4 |
| 35–44 | 62,566 | 39.1 | 38.8–39.4 | 2,979 | 1.9 | 1.8–1.9 | 65,545 | 40.9 | 40.6–41.2 |
| 45–54 | 91,365 | 59.0 | 58.6–59.4 | 8,834 | 5.7 | 5.6–5.8 | 100,199 | 64.7 | 64.3–65.1 |
| 55–64 | 72,361 | 55.2 | 54.8–55.6 | 12,011 | 9.2 | 9.0–9.3 | 84,372 | 64.4 | 63.9–64.8 |
| 65–74 | 51,836 | 60.5 | 59.9–61.0 | 11,729 | 13.7 | 13.4–13.9 | 63,565 | 74.1 | 73.6–74.7 |
| 75–84 | 20,484 | 37.2 | 36.7–37.7 | 5,538 | 10.1 | 9.8–10.3 | 26,022 | 47.3 | 46.7–47.8 |
| 85+ | 2,801 | 10.4 | 10.0–10.8 | 904 | 3.4 | 3.1–3.6 | 3,705 | 13.8 | 13.3–14.2 |
| **Total[(b)]** | **311,660** | **27.4** | **27.3–27.5** | **42,680** | **3.8** | **3.7–3.8** | **354,340** | **31.2** | **31.1–31.3** |

(a) These rates are age-specific and expressed per 1,000 women.

(b) The rates in this row are age-standardised to the Australian population as at 30 June 2001; they are expressed per 1,000 women.

*Source:* AIHW analysis of Medicare Australia data.

### Table D7.6: Medicare Benefit Schedule–funded mammography services, women, 1994 to 2011

| | Mammography of both breasts | | | Mammography of one breast | | | Total mammography | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | No. of services | ASR[(a)] | 95% CI | No. of services | ASR[(a)] | 95% CI | No. of services | ASR[(a)] | 95% CI |
| 1994 | 353,885 | 42.2 | 42.0–42.3 | 29,296 | 3.5 | 3.4–3.5 | 383,181 | 45.6 | 45.5–45.8 |
| 1995 | 348,450 | 40.5 | 40.4–40.6 | 31,949 | 3.7 | 3.6–3.7 | 380,399 | 44.2 | 44.0–44.3 |
| 1996 | 298,013 | 33.9 | 33.7–34.0 | 30,848 | 3.5 | 3.4–3.5 | 328,861 | 37.3 | 37.2–37.5 |
| 1997 | 304,941 | 33.8 | 33.7–33.9 | 32,321 | 3.6 | 3.5–3.6 | 337,262 | 37.4 | 37.2–37.5 |
| 1998 | 325,069 | 35.2 | 35.1–35.3 | 31,045 | 3.3 | 3.3–3.4 | 356,114 | 38.5 | 38.4–38.6 |
| 1999 | 301,528 | 32.0 | 31.9–32.1 | 30,645 | 3.2 | 3.2–3.3 | 332,173 | 35.2 | 35.1–35.3 |
| 2000 | 297,019 | 30.9 | 30.8–31.0 | 33,102 | 3.4 | 3.4–3.4 | 330,121 | 34.3 | 34.2–34.4 |
| 2001 | 304,307 | 31.0 | 30.9–31.1 | 35,623 | 3.6 | 3.5–3.6 | 339,930 | 34.6 | 34.5–34.7 |
| 2002 | 298,865 | 29.9 | 29.8–30.0 | 37,537 | 3.7 | 3.7–3.7 | 336,402 | 33.6 | 33.5–33.7 |
| 2003 | 288,821 | 28.4 | 28.3–28.5 | 39,604 | 3.8 | 3.8–3.8 | 328,425 | 32.2 | 32.1–32.3 |
| 2004 | 286,689 | 27.6 | 27.5–27.7 | 40,032 | 3.8 | 3.7–3.8 | 326,721 | 31.4 | 31.3–31.5 |
| 2005 | 317,992 | 30.2 | 30.1–30.3 | 38,655 | 3.6 | 3.5–3.6 | 356,647 | 33.7 | 33.6–33.8 |
| 2006 | 312,935 | 29.1 | 29.0–29.2 | 39,314 | 3.5 | 3.5–3.6 | 352,249 | 32.6 | 32.5–32.7 |
| 2007 | 315,475 | 28.7 | 28.6–28.8 | 40,603 | 3.6 | 3.5–3.6 | 356,078 | 32.2 | 32.1–32.3 |
| 2008 | 320,916 | 28.5 | 28.4–28.6 | 40,470 | 3.5 | 3.4–3.5 | 361,386 | 32.0 | 31.9–32.1 |
| 2009 | 321,716 | 28.0 | 27.9–28.1 | 40,244 | 3.4 | 3.3–3.4 | 361,960 | 31.4 | 31.2–31.5 |
| 2010 | 309,919 | 26.4 | 26.3–26.5 | 41,219 | 3.4 | 3.3–3.4 | 351,138 | 29.8 | 29.7–29.9 |
| 2011 | 311,660 | 26.1 | 26.0–26.2 | 42,680 | 3.4 | 3.4–3.4 | 354,340 | 29.5 | 29.4–29.6 |

(a) Standardised to the Australian population as at 30 June 2001 and expressed per 1,000 females.

*Source:* AIHW analysis of Medicare Australia data.

# Additional tables for Chapter 8: Hospitalisations for breast cancer

Table D8.1: Hospitalisations for breast cancer[a], by age at hospitalisation, females, Australia, 2009–10

| Age group (years) | Number | Age-specific rate | 95% confidence interval |
|---|---|---|---|
| <25 | 102 | 0.0 | 0.0–0.0 |
| 25–29 | 626 | 0.8 | 0.7–0.9 |
| 30–34 | 1,678 | 2.2 | 2.1–2.3 |
| 35–39 | 4,953 | 6.1 | 5.9–6.3 |
| 40–44 | 10,177 | 13.2 | 13.0–13.5 |
| 45–49 | 14,751 | 18.6 | 18.3–18.9 |
| 50–54 | 16,176 | 22.2 | 21.9–22.6 |
| 55–59 | 16,775 | 25.5 | 25.1–25.9 |
| 60–64 | 17,076 | 29.2 | 28.7–29.6 |
| 65–69 | 13,327 | 30.4 | 29.9–30.9 |
| 70–74 | 7,876 | 22.2 | 21.7–22.7 |
| 75–79 | 4,790 | 16.2 | 15.8–16.7 |
| 80–84 | 3,099 | 12.5 | 12.1–13.0 |
| 85+ | 1,726 | 6.9 | 6.6–7.2 |
| **All ages[b]** | **113,132** | **9.6** | **9.0–10.2** |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

(b) The rate in this row is age-standardised to the Australian population as at 30 June 2001 and expressed per 1,000 females.

*Source:* AIHW National Hospital Morbidity Database.

## Table D8.2: Hospitalisations for breast cancer[a], by same-day and overnight status, females, Australia, 2000–01 to 2009–10

| | Same-day | | | Overnight | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Number | ASR[b] | 95% CI | Number | ASR[b] | 95% CI | Number | ASR[b] | 95% CI |
| 2000–01 | 49,985 | 5.2 | 4.8–5.7 | 15,985 | 1.6 | 1.4–1.9 | 65,970 | 6.9 | 6.3–7.4 |
| 2001–02 | 54,483 | 5.6 | 5.1–6.0 | 16,269 | 1.6 | 1.4–1.9 | 70,752 | 7.2 | 6.7–7.7 |
| 2002–03 | 62,231 | 6.2 | 5.7–6.7 | 16,963 | 1.7 | 1.4–1.9 | 79,194 | 7.9 | 7.3–8.4 |
| 2003–04 | 67,674 | 6.6 | 6.1–7.1 | 17,223 | 1.6 | 1.4–1.9 | 84,897 | 8.2 | 7.7–8.8 |
| 2004–05 | 72,972 | 6.9 | 6.4–7.4 | 16,914 | 1.6 | 1.3–1.8 | 89,886 | 8.5 | 8.0–9.1 |
| 2005–06 | 74,447 | 6.9 | 6.4–7.4 | 18,149 | 1.7 | 1.4–1.9 | 92,596 | 8.6 | 8.0–9.1 |
| 2006–07 | 86,408 | 7.9 | 7.4–8.4 | 18,250 | 1.6 | 1.4–1.9 | 104,658 | 9.5 | 9.0–10.1 |
| 2007–08 | 87,556 | 7.8 | 7.3–8.3 | 18,505 | 1.6 | 1.4–1.9 | 106,061 | 9.4 | 8.9–10.0 |
| 2008–09 | 91,084 | 7.9 | 7.4–8.5 | 19,023 | 1.6 | 1.4–1.9 | 110,107 | 9.6 | 9.0–10.1 |
| 2009–10 | 93,775 | 8.0 | 7.5–8.5 | 19,357 | 1.6 | 1.4–1.9 | 113,132 | 9.6 | 9.0–10.2 |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

(b) The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 1,000 females.

*Source:* AIHW National Hospital Morbidity Database.

## Table D8.3: Average length of stay (ALOS) for overnight hospitalisations due to breast cancer[a], females, Australia, 2000–01 to 2009–10

| Year | Crude ALOS | Age-standardised ALOS[b] |
|---|---|---|
| 2000–01 | 5.1 | 5.6 |
| 2001–02 | 5.0 | 5.6 |
| 2002–03 | 4.8 | 5.4 |
| 2003–04 | 4.9 | 5.7 |
| 2004–05 | 4.5 | 5.0 |
| 2005–06 | 4.3 | 4.8 |
| 2006–07 | 4.2 | 4.8 |
| 2007–08 | 4.1 | 4.5 |
| 2008–09 | 4.2 | 4.7 |
| 2009–10 | 4.0 | 4.4 |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

(b) Directly age-standardised to the national distribution of overnight hospitalisations due to all cancers combined (ICD-10-AM codes of C00–C97, D45, D47.1 and D47.3) in 2009–10.

*Source:* AIHW National Hospital Morbidity Database.

### Table D8.4: Hospitalisations for breast cancer[(a)], by age group, females, Australia, 2000–01 to 2009–10

| | Age group (years) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | <50 | | 50–69 | | 70+ | | All ages | |
| Year | ASR[(b)] | 95% CI | ASR[(b)] | 95% CI | ASR[(b)] | 95% CI | ASR[(b)] | 95% CI |
| 2000–01 | 3.3 | 3.0–3.6 | 18.6 | 18.2–19.0 | 9.8 | 9.6–10.0 | 6.9 | 6.3–7.4 |
| 2001–02 | 3.4 | 3.1–3.7 | 19.9 | 19.5–20.2 | 9.7 | 9.5–9.8 | 7.2 | 6.7–7.7 |
| 2002–03 | 3.8 | 3.5–4.1 | 21.3 | 20.9–21.7 | 10.8 | 10.6–11.0 | 7.9 | 7.3–8.4 |
| 2003–04 | 4.0 | 3.6–4.3 | 22.2 | 21.8–22.6 | 11.6 | 11.5–11.8 | 8.2 | 7.7–8.8 |
| 2004–05 | 3.9 | 3.6–4.2 | 22.9 | 22.5–23.3 | 13.6 | 13.4–13.8 | 8.5 | 8.0–9.1 |
| 2005–06 | 4.1 | 3.7–4.4 | 22.8 | 22.4–23.1 | 13.7 | 13.5–13.9 | 8.6 | 8.0–9.1 |
| 2006–07 | 4.5 | 4.1–4.8 | 25.5 | 25.1–25.9 | 14.9 | 14.7–15.1 | 9.5 | 9.0–10.1 |
| 2007–08 | 4.3 | 4.0–4.7 | 25.4 | 25.0–25.8 | 15.0 | 14.7–15.2 | 9.4 | 8.9–10.0 |
| 2008–09 | 4.4 | 4.0–4.7 | 25.8 | 25.4–26.2 | 15.5 | 15.2–15.7 | 9.6 | 9.0–10.1 |
| 2009–10 | 4.2 | 3.9–4.6 | 26.0 | 25.7–26.4 | 16.3 | 16.1–16.5 | 9.6 | 9.0–10.2 |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

(b) The rates were age-standardised to the Australian population as at 30 June 2001 and expressed per 1,000 females.

*Source*: National Hospital Morbidity Database, AIHW.

### Table D8.5: Twenty most common procedure blocks for same-day hospitalisations due to breast cancer[(a)], females, Australia, 2009–10

| Procedure description (ACHI[(b)] block code) | Number[(c)(d)] | Per cent[(d)] | Rank |
|---|---|---|---|
| **Procedures on breast (blocks 1740–1759)** | | | |
| Excision of lesion of breast (1744) | 2,568 | 2.7 | 3 |
| Examination procedures on breast (1740) | 752 | 0.8 | 9 |
| Biopsy of breast (1743) | 410 | 0.4 | 11 |
| Incision procedures on breast (1742) | 35 | 0.0 | 20 |
| **Procedures on blood and blood-forming organs (blocks 800–817)** | | | |
| Excision procedures on lymph node of axilla (808) | 1,259 | 1.3 | 6 |
| Procedures on cardiovascular system (blocks 600–777) | | | |
| Vascular access device (766) | 855 | 0.9 | 8 |
| Venous catheterisation (738) | 206 | 0.2 | 13 |
| **Non-invasive, cognitive and other interventions, not elsewhere classified (blocks 1820–1922)** | | | |
| Administration of pharmacotherapy (1920) | 85,338 | 91.0 | 1 |
| Cerebral anaesthesia (1910) | 3,586 | 3.8 | 2 |
| Other procedures related to pharmacotherapy (1922) | 2,188 | 2.3 | 4 |
| Administration of blood and blood products (1893) | 1,544 | 1.6 | 5 |
| Generalised allied health interventions (1916) | 927 | 1.0 | 7 |
| Therapeutic interventions on cardiovascular system (1890) | 597 | 0.6 | 10 |
| Other client support interventions (1915) | 176 | 0.2 | 14 |
| Other assessment, consultation, interview, examination or evaluation (1824) | 171 | 0.2 | 15 |
| Diagnostic tests, measures or investigations, blood and blood-forming organs (1858) | 61 | 0.1 | 17 |
| Hyperbaric oxygen therapy (1888) | 45 | 0.0 | 18 |
| Other counselling or education (1869) | 37 | 0.0 | 19 |
| **Imaging services (blocks 1940–2016)** | | | |
| Other circulatory system nuclear medicine imaging study (2005) | 286 | 0.3 | 12 |
| Intraoperative ultrasound (1949) | 91 | 0.1 | 16 |
| **Total same-day breast cancer-related hospitalisations** | **93,775** | **100.0** | . . |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

(b) Australian Classification of Health Interventions, 6th edition.

(c) Indicates the number of hospitalisations in which the listed procedure block was undertaken.

(d) A hospitalisation is counted once for the block if it has at least one procedure reported within the block. As more than one procedure can be reported for each hospitalisation, the data are not additive and therefore the totals in the tables may not equal the sum of the counts in the rows. For the same reason, the sum of the percentages does not equal 100.

*Source*: AIHW National Hospital Morbidity Database.

### Table D8.6: Twenty most common procedure blocks for overnight hospitalisations due to breast cancer[a], females, Australia, 2009–10

| Procedure description (ACHI[b] block code) | Number[c][d] | Per cent[d] | Rank |
|---|---|---|---|
| **Imaging services (blocks 1940–2016)** | | | |
| Other circulatory system nuclear medicine imaging study (2005) | 2,294 | 11.9 | 6 |
| Computerised tomography of chest, abdomen and pelvis (1961) | 449 | 2.3 | 13 |
| Whole body bone nuclear medicine imaging study (2011) | 368 | 1.9 | 17 |
| Computerised tomography of brain (1952) | 263 | 1.4 | 18 |
| **Non-invasive, cognitive and other interventions, not elsewhere classified (blocks 1820–1922)** | | | |
| Cerebral anaesthesia (1910) | 15,037 | 77.7 | 1 |
| Generalised allied health interventions (1916) | 8,941 | 46.2 | 3 |
| Administration of pharmacotherapy (1920) | 2,259 | 11.7 | 7 |
| Postprocedural analgesia (1912) | 833 | 4.3 | 10 |
| Administration of blood and blood products (1893) | 747 | 3.9 | 11 |
| Other client support interventions (1915) | 401 | 2.1 | 15 |
| Other assessment, consultation, interview, examination or evaluation (1824) | 369 | 1.9 | 16 |
| **Procedures on blood and blood-forming organs (blocks 800–817)** | | | |
| Excision procedures on lymph node of axilla (808) | 12,358 | 63.8 | 2 |
| **Procedures on breast (blocks 1740–1759)** | | | |
| Excision of lesion of breast (1744) | 7,766 | 40.1 | 4 |
| Simple mastectomy (1748) | 5,657 | 29.2 | 5 |
| Examination procedures on breast (1740) | 2,237 | 11.6 | 8 |
| Reconstruction procedures on breast (1756) | 980 | 5.1 | 9 |
| Subcutaneous mastectomy (1747) | 491 | 2.5 | 12 |
| Incision procedures on breast (1742) | 234 | 1.2 | 19 |
| Biopsy of breast (1743) | 170 | 0.9 | 20 |
| **Procedures on cardiovascular system (blocks 600–777)** | | | |
| Vascular access device (766) | 436 | 2.3 | 14 |
| **Total overnight breast cancer-related hospitalisations** | **19,357** | **100.0** | . . |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis.

(b) Australian Classification of Health Interventions, 6th edition.

(c) Indicates the number of hospitalisations in which the listed procedure block was undertaken.

(d) A hospitalisation is counted once for the block if it has at least one procedure reported within the block. As more than one procedure can be reported for each hospitalisation, the data are not additive and therefore the totals in the tables may not equal the sum of the counts in the rows. For the same reason, the sum of the percentages does not equal 100.

*Source*: AIHW National Hospital Morbidity Database.

Table D8.7: Twenty most common procedure blocks for hospitalisations due to breast cancer[(a)], females, Australia, 2009–10

| Procedure description (ACHI[(b)] block code) | Number[(c)(d)] | Per cent[(d)] | Rank |
|---|---|---|---|
| **Procedures on breast (blocks 1740–1759)** | | | |
| Excision of lesion of breast (1744) | 10,334 | 9.1 | 4 |
| Simple mastectomy (1748) | 5,677 | 5.0 | 6 |
| Examination procedures on breast (1740) | 2,989 | 2.6 | 7 |
| Reconstruction procedures on breast (1756) | 984 | 0.9 | 12 |
| Biopsy of breast (1743) | 580 | 0.5 | 15 |
| Subcutaneous mastectomy (1747) | 493 | 0.4 | 18 |
| **Procedures on blood and blood-forming organs (blocks 800–817)** | | | |
| Excision procedures on lymph node of axilla (808) | 13,617 | 12.0 | 3 |
| **Procedures on cardiovascular system (blocks 600–777)** | | | |
| Vascular access device (766) | 1,291 | 1.1 | 11 |
| **Non-invasive, cognitive and other interventions, not elsewhere classified (blocks 1820–1922)** | | | |
| Administration of pharmacotherapy (1920) | 87,597 | 77.4 | 1 |
| Cerebral anaesthesia (1910) | 18,623 | 16.5 | 2 |
| Generalised allied health interventions (1916) | 9,868 | 8.7 | 5 |
| Administration of blood and blood products (1893) | 2,291 | 2.0 | 9 |
| Other procedures related to pharmacotherapy (1922) | 2,209 | 2.0 | 10 |
| Postprocedural analgesia (1912) | 835 | 0.7 | 13 |
| Therapeutic interventions on cardiovascular system (1890) | 616 | 0.5 | 14 |
| Other client support interventions (1915) | 577 | 0.5 | 16 |
| Other assessment, consultation, interview, examination or evaluation (1824) | 540 | 0.5 | 17 |
| **Imaging services (blocks 1940–2016)** | | | |
| Other circulatory system nuclear medicine imaging study (2005) | 2,580 | 2.3 | 8 |
| Computerised tomography of chest, abdomen and pelvis (1961) | 470 | 0.4 | 19 |
| Whole body bone nuclear medicine imaging study (2011) | 374 | 0.3 | 20 |
| **Total breast cancer-related hospitalisations** | **113,132** | **100.0** | . . |

(a) Pertain to hospitalisations in which i) the principal diagnosis is breast cancer (ICD-10-AM code C50), or ii) the principal diagnosis is a health service or treatment that may be related to the treatment of breast cancer (ICD-10-AM codes Z08, Z29.2 , Z40.00, Z42.1, Z44.3, Z45.1, Z45.2, Z45.8, Z51.0, Z51.1, Z54.1 and Z54.2) and breast cancer is recorded as an additional diagnosis

(b) Australian Classification of Health Interventions, 6th edition.

(c) Indicates the number of hospitalisations in which the listed procedure block was undertaken.

(d) A hospitalisation is counted once for the block if it has at least one procedure reported within the block. As more than one procedure can be reported for each hospitalisation, the data are not additive and therefore the totals in the tables may not equal the sum of the counts in the rows. For the same reason, the sum of the percentages does not equal 100.

*Source*: AIHW National Hospital Morbidity Database.

# Additional tables for Chapter 9: Expenditure on breast cancer

Table D9.1: Expenditure on hospital admitted patient services and number of hospitalisations for breast cancer, by age group, females, Australia, 2004–05

| Age group (years) | Hospital admitted patient expenditure ($ million) | Hospital admitted patient expenditure Per cent | Number of admitted patient hospitalisations[a] | Average expenditure per hospitalisation ($) |
|---|---|---|---|---|
| <25 | 0 | 0.1 | 16 | 4,034 |
| 25–34 | 2 | 2.0 | 461 | 3,926 |
| 35–44 | 11 | 11.8 | 2,774 | 3,913 |
| 45–54 | 21 | 23.2 | 5,360 | 3,978 |
| 54–64 | 24 | 25.7 | 5,658 | 4,174 |
| 65–74 | 18 | 19.5 | 3,765 | 4,779 |
| 75–84 | 12 | 13.4 | 2,408 | 5,119 |
| 85+ | 4 | 4.4 | 604 | 6,701 |
| **Total** | **92** | **100.0** | **21,046** | **4,373** |

(a) Defined as those hospitalisations for which the principal diagnosis was breast cancer (ICD-10 code of C50). Does not include hospitalisations for which breast cancer was an additional diagnosis and the principal diagnosis related specifically to the type of cancer treatment or care received.

*Source:* AIHW Disease Expenditure Database.

# Appendix E: Definition of breast cancer–related hospitalisations

For the purposes of examining the number of admitted patient separations that arose specifically due to invasive breast cancer and were directly related to treatment/care for breast cancer, 'breast cancer–related hospitalisations' were identified in this report as follows:

**Either** a *principal* diagnosis of invasive breast cancer (ICD-10 code of C50)

**OR** an *additional* diagnosis of breast cancer (ICD-10 code of C50) **AND** a principal diagnosis of one of the following ICD-10 'Z' codes (with these Z codes falling within ICD-10 Chapter 21 'Factors influencing health status and contact with health services'):

- Follow-up examination after treatment for malignant neoplasms (Z08)
- Other prophylactic immunotherapy (Z29.2)
- Prophylactic surgery for risk-factors related to malignant neoplasm—breast (Z40.00)
- Follow-up care involving plastic surgery of breast (Z42.1)
- Fitting and adjustment of external breast prosthesis (Z44.3)
- Adjustment and management of drug delivery or implanted device (Z45.1)
- Adjustment and management of vascular access device (Z45.2)
- Adjustment and management of other implanted devices (Z45.8)
- Radiotherapy session (Z51.0)
- Pharmacotherapy session for neoplasm (Z51.1)
- Convalescence following radiotherapy (Z54.1)
- Convalescence following chemotherapy (Z54.2).

Using data from the National Hospital Morbidity Database (NHMD) for 2009–10, Table E.1 shows the number of hospitalisations for each of the relevant 'Z' code principal diagnoses, as well as for those hospitalisations in which breast cancer was the principal diagnosis.

As noted in Chapter 8, not all hospitals in all states and territories formally admit patients for same-day chemotherapy services. In some states and territories, some patients are provided same-day chemotherapy on an outpatient (or non-admitted patient) basis. Such services are not captured in the NHMD.

### Table E.1: Hospitalisations for breast cancer by same-day and overnight status, females, 2009–10

| | Same-day hospitalisations | | Overnight hospitalisations | | Total hospitalisations | |
|---|---|---|---|---|---|---|
| **Diagnosis** | **Number** | **Per cent** | **Number** | **Per cent** | **Number** | **Per cent** |
| Invasive breast cancer as principal diagnosis | 6,528 | 7.0 | 19,050 | 98.4 | 25,578 | 22.6 |
| Invasive breast cancer as additional diagnosis AND principal diagnosis of: | | | | | | |
| Follow-up examination after treatment for malignant neoplasms | 1–4 | n.p. | 1–4 | n.p | 1–4 | n.p. |
| Other prophylactic immunotherapy | 114 | 0.1 | 3 | 0.0 | 117 | 0.1 |
| Prophylactic surgery for risk-factors related to malignant neoplasm—breast | 1–4 | n.p. | 10–13 | n.p. | 14 | 0.0 |
| Follow-up care involving plastic surgery of breast | 27 | 0.0 | 141 | 0.7 | 168 | 0.1 |
| Fitting and adjustment of external breast prosthesis | 0 | 0.0 | 1–4 | n.p. | 1–4 | n.p. |
| Adjustment and management of implantable infusion device or pump | 122 | 0.1 | 12 | 0.1 | 134 | 0.1 |
| Adjustment and management of vascular access device | 2,398 | 2.6 | 92 | 0.5 | 2,490 | 2.2 |
| Adjustment and management of other implanted devices | 564 | 0.6 | 3 | 0.0 | 567 | 0.5 |
| Radiotherapy session | 42 | 0.0 | 1 | 0.0 | 43 | 0.0 |
| Pharmacotherapy session for neoplasm | 83,946 | 89.5 | 19 | 0.1 | 83,965 | 74.2 |
| Convalescence following radiotherapy | 0 | 0.0 | 5 | 0.0 | 5 | 0.0 |
| Convalescence following chemotherapy | 31 | 0.0 | 16 | 0.1 | 47 | 0.0 |
| **Total breast cancer–related hospitalisations** | **93,775** | **100.0** | **19,357** | **100.0** | **113,132** | **100.0** |

*Source*: National Hospital Morbidity Database, AIHW.

# Glossary

*This section provides a general description of the terms used in this report. The terms have been 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, hospital separations 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.

**Average length of stay:** 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.

**Benign:** Non-cancerous tumours that may grow larger but do not spread to other parts of the body.

**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.

**Carcinoma:** A cancer that begins in the lining layer (epithelial cells) of organs such as the ovaries.

**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.

**Combined hormone replacement therapy:** Daily hormone therapy/hormone replacement therapy (HT/HRT) containing oestrogen plus progestin, a synthetic form of the natural hormone.

**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.

**Constant prices:** Dollar amounts for different years that are adjusted to reflect the prices in a chosen reference year. This provides a way of comparing expenditure over time on an equal value-for-value basis without the distorting effects of inflation. The comparison will reflect only the changes in the amount of goods and services purchased—changes in the 'buying power'—not the changes in prices of these goods and services caused by inflation.

**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:** The proportion of people alive at a specified point in time subsequent to the diagnosis of cancer.

**DALYs (disability-adjusted life years):** 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.

**Heath expenditure:** Includes expenditure on health goods and services (for example, medications, aids and appliances, medical treatment, public health, research) that 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 E).

**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.

**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.

**Median:** The midpoint of a list of observations that have been ranked from the smallest to the largest.

**Metastasis:** See *Secondary cancer*.

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

**Mortality-to-incidence ratio:** 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 that 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 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.

**Population estimates:** Official population numbers compiled by the Australian Bureau of Statistics 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 E).

**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 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 B for more information about statistical significance).

**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.

**YLD (years of healthy life lost due to disability):** 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).

**YLL (years of life lost):** 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, *Breast cancer in Australia: an overview*, is part of a series. The two earlier editions and any published subsequently can be downloaded for free from the AIHW website <http://www.aihw.gov.au>. The website also includes information on ordering printed copies.

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

- AIHW 2012. Cancer incidence projections, Australia 2011 to 2020. Cancer series no. 66. Cat. no. CAN 62. Canberra: AIHW.
- AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW.
- AIHW & NBOCC 2010. Risk of invasive breast cancer in women diagnosed with ductal carcinoma in situ in Australia between 1995 and 2005. Cancer series no. 51. Cat. no. CAN 47. Canberra: AIHW.
- AIHW & NBOCC 2007. Breast cancer survival by size and nodal status in Australia. Cancer series no. 39. Cat. no. CAN 34. Canberra: AIHW.

Data in this report provide a comprehensive picture of breast cancer in Australia including how breast cancer rates differ by geographical area, socioeconomic status, Aboriginal and Torres Strait Islander status and country of birth.