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cancer

survival and prevalence in Australia:
period estimates from 1982 to 2010



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Australian Institute of
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*Authoritative information and statistics
to promote better health and wellbeing*

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**Please note that there is the potential for minor revisions of data in this report.
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Abbreviations

AACR	Australasian Association of Cancer Registries
ABS	Australian Bureau of Statistics
ACD	Australian Cancer Database
ACS	American Cancer Society
AICR	American Institute of Cancer Research
AIHW	Australian Institute of Health and Welfare
AML	acute myeloid leukaemia
ARIA	Accessibility/Remoteness Index for Australia
ASGC	Australian Standard Geographical Classification
CA	Cancer Australia
CI	confidence interval
CLL	chronic lymphocytic leukaemia
CS	conditional relative survival
DLBCL	diffuse large B-cell lymphoma
FL	follicular lymphoma
HL	Hodgkin lymphoma
HIV	human immunodeficiency virus
IARC	International Agency for Research on Cancer
ICD	International Statistical Classification of Diseases and Related Health Problems
ICD-10	International Statistical Classification of Diseases and Related Health Problems, 10th Revision
ICD-O-3	International Classification of Diseases for Oncology, Third Edition
IRSD	Index of Relative Socio-economic Disadvantage
MCL	marginal cell lymphoma
MZL	marginal zone lymphoma
mm	millimetres
NCI	National Cancer Institute
NCMC	National Centre for Monitoring Cancer

NDI	National Death Index
NHL	non-Hodgkin lymphoma
NMD	National Mortality Database
No.	number
NOS	not otherwise specified
NSW	New South Wales
PTCL	peripheral T-cell lymphoma
PSA	prostate-specific antigen
RS	relative survival
SEER	Surveillance, Epidemiological and End Results
SEIFA	Socio-Economic Indexes for Areas
SLA	statistical local area
UPS	unknown primary site
WCRF	World Cancer Research Fund
WHO	World Health Organization

Symbols

%	per cent
..	not applicable
n.a.	not available
n.p.	not publishable because of small numbers, confidentiality or other concerns about the quality of the data

Summary

Survival is a general term indicating the probability of being alive for a given amount of time after a diagnosis of cancer. Cancer survival statistics are a key indicator of cancer prognosis, control and treatment. Prevalence measures the number of people living with cancer and is essential for health-care planning and service delivery. This report presents the latest national survival and prevalence statistics for cancers in Australia from 1982 to 2010. Note that survival estimates in this report were produced using a revised methodology and should not be compared with those from previous national survival reports.

Survival improved over time, but not for all cancers

Five-year survival from all cancers combined increased from 47% in the period 1982–1987 to 66% in 2006–2010. The cancers that had the largest survival gains over this time were prostate cancer, kidney cancer and non-Hodgkin lymphoma. Four cancers did not show any significant changes over time: those of the lip, larynx and brain, and chronic lymphocytic leukaemia. Only bladder cancer showed a significant decrease in survival, which may be partly related to changes in coding and age at diagnosis.

Cancer is a heterogeneous disease and survival outcomes varied

Survival varied markedly by cancer type. In the period 2006–2010, cancers with the highest survival were those of the testis, lip, prostate and thyroid, and melanoma of the skin. All of these cancers had a 5-year survival of 90% or higher. In comparison, pancreatic cancer and mesothelioma had the lowest survival: 5-year survival for these cancers was less than 10%.

Women generally had higher survival than men, and younger people had higher survival than older people. For almost all cancers, survival dropped steeply for the very old.

Cancer survival also differed by population group. For all cancers combined, survival was lower for those living in remote and regional areas compared with those in major cities. There was also a gradient of decreasing survival with greater socioeconomic disadvantage.

Survival was high for those who had already survived the first few years after a cancer diagnosis

For the first time nationally, this report presents survival for those who have already survived a given number of years after diagnosis, known as conditional survival. The results point to a positive finding: if those with cancer had already survived 5 years past their diagnosis, their survival prospects for the next 5 years were quite high—more than 90% for all cancers combined.

There were almost 775,000 Australians alive who had a history of cancer

At the end of 2007, there were around 774,700 Australians alive, about 3.6% of the total population, who were diagnosed with cancer in the previous 26 years. Notably, almost a fifth of all Australians aged 80 and over had a history of cancer within this time.

The prevalence of four cancers stood out as particularly high: breast cancer, melanoma of the skin, prostate cancer and bowel cancer. At the end of 2007, there were more than 100,000 people in Australia with a history of each of these cancers, largely because these cancers were common and had relatively high survival.

Data at a glance

Table 1: Five-year relative survival from selected cancers, in descending order, Australia, 2006–2010

Males				Females			
Site/type	RS (%)	95% CI	Δ ^(a)	Site/type	RS (%)	95% CI	Δ ^(a)
Testis	97.6	96.7–98.3	↗	Thyroid	97.3	96.5–98.0	↗
Lip	92.8	91.1–94.4	→	Melanoma of the skin	93.6	93.0–94.2	↗
Prostate	92.0	91.6–92.3	↗	Lip	91.5	88.2–94.4	→
Thyroid	91.3	89.3–93.2	↗	Breast	89.4	89.1–89.8	↗
Melanoma of the skin	88.5	87.9–89.1	↗	Hodgkin lymphoma	88.8	86.1–91.0	↗
Hodgkin lymphoma	85.9	83.2–88.3	↗	Uterus	82.0	80.8–83.1	↗
Kidney	71.6	70.1–73.0	↗	Chronic lymphocytic leukaemia	75.8	72.7–78.7	→
Chronic lymphocytic leukaemia	70.7	68.3–73.1	→	Kidney	72.5	70.5–74.5	↗
Non-Hodgkin lymphoma	70.0	68.8–71.3	↗	Cervix	72.1	70.1–74.0	↗
Bowel	65.3	64.6–66.0	↗	Non-Hodgkin lymphoma	71.3	69.9–72.6	↗
Larynx	64.8	62.3–67.3	→	Bowel	67.1	66.4–67.9	↗
Tongue	61.3	58.2–64.3	↗	Larynx	64.0	56.3–71.1	→
Bladder	60.0	58.4–61.6	↘	Tongue	61.9	57.5–66.2	→
Myeloma	43.9	41.7–46.1	↗	Bladder	49.6	46.9–52.3	↘
Stomach	26.9	25.4–28.4	↗	Ovary	43.3	41.8–44.9	↗
Acute myeloid leukaemia	22.9	20.7–25.2	↗	Myeloma	42.8	40.4–45.2	↗
Gallbladder	22.5	19.7–25.5	↗	Stomach	26.4	24.4–28.4	↗
Brain	20.4	18.9–21.9	→	Acute myeloid leukaemia	24.5	21.9–27.2	↗
Unknown primary site	18.1	16.8–19.4	↗	Brain	23.9	22.0–25.9	↗
Oesophagus	15.5	14.2–17.0	↗	Gallbladder	17.7	15.4–20.1	↗
Liver	15.5	14.1–16.9	↗	Oesophagus	17.0	14.9–19.3	→
Lung	12.6	12.1–13.1	↗	Lung	16.5	15.9–17.3	↗
Mesothelioma	5.3	4.3–6.4	→	Liver	15.4	13.2–17.8	→
Pancreas	4.9	4.2–5.5	↗	Unknown primary site	13.1	12.1–14.3	↗
				Mesothelioma	10.2	7.4–13.4	→
				Pancreas	5.6	4.9–6.4	↗
All cancers combined ^(b)	65.1	64.9–65.4	↗	All cancers combined ^(b)	67.4	67.1–67.6	↗

(a) Indicates the direction of any statistically significant change in 5-year relative survival between the periods 1982–1987 and 2006–2010. For liver cancer in both sexes and mesothelioma in females, data for 1988–1993 were applied for the earlier period due to small numbers.

(b) Includes cancers coded in ICD-10 as C00–C96, D45, D46, D47.1 and D47.3 with the exception of those C44 codes which indicate a basal cell or squamous cell carcinoma of the skin.

Note: Survival trends for males and females separately may differ from trends for persons (males and females combined).

Source: AIHW Australian Cancer Database (2007).

1 Introduction

Cancer is the leading cause of burden of disease in Australia, accounting for about one fifth of the total burden (AIHW 2010a). With 1 in 2 Australians developing cancer and 1 in 5 dying from it before the age of 85, cancer has a major impact on individuals, their families and the health-care system (AIHW 2012).

Survival from cancer is a key indicator of cancer prognosis, control and treatment. It refers to the probability of being alive for a given amount of time after diagnosis and reflects the severity of a cancer diagnosis. Population-based survival statistics are essential for monitoring progress in cancer control and highlighting areas of improvement and need.

It is important to note that survival estimates are based on the outcomes of groups of people with a diverse mix of cancer and other characteristics. As such, 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. An individual's doctor or oncologist is the best source of information about his or her survival prospects.

Prevalence refers to the number of people alive with a prior diagnosis of cancer and is a function of cancer survival as well as the number of new cancers diagnosed. It reflects the number of people undergoing treatment or longer-term management for their cancer.

Prevalence statistics measure overall cancer control efforts and the demand for cancer care and are important for health-care planning and service delivery.

Box 1.1: Key definitions

Cancer: a primary, invasive tumour. It does not refer to secondary, recurrent or benign tumours.

Survival: the probability of being alive for a given amount of time after a diagnosis of cancer. See Box 1.2.

Prevalence: the number of people alive with a prior diagnosis of cancer. See Box 1.3.

Purpose and content of this report

This report is funded by the National Centre for Monitoring Cancer and provides an update of the latest Australian survival and prevalence statistics. It presents data on all cancers (except basal cell and squamous cell carcinoma of the skin) diagnosed in Australia between 1982 and 2007, and followed for deaths to 2010. Survival and prevalence are analysed by age, sex and histology, as well as by geographic remoteness of residence and socioeconomic status. For the first time, national conditional survival statistics are also presented, which illustrate the survival prospects for individuals who have already survived a given number of years after their cancer diagnosis.

This report is divided into the following sections:

- Chapter 2 provides an introduction to the concepts of cancer survival and prevalence, with information on methodology, data interpretation and data sources.
- Chapter 3 presents an overview of survival and prevalence for all cancers combined, as well as a comparison of individual cancer types.
- Chapter 4 contains survival and prevalence summaries for 28 individual cancer types. Each 4-page summary features a synopsis followed by key tables and figures.
- Appendix A provides a guide to accessing online supplementary data.
- Appendix B presents 5-year survival estimates using the cohort method for comparison.
- Appendix C presents detailed information on data sources, in particular, the Australian Cancer Database.
- Appendix D provides information on classifications of cancer types.
- Appendix E provides information on classifications of population groups.
- Appendix F contains detailed information on the statistical methods used for calculating survival and prevalence.

In addition, supplementary data are available as online Excel tables at <www.aihw.gov.au>. These tables contain detailed statistics, some of which are presented in summary form in the body of the report. Throughout the report, online supplementary tables are referred to with an 'S', for example, 'See online Table S1.1'. Appendix A provides more information on accessing these tables online.

This report is intended as a companion publication to *Cancer in Australia: an overview, 2010* (AIHW & AACR 2010) and *Cancer incidence projections: Australia, 2011 to 2020* (AIHW 2012) and draws from the same data source. These publications are available free of charge from the Australian Institute of Health and Welfare (AIHW) website <www.aihw.gov.au>.

Scope

State and territory data: This report concentrates on national Australian data. State and territory or regional estimates of survival and prevalence are produced by individual state and territory cancer registries. A list of these publications is provided at the end of this report.

Survival by stage and treatment: The stage at cancer diagnosis and subsequent treatment outcomes are important determinants of cancer survival. They can also reflect the extent to which gains in survival are a result of earlier detection or improvements in treatment. At present, there is no national collection of data on stage at cancer diagnosis, nor of treatment. However, extent of disease is reported by some state and territory cancer registries and detailed stage and treatment information is collected by a number of clinical cancer registries. At the national level, Cancer Australia and the National Centre for Monitoring Cancer are also developing methodologies for complementing existing cancer data collections with stage and treatment data.

Data by population group: Data issues preclude analyses of relative survival for Aboriginal and Torres Strait Islander people and people from culturally and linguistically diverse backgrounds, due to the lack of complete life tables for these population groups. However, the report does present survival by remoteness and socioeconomic status.

Data on young Australians: Due to the small number of cancers in young people, ages 0 to 39 are aggregated for analyses of survival by age. Detailed survival statistics for all Australians aged under 40 can be found in the report *Cancer in adolescents and young adults in Australia* (AIHW 2011).

Interpretation of trends and differences: The main purpose of this report is to analyse and describe survival and prevalence. It is outside the scope of this report to interpret differences in survival outcomes and trends or to use the data to evaluate progress in cancer control. A full explanation of the reasons underlying the survival and prevalence statistics would require multidisciplinary expertise from clinical, epidemiological and public health perspectives. Some general information is provided throughout this report, where relevant, to give readers a better understanding of the data. Incidence and mortality trends are also presented alongside survival trends to provide greater context to survival statistics.

International comparisons: Generally, cancer survival outcomes in Australia compare favourably with those in other countries (Coleman et al. 2011). However, detailed international comparisons are not presented in this report due to differences in data collection, coding and reporting practices, as well as differences in the methodologies used for calculating survival. Recent state and territory and international survival publications are listed at the end of this report for further reading.

2 Background

Cancer

What is cancer?

Cancer describes a diverse group of more than 100 diseases in which some of the body's cells become abnormal and begin to multiply out of control as a result of changes in the genetic information of a cell. These abnormal cells can form an invasive (that is, malignant) tumour which can damage the area around it and spread to other parts of the body, through a process known as metastasis. Not all tumours are invasive. Some are benign and do not spread to other parts of the body: these are rarely life-threatening.

Cancers are distinguished from one another by the location in the body in which the disease began (known as the site) or by the type of cell involved (known as histology). The original site at which the tumour is formed is known as the site of the primary cancer.

How is cancer defined in this report?

Throughout this report, cancer refers to a primary, invasive tumour. It does not refer to secondary, recurrent or benign tumours.

Cancer incidence and survival data in this report exclude cases of basal cell and squamous cell carcinoma of the skin, which are not legally notifiable and for which national, population-based data are unavailable. For brevity, all instances of the word 'cancer' in this publication refer to 'primary invasive cancer, excluding basal cell and squamous cell carcinoma of the skin'.

It was estimated that almost 434,000 Australians were diagnosed and treated with these two types of cancer in 2008 (AIHW & CA 2008), while there were only 448 deaths from *all* types of non-melanoma skin cancer in 2007 (AIHW & AACR 2010). Given their high incidence and low mortality, basal cell and squamous cell carcinoma of the skin are expected to have particularly high survival and prevalence.

Cancer types

Definitions of the 28 different cancer types in this report are consistent with those in *Cancer in Australia: an overview, 2010* (AIHW & AACR 2010). Cancers were coded according to the tenth version of the International Statistical Classification of Diseases and Related Health Problems (ICD-10). The final list of cancers was determined based on the clinical and public health significance of the cancers, as well as the availability of data. Combined, these 28 cancers accounted for more than 90% of all cancers.

Some cancers were further disaggregated by histological subtype, which were defined according to the recommendations of the International Agency for Research on Cancer (Egevad et al. 2007) or according to previous AIHW cancer-specific reports. Cancer histologies were coded according to the third edition of the International Classification of Diseases for Oncology (ICD-O-3).

Table D.1 in Appendix D lists the cancer types and subtypes presented in this report, accompanied by their ICD-10 and ICD-O-3 codes.

Survival

What is survival?

Survival from cancer is a key indicator of cancer prognosis, control and treatment. It refers to the probability of being alive for a given amount of time after diagnosis and reflects the severity of a cancer diagnosis. Population-based survival statistics are essential for monitoring progress in cancer control and highlighting areas of improvement and need.

Population-based survival statistics indicate the survival experience of a heterogeneous group of people with diverse characteristics. They do not equate to an individual's particular cancer prognosis, which can depend on a range of other factors. A doctor or oncologist is the best source of information about an individual's survival prospects.

Survival is influenced by a wide range of factors, including:

- characteristics of the individual with cancer, such as age, sex, ethnicity, lifestyle factors and comorbidity from other health conditions
- the nature of the tumour diagnosed, such as the primary site and histology of the cancer and the extent or stage of disease
- elements of the health-care system, such as screening, diagnostic and treatment facilities and follow-up services to which an individual has access (Black et al. 1998; WCRF & AICR 2007).

Box 1.2: Survival terminology in this report

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

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

Expected survival: the proportion of people in the general population alive for a given amount of time. Expected survival estimates are crude estimates calculated from life tables of the entire Australian population.

Relative survival: the ratio of observed survival to expected survival. Relative survival measures inversely the excess mortality associated with a cancer diagnosis. *All* survival estimates in this report are relative survival estimates.

Conditional relative survival: the probability that individuals with cancer will be alive for a given amount of time provided that they have already survived for a specified time after diagnosis. *All* conditional survival estimates in this report are conditional *relative* survival estimates as they were derived from relative survival.

How is survival measured?

Relative survival

Relative survival is the standard approach for measuring population-based cancer survival (Coleman et al. 2011). It is calculated from two measures of crude survival: observed and expected survival.

Observed survival refers to the proportion of people alive for a given amount of time after a diagnosis of cancer and is calculated from population-based cancer data. Expected survival refers to the proportion of people in the general population alive for a given amount of time and is calculated from life tables of the entire Australian population, assumed to be cancer-free.

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

A simplified example of how relative survival is calculated is shown in Figure 1.1. Given that 6 in 10 people with 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 cancer would be calculated as 0.6 divided by 0.9, or 0.67. This means that individuals with cancer are 67% as likely to be alive for at least 5 years after their diagnosis compared with their counterparts in the general population. Further information on how relative survival is calculated is provided in Appendix F.

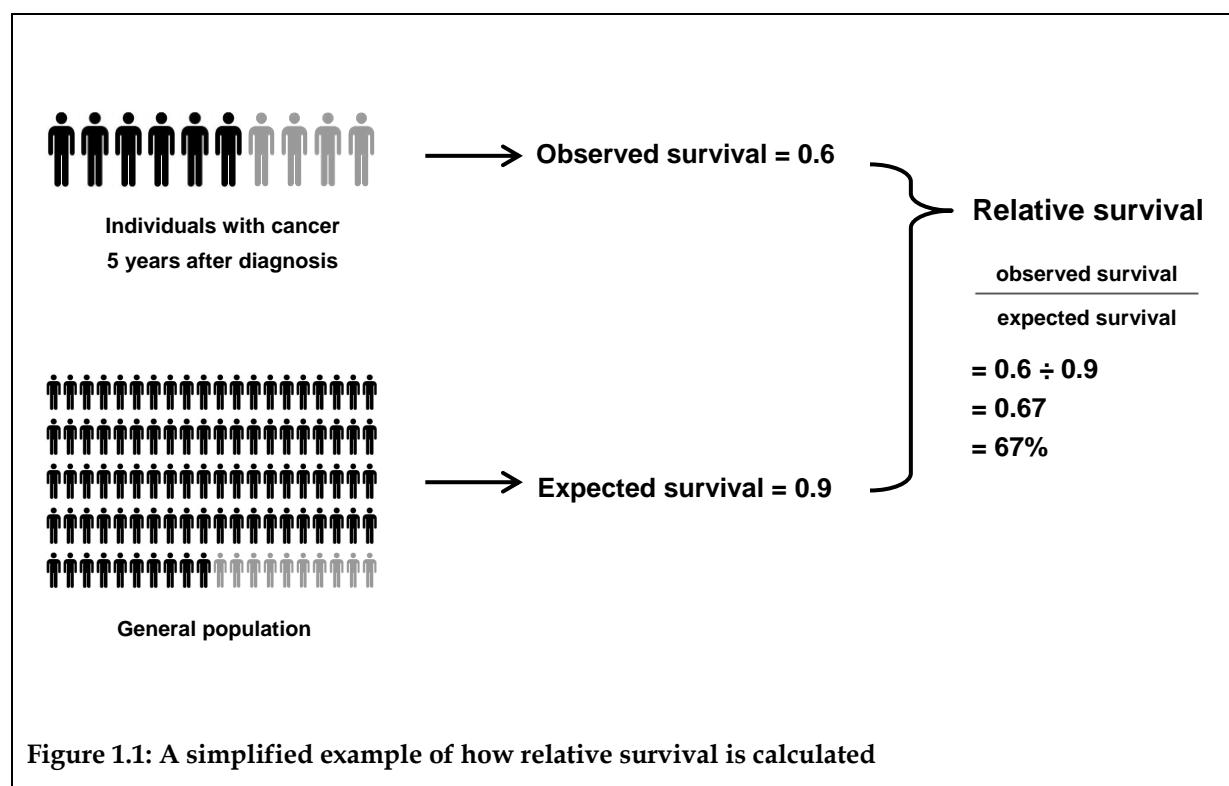


Figure 1.1: A simplified example of how relative survival is calculated

One of the advantages of relative survival is that it does not require information on the cause of death. By adjusting the survival of individuals with cancer for the underlying mortality that they would have experienced in the general population, relative survival reflects the net survival associated with cancer. In other words, relative survival is an inverse measure of the excess mortality attributed, either directly or indirectly, to a diagnosis of cancer.

A by-product of this is that characteristics associated with cancer may also be related to other health conditions that further impair survival. For example, many individuals with lung cancer may also be smokers, and smoking itself is a risk factor for cardiovascular disease and other chronic lung conditions. The risk of death from cardiovascular disease would reduce both observed and relative survival, thereby inflating the excess mortality attributable to lung cancer.

Note that *all* survival estimates in this report are relative survival estimates. That is, all survival probabilities presented are relative to those of the general population. For brevity, they will be referred to simply as 'survival', without a comparison with the general population each time.

Period and cohort methods

In this report, relative survival was calculated using the period method (Brenner & Gefeller 1996). The period method calculates survival from a given follow-up or at-risk time 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. Because the period method allows recent years of follow-up to be selected, it produces up-to-date survival estimates that reflect recent changes in cancer survival trends (Brenner 2002; Brenner & Hakulinen 2002a; Brenner & Hakulinen 2002b). More information can be found in Appendix F.

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. Because the cohort method was used for previous national survival reports (AIHW & AACR 2001; AIHW et al. 2008), survival estimates in this report should not be directly compared with those in earlier reports.

Conditional relative survival

A major issue faced by those living with cancer is how to manage uncertainty about the longer-term future and how to make important life decisions accordingly. Ordinary relative survival estimates show the probability of survival at diagnosis: they may be less informative or even overly pessimistic when applied to those who have already survived for some time after their diagnosis (Xing et al. 2010).

Conditional relative survival may be a more realistic and clinically-relevant measure of survival for individuals who are already living with cancer (Baade et al. 2011). Conditional survival shows the probability of surviving a given number of years provided that an individual has *already* survived a specified amount of time after diagnosis.

The relationship between survival at diagnosis and conditional survival some years after diagnosis is not always straightforward. Some cancers may show promising survival prospects at diagnosis, but with little improvement regardless of additional years survived (Ellison et al. 2011). These cancers may have a high rate of recurrence or may be associated with other long-term risks.

For other cancers, the risk of death is greatest in the initial years after diagnosis, with survival improving rapidly with each additional year survived. For these cancers, conditional survival may eventually approach 100%. That is, individuals with cancer will no longer experience excess mortality and will begin to share the same survival prospects as their counterparts in the general population (Baade et al. 2011).

Note that *all* conditional survival estimates in this report are conditional *relative* survival estimates. That is, they have been derived from relative survival. However, for brevity, they will often be referred to simply as 'conditional survival'.

How is survival presented in this report?

Five-year survival

Five-year survival reflects the probability of being alive for at least five years. It is a standard indicator used in reporting to reflect the prognosis of cancer and to compare survival across different cancers, time periods and groups of people. For some cancers, 5 years after diagnosis is an important milestone for long-term remission, although for others there is still a substantial chance that the cancer may recur, even after years of successful treatment (Tracey, Barraclough et al. 2007).

Other survival durations are also presented in this report, the maximum being 20-year survival. One-year survival may indicate the net short-term effectiveness of treatment and the stage at which the cancer was detected. Ten- or 20-year survival may indicate the longer-term morbidity and mortality associated with the disease, as well as longer-term disease outcomes.

Time periods used for reporting survival

The time periods selected for this report were based on the availability of national cancer data. At the time of analysis, the earliest and latest years of diagnosis were 1982 and 2007 respectively, with information on subsequent deaths to the end of 2010.

Single-year trends: Survival trends are presented by single years of follow-up where numbers permit, from 1986 to 2007. This year range is based on the number of years of diagnosis and follow-up required to calculate 5-year relative survival using the period method (see Appendix F). This approach allows yearly survival estimates to be plotted alongside annual trends in incidence and mortality.

Trends by period: Trends are also analysed by 5 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. One- to 10-year survival is presented for each of these periods, with the exception of the earliest period. Survival estimates for 7 years or greater were not available for the 1982–1987 period, as these would require data on cases diagnosed in 1981 and earlier.

Survival in the latest period: Analyses are based on the most recent period, 2006–2010, for the latest survival estimates and for comparisons between sex, age group, cancer subtype, remoteness and socioeconomic status.

Multiple cancers

Like incidence, survival is based on cancer cases, not people with cancer. Individuals with multiple cancers contributed towards survival analysis more than once. For example, a person with a primary lung cancer and a primary breast cancer was included in multiple datasets for

survival analysis (one for lung cancer and one for breast cancer). This practice is consistent with previous survival reports and with recommendations that data on subsequent primary tumours should not be excluded from survival analysis (Rosso & Zanetti 2010).

Interpreting survival

Explanations of survival trends or differences

Survival is shaped by a wide range of factors, including characteristics of the individual with cancer, the nature of the tumour diagnosed, elements of the health-care system and cancer data collection and reporting processes. Many cancers show an increase in survival over time. It is beyond the scope of this report to examine in detail the reasons contributing to survival trends or differences. However, these are some general reasons for increasing survival:

Factors associated with the underlying distribution of cancers:

- changes in the age and sex distribution of people diagnosed with cancer
- changes the stage or extent of disease at diagnosis
- changes in the type and mix of tumours within the category.

Factors associated with cancer control and the health system:

- earlier detection through organised screening programs and public education promoting awareness and recognition of symptoms
- increased effectiveness in diagnosing and following up suspicious signs and symptoms
- more effective investigation and staging of disease
- more widespread availability of treatment
- increasing subspecialisation of cancer treatment
- more effective treatment and new therapies
- improved referral patterns to appropriate cancer services.

Factors associated with cancer collection and reporting:

- changes in the definition and coding of cancer
- changes in the completeness of cancer registration and deaths
- changes in survival analysis methods, including the selection of years of diagnosis and follow-up.

Importantly, cancer-coding practices can influence survival estimates and care should be taken when comparing over time, or with other countries. For example, the Surveillance, Epidemiological and End Results (SEER) program in the United States of America combines *in situ* bladder tumours with invasive cancers, which would increase survival compared with using just invasive cancer alone (Parkin et al. 1992). A note is provided where survival trends or differences may be an artefact of coding or reporting practices.

A note about lead-time bias

Cancer survival is based on the time between cancer diagnosis and death, and is therefore sensitive to anything that affects the timing of either date. Effective treatment and management of cancer can improve survival by delaying the time until death. However, the timing of cancer diagnosis can also be brought forward, resulting in an artificial or inflated increase in survival. This time shift in the detection of cancer, without changing the natural course of the disease, is known as lead-time bias (Welch et al. 2000; Duffy et al. 2008; Gigerenzer et al. 2008; de Vries et al. 2010). Cancers that can be diagnosed asymptotically through screening or other sensitive diagnostic techniques are more prone to lead-time bias.

It should be emphasised that early detection and screening also lead to genuine gains in survival as early-stage or smaller cancers can be treated more successfully (AIHW & NBCC 2007; BreastScreen Australia Evaluation Advisory Committee 2009; Duffy et al. 2010). There is a need to better understand the extent to which increases in survival are due to early detection, improvements in treatment, or a combination of the two. While the figures in this report have not been adjusted for lead-time bias, a cautionary note is provided where increases in survival may be exaggerated due to this effect.

Mortality trends have also been suggested as an alternative to survival for measuring cancer control without the influence of lead-time bias. However, mortality trends in isolation can also be misleading as an expression of survival since they are influenced by incidence trends. The most appropriate way of evaluating progress in cancer control is to consider all three measures of incidence, mortality and survival together (Dickman & Adami 2006). For this reason, the report plots yearly survival estimates alongside yearly age-standardised incidence and mortality rates.

Age adjustment

Relative survival estimates in this report have not been age adjusted. While relative survival relates the observed survival of those with cancer to the expected survival of the general population of comparable age, sex and calendar year, the *net* survival associated with cancer still varies with age. As such, differences in survival by population group or time period may be affected by differing age distributions. However, previous investigations with Australian data showed that age adjustment had little overall effect on survival comparisons by time period, remoteness and socioeconomic status (AIHW et al. 2008).

Relative survival over 100%

Some tables in this report show relative survival estimates of more than 100%. This suggests that an individual in such a category had higher chance of survival than those in the general population. There are a number of possible reasons for this. For example, the diagnosis of a serious disease can result in lifestyle changes that in turn lead to health benefits. Longer-term medical surveillance may also be associated with genuine survival gains. A further influence is that patients diagnosed with some types of cancers may be at a greater socioeconomic advantage than the general population and may have better access to health care (Brenner & Arndt 2005). Apart from these considerations, the confidence intervals associated with estimates over 100% also need to be taken into consideration, as estimates are subject to statistical variation.

Statistical significance

Confidence intervals (at the 95% level) are shown in a number of graphs (as error bars) and tables in this report. They can be used as a guide when considering whether differences in survival estimates are a result of chance variation. Where confidence intervals do not overlap, the difference between estimates may be greater than would be readily attributable to chance. While such differences may be regarded as 'significant' in statistical terms, they may not be 'significant' from a clinical perspective.

The AIHW is currently 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 analyses 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 reports remain robust and appropriately inform understanding and decision-making.

What is prevalence?

Prevalence refers to the number of people alive with a prior diagnosis of cancer. It is distinct from incidence, which is the number of all new cancer cases diagnosed in a given time period. Prevalence reflects the number of people receiving treatment, follow-up management or ongoing monitoring for their cancer, as well as those with a permanent impairment or disability as a result of cancer. Prevalence statistics indicate the demand for cancer care and the need for cancer surveillance and are important considerations for health-care planning and service delivery.

Prevalence is a direct product of incidence and survival. Cancers with high incidence and high survival (such as melanoma of the skin) tend to have high prevalence, whereas cancers with low incidence and low survival (such as pancreatic cancer) tend to have low prevalence. The prevalence of other cancers may represent a balance between conflicting patterns of incidence and survival. Lung cancer, for example, had low prevalence compared with other cancers despite being the fifth most common cancer diagnosed (AIHW & CA 2011). This is because people with lung cancer tend not to live as long as those diagnosed with other cancers (AIHW & CA 2011).

Box 1.3: Prevalence terminology in this report

Prevalence: a general term indicating the number of people alive with a prior diagnosis of cancer.

Complete prevalence: the number of living people who were *ever* diagnosed with cancer.

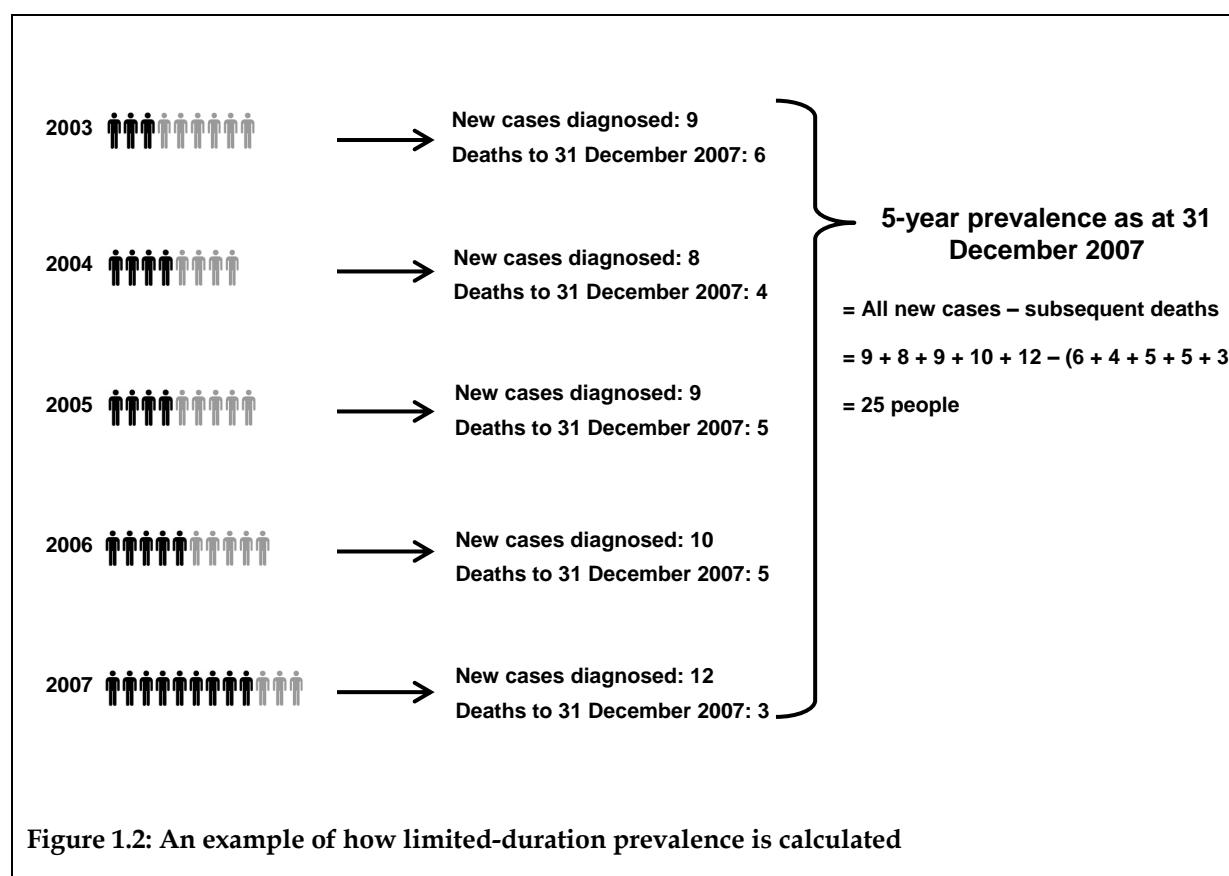
Limited-duration prevalence: the number of living people who were diagnosed with cancer within a given time period up to a specific date. Limited-duration prevalence is presented in this report as at 31 December 2007.

Limited-duration prevalence

Limited-duration prevalence is presented in this report. It refers to the number of living people who were diagnosed with cancer within a given time period up to a specific (or index) date. In this report, limited-duration prevalence is provided for 1 year, 5 years, 10 years and 26 years, with an index date of 31 December 2007:

- **One-year prevalence** is the number of living people who were diagnosed with cancer in the past year to 31 December 2007. It may include predominantly people undergoing primary first-year cancer treatment or experiencing its side effects (Tracey, Baker et al. 2007).
- **Five-year prevalence** is the number of living people who were diagnosed in the 5 years to 31 December 2007, and includes those people defined by 1-year prevalence. It may include a combination of people receiving initial treatment or ongoing follow-up management.

Figure 1.2 presents an example of how limited-duration 5-year prevalence is calculated. Prevalence is simply a count of all people diagnosed with cancer in the 5 years to the index date, less the number of subsequent deaths.



In this report, 26 years is the longest duration that can be calculated for prevalence with the earliest (1982) and latest (2007) years of available incidence data. Individuals who were diagnosed with at least one cancer between 1982 and 2007 and who were alive on 31 December 2007 would be counted in 26-year prevalence. It is presented in this report as an approximation of the number of people alive who have ever been diagnosed with cancer, known as *complete prevalence*. Limited-duration prevalence was selected because of its advantages in the ease of interpretation and calculation. Twenty-six years was deemed a sufficiently long period for approximating complete prevalence, given that most cancers are diagnosed in the second half of the life span and that the potential for them to cause death would generally diminish over time.

How is prevalence presented in this report?

Multiple cancers: Unlike survival and incidence, prevalence is based on the number of people with cancer, rather than the number of cases. Individuals with multiple cancers were only counted once for prevalence; however, this depended on the definition of the cancer of interest. For example, a person with a primary lung cancer and a primary breast cancer was counted once for prevalence of all cancers combined, but contributed separately to the prevalence of lung cancer and the prevalence of breast cancer.

Prevalence rate: Prevalence is also presented as a proportion of the population (also known as the prevalence 'rate'), which is calculated from the total Australian population as at 31 December 2007. Given low prevalence numbers relative to the total population, these rates are expressed per 100,000 population rather than as a percentage. These rates have not been age standardised and should not be compared over time with prevalence statistics from earlier reports.

Age: In prevalence statistics, age refers to the age of a person on the index date, or 31 December 2007. This differs from the age used for incidence and survival, which is the age at diagnosis. For example, a person diagnosed with cancer in 1982 when they turned 50 that year would be counted as age 75 in the prevalence statistics (as at the end of 2007).

Data sources

Australian Cancer Database

The primary data source for this report was the Australian Cancer Database (ACD). This database 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 for compilation into a national database. The ACD is maintained by the AIHW in partnership with the Australasian Association of Cancer Registries (AACR).

National Death Index

The ACD is routinely linked to the National Death Index (NDI) so that cancer data can be updated with mortality information. The NDI is a database of all deaths that have occurred in Australia since 1980 and is maintained by the AIHW for the purposes of record linkage. These

data are supplied monthly by the state and territory Registrars of Births, Deaths and Marriages.

National Mortality Database and ABS population data

The National Mortality Database (NMD) and population data from the Australian Bureau of Statistics (ABS) were used to produce life tables for the general population, which were the basis for calculating expected survival. The NMD contains information on all registered deaths in Australia from 1964 onwards and is maintained by the AIHW. It is compiled from death registrations from the state and territory Registrars of Births, Deaths and Marriages that are coded for causes of death by the ABS.

Population data were sourced from the ABS Demography section using the most up-to-date estimates from the 5-yearly Census of Population and Housing.

More information on the data sources for this report, including Data Quality Statements, can be found in Appendix C.

3 Survival and prevalence overview

In general, previous studies have shown increasing survival trends throughout Australia (English et al. 2007; AIHW, CA & AACR 2008; ACT Cancer Registry 2009; Cancer Institute NSW 2012), as well as in other similar countries (Rachet et al. 2008; Ministry of Health 2010; Coleman et al. 2011; Ministry of Industry 2011). Gains in survival were not distributed equally among cancer types, although an important moderator of cancer survival is the stage or extent of disease at diagnosis.

This chapter presents an overview of survival and prevalence in Australia from 1982 to 2010 for all cancers combined, as well as a comparison of individual cancer type.

All cancers combined (C00–C97, D45–D46, D47.1, D47.3)

Cancer is a major cause of illness in Australia, responsible for around 108,000 new cases diagnosed and almost 40,000 deaths in 2007 (AIHW & AACR 2010). One in 2 Australians will have developed cancer and 1 in 5 will have died from cancer before the age of 85, and the number of cancer cases is expected to rise over the next decade (AIHW 2012).

Although cancer is a heterogeneous group of diseases, survival and prevalence estimates for all cancers combined are important overall indicators for monitoring the burden of cancer, demand for cancer care and progress in cancer control.

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of all cancers combined rose by 27% to 490 new cases per 100,000. Meanwhile, mortality from cancer fell by 16% during the same period, to 176 deaths per 100,000.

Along with rising incidence and falling mortality, survival from all cancers combined increased steadily and significantly over time. Between the periods 1982–1987 and 2006–2010, 5-year survival rose from 47% to 66%.

There was a slight jump in survival in 1994–1999; this may have been related to the peak in incidence of early-stage cancers in the mid-1990s, largely driven by the surge in use of prostate-specific antigen (PSA) testing (AIHW 2007). Improvements in the sensitivity of diagnostic tools allowing cancers to be detected earlier in their natural course, as well as the detection of slow-progressing cancers, may have contributed towards this increase in survival (Dickman & Adami 2006).

Survival in the period 2006–2010

In 2006–2010, 5-year relative survival was 66%. That is, people diagnosed with cancer had a 66% chance of surviving for at least 5 years compared with their counterparts in the general population.

Sex: Females tended to have slightly higher survival than males overall. Five-year survival was 67% for females compared with 65% for males.

However, this varied with age: females had a survival advantage up to the 60–69-year age group. After that, survival was slightly higher for males, and significantly so for those aged in their 70s. This may be due to the underlying age distributions and survival outcomes for the two most common cancers in males and females: prostate and breast cancer.

Age: Survival was highest for people aged under 40 (5-year survival of 86%) and decreased with age so that it was lowest for those aged 80 and over (43%). This age-related pattern of survival is characteristic of most individual cancer types presented in this report. The reduction in survival with age was more pronounced in the second half of the life span—for almost all types of cancers, survival was lowest in the elderly.

Population group: Survival decreased with greater remoteness although the differences were small: 5-year survival was 67% in *Major cities*, 66% in *Inner regional* areas, 65% in *Outer regional* areas and 63% in *Remote and Very remote* areas.

Similarly, there was a gradient of decreasing survival with greater socioeconomic disadvantage: 5-year survival was 8 percentage points higher for people in areas of the highest socioeconomic status quintile (71%), compared with those in the lowest quintile (63%).

Conditional survival

The prospect of surviving for at least 5 more years increased markedly with the number of years already survived. At diagnosis, the probability of surviving for at least 5 years was 66%. However, by 1 year after diagnosis, individuals with cancer had an 80% chance of surviving at least 5 more years. This increased further to 97% by 15 years after diagnosis, at which survival prospects were almost the same as in the general population.

Prevalence at the end of 2007

At the end of 2007, there were about 774,700 people in Australia who were diagnosed with cancer in the previous 26 years, including 339,000 diagnosed in the previous 5 years. This 26-year prevalence equated to roughly 3.6% of the total Australian population. Prevalence also increased with age: almost a fifth (19%) of all Australians aged 80 and over had a diagnosis of cancer within the previous 26 years.

Table 3.1: Summary of new cases, deaths and prevalence for all cancers combined^(a), Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	1,058,733	717,624	185,574	381,164	3,609.6
Females	870,421	506,826	153,503	393,510	3,685.2
Persons	1,929,154	1,224,450	339,077	774,674	3,647.6

(a) Excludes basal cell and squamous cell carcinoma of the skin.

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 3.2: Summary of relative survival from all cancers combined^(a), Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	80.0	79.8–80.3	65.1	64.9–65.4	58.7	58.4–59.0
Females	81.5	81.2–81.7	67.4	67.1–67.6	62.1	61.8–62.4
Persons	80.7	80.5–80.8	66.1	65.9–66.3	60.2	60.0–60.5
<i>Previous time periods</i>						
1982–1987	67.4	67.3–67.6	46.9	46.6–47.2	n.a.	n.a.
1988–1993	71.5	71.3–71.6	51.9	51.7–52.1	44.9	44.7–45.2
1994–1999	75.0	74.9–75.2	57.9	57.8–58.1	50.9	50.7–51.1
2000–2005	77.6	77.5–77.7	61.5	61.4–61.7	55.1	54.9–55.3

(a) Excludes basal cell and squamous cell carcinoma of the skin.

Note: Additional data are presented in online tables S1.1 and S1.2.

Source: AIHW Australian Cancer Database (2007).

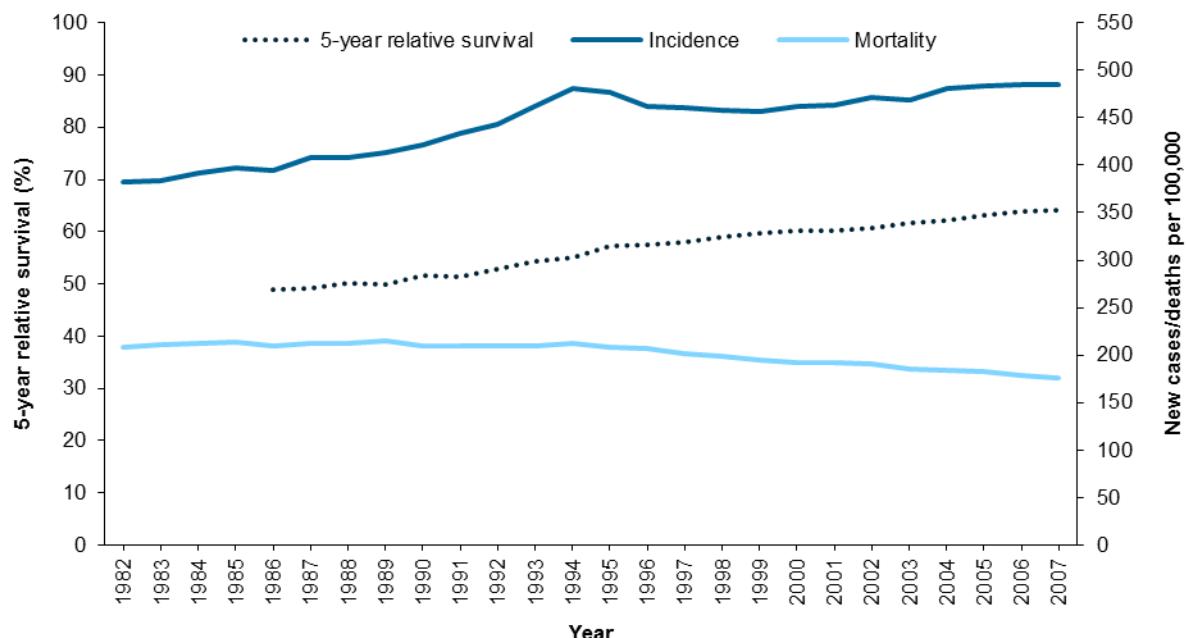
Table 3.3: Summary of conditional relative survival from all cancers combined^(a), Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	66.1	65.9–66.3
Already survived 1 year after diagnosis	80.0	79.9–80.2
Already survived 5 years after diagnosis	91.1	90.9–91.2
Already survived 10 years after diagnosis	94.0	93.8–94.2

(a) Excludes basal cell and squamous cell carcinoma of the skin.

Note: Additional data are presented in online Table S1.4.

Source: AIHW Australian Cancer Database (2007).

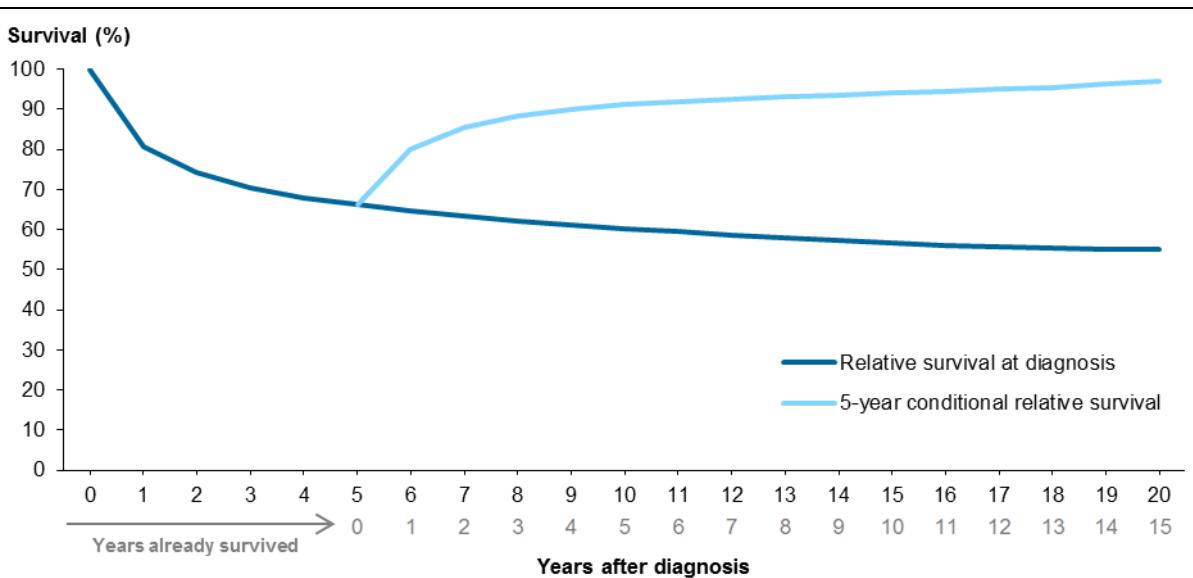


Notes

1. Excludes basal cell and squamous cell carcinoma of the skin.
2. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
3. Survival data for this figure are presented in online Table S1.3.

Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 3.1: Yearly trends in incidence, mortality and 5-year relative survival of all cancers combined, Australia, 1982 to 2007



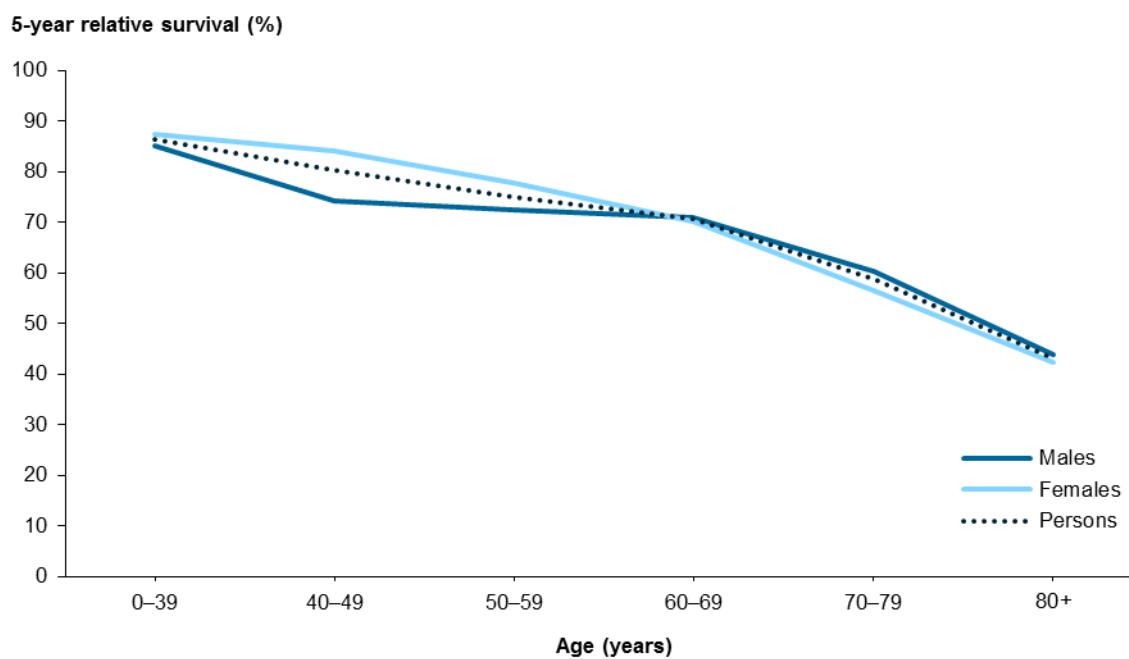
Notes

1. Excludes basal cell and squamous cell carcinoma of the skin.
2. Data for this figure are presented in online tables S1.1 and S1.4.

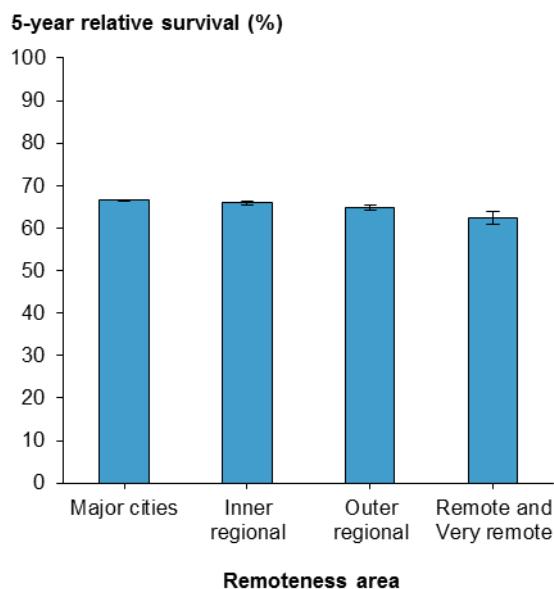
Source: AIHW Australian Cancer Database (2007).

Figure 3.2: Relative survival at diagnosis and 5-year conditional relative survival from all cancers combined, Australia, 2006–2010

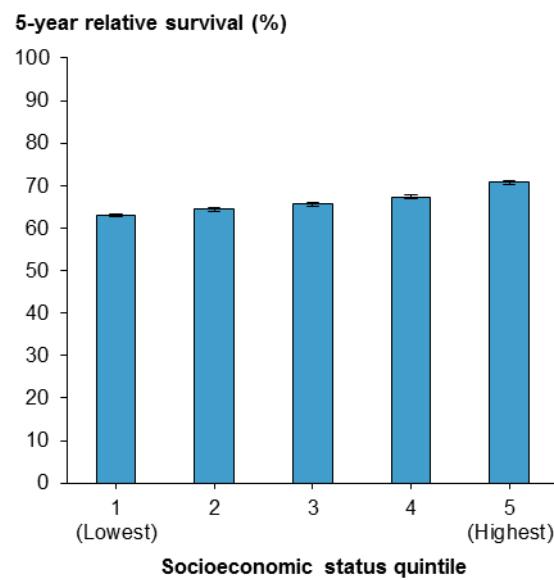
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Excludes basal cell and squamous cell carcinoma of the skin.
2. Error bars represent 95% confidence intervals.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S1.5 and S1.6.

Source: AIHW Australian Cancer Database (2007).

Figure 3.3: Five-year relative survival from all cancers combined by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Differences by cancer type

Cancer is a heterogeneous disease with vast differences in survival by cancer type (see Figure 3.4). For some cancers, such as testicular cancer, relative survival was almost 100% — that is, individuals with these cancers had survival prospects about the same as members of the general population.

For other cancers, such as pancreatic cancer, individuals faced survival prospects that were much lower than that experienced in the general population. The variation in survival by cancer type was even greater if other prognostic factors, such as age, were taken into account.

Which cancers had the highest survival?

In the period 2006–2010, cancers that had a 5-year survival of 90% or higher were:

- testicular cancer
- lip cancer
- prostate cancer
- thyroid cancer
- melanoma of the skin.

Other cancer types with comparatively good survival prospects were breast cancer (for females), Hodgkin lymphoma and uterine cancer.

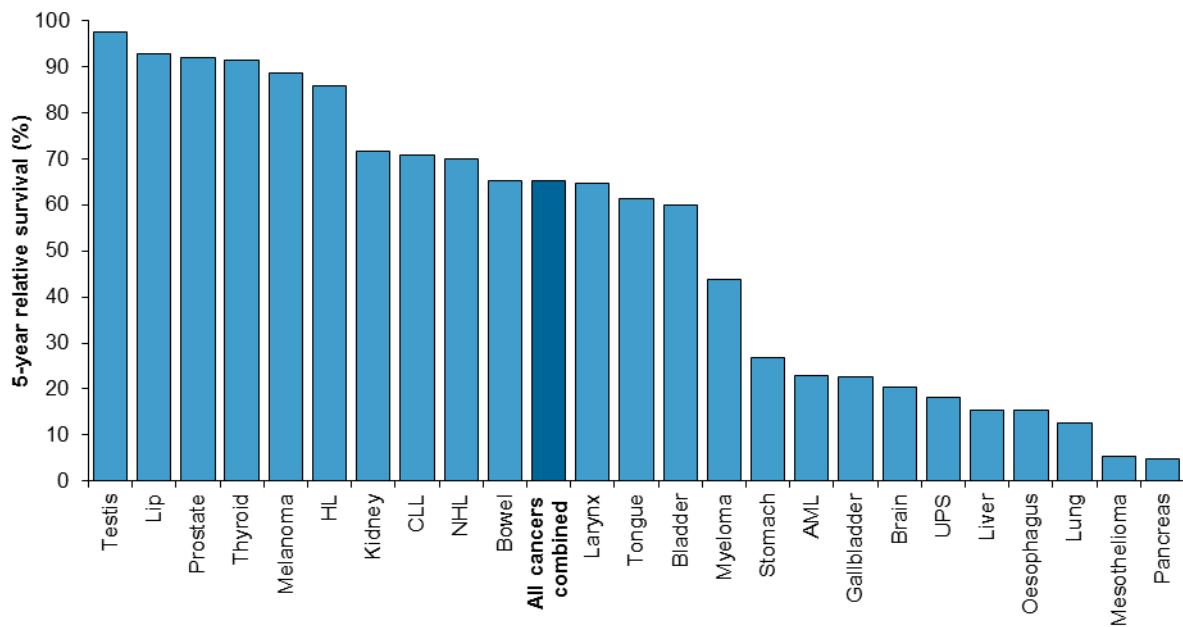
Which cancers had the lowest survival?

In the period 2006–2010, cancers that had a 5-year survival of 10% or lower were:

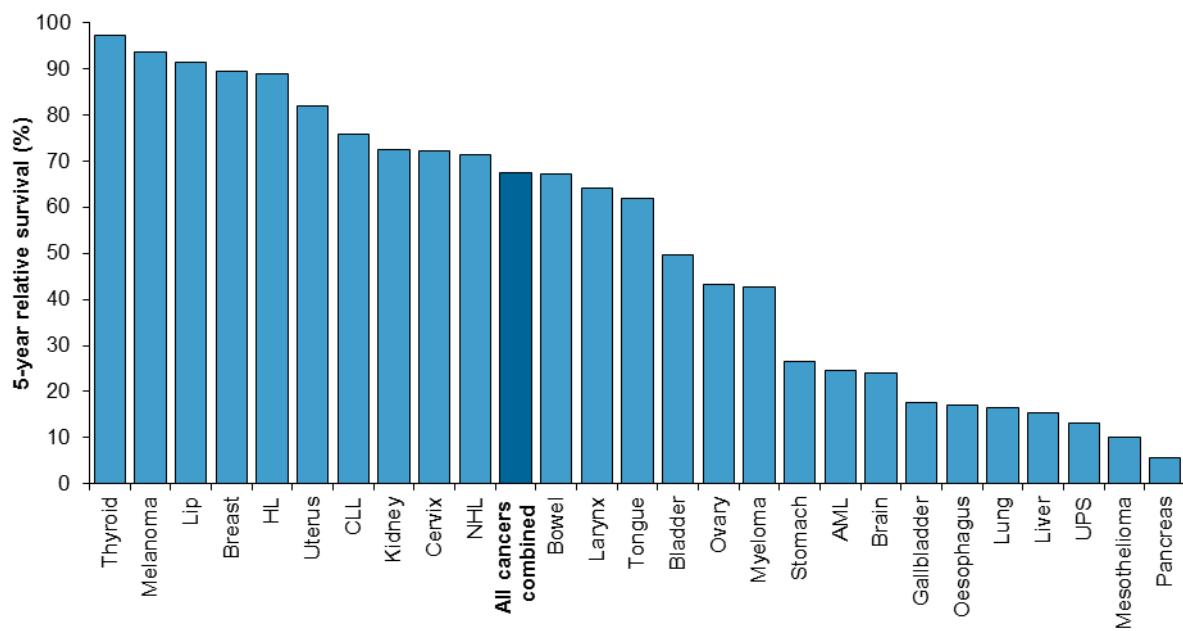
- pancreatic cancer
- mesothelioma.

Other cancers with comparatively poor survival were those with a primary site of the lung, liver, oesophagus, as well as cancers of unknown primary site.

A. Males



B. Females



Note: AML=Acute myeloid leukaemia, CLL=Chronic lymphocytic leukaemia, HL= Hodgkin lymphoma, NHL=Non-Hodgkin lymphoma, UPS=Unknown primary site. Melanoma refers to melanoma of the skin.

Source: AIHW Australian Cancer Database (2007).

Figure 3.4: Five-year relative survival, males (A) and females (B), Australia, 2006–2010

Trends in survival by cancer type

Figure 3.5 presents a summary of trends in 5-year survival between the periods 1982–1987 and 2006–2010. In general, survival from most cancers improved over time. However, the change in survival was not uniform over time and across cancer types. For example, survival from cervical cancer increased until the early 1990s but did not change significantly thereafter. By way of contrast, survival from cancer of unknown primary site remained virtually unchanged until the 2000s when it more than doubled.

The cancers that showed the greatest percentage-point increase in survival were:

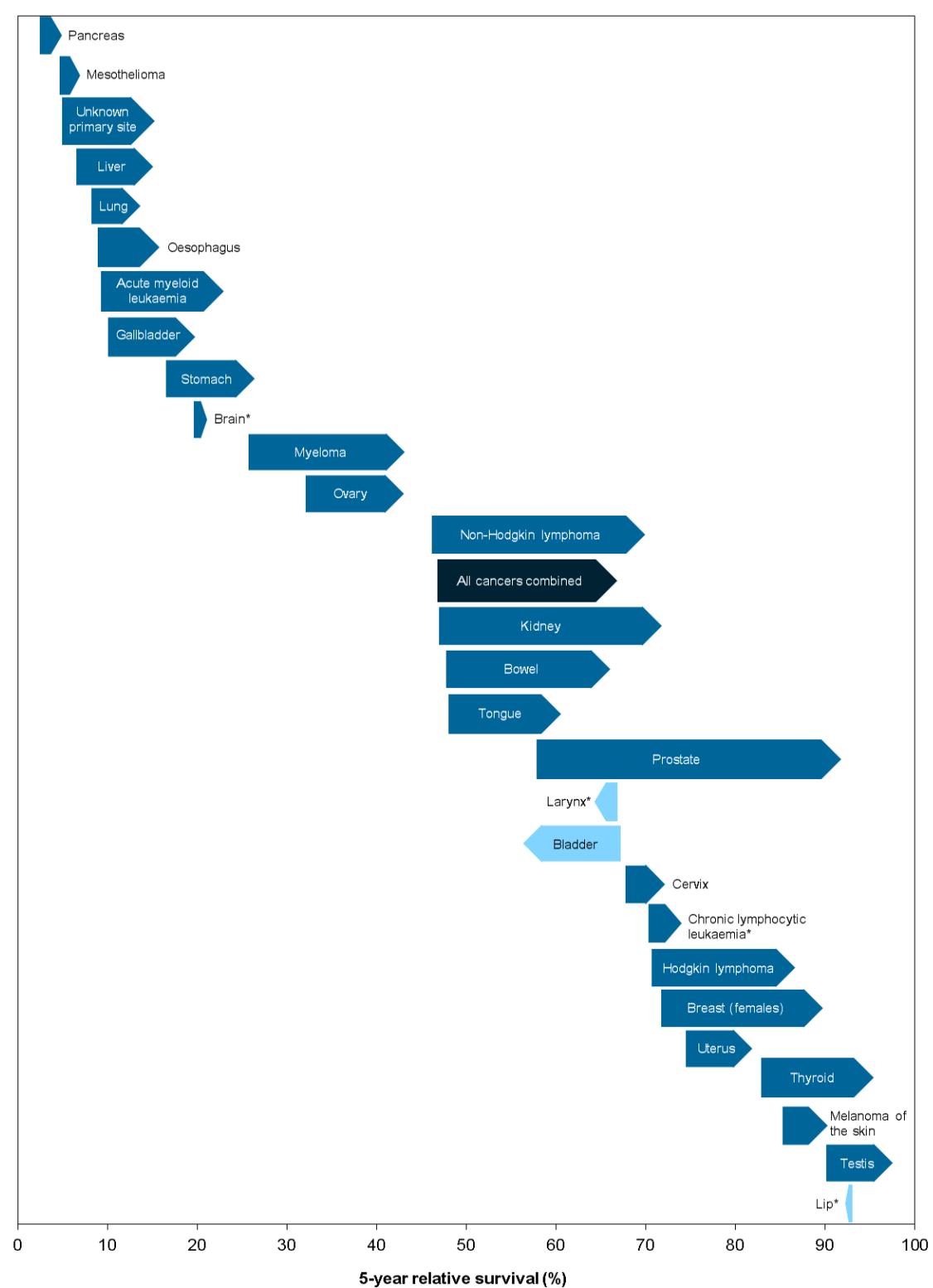
- prostate cancer
- kidney cancer
- non-Hodgkin lymphoma.

Five-year survival from these cancers increased by 24 percentage points or more in absolute terms.

Other cancers that showed a greater proportional increase in survival included liver cancer, cancer of unknown primary site, and acute myeloid leukaemia. Five-year survival from these cancers more than doubled between the periods 1982–1987 and 2006–2010, despite remaining lower than the average.

However, many of the cancers that already had low survival in 1982–1987 showed only small gains in survival over time, such as mesothelioma, pancreatic cancer and lung cancer. In addition, three cancers showed a decrease in 5-year survival: cancers of the bladder, larynx and lip. However, the decrease was not statistically significant for the last two. The negative trend in bladder cancer survival has been observed elsewhere in Australia and is believed to be related to changes in the coding of invasive cancers and changes in the age at diagnosis over time (English et al. 2007; Duncombe et al. 2009; Luke et al. 2010).

Five-year survival from chronic lymphocytic leukaemia and brain cancer also did not change significantly between 1982–1987 and 2006–2010 overall. However, brain cancer survival for females increased significantly during this period, while for both males and females combined, brain cancer survival showed a marginal increase between the periods 2000–2005 and 2006–2010.



Notes

- Arrow positions indicate survival estimates and arrow lengths indicate the change in survival between the periods 1982–1987 and 2006–2010. Cancers labelled with an asterisk (*) indicate changes that were not statistically significant.
- Data for 1988–1993, instead of 1982–1987, are used for liver cancer due to the small number of cases from the earlier time period.

Source: AIHW Australian Cancer Database (2007).

Figure 3.5: Survival trends at a glance, Australia, 1982–1987 to 2006–2010

Variation by remoteness

Some cancers showed survival differences by geographical location of residence at diagnosis, as shown in Figure 3.6. In the period 2006–2010, cancers which had higher 5-year survival in *Major cities* compared with some or all areas outside *Major cities* were:

- bowel cancer
- breast cancer (females)
- liver cancer
- lung cancer
- ovarian cancer
- pancreatic cancer
- stomach cancer
- tongue cancer.

Cancer survival outcomes may vary across regions due to differences in the age at diagnosis, the extent of disease at diagnosis and cancer histology and subtypes. The effects of these covariates on survival have been modelled and further explored in other Australian reports (English et al. 2007; Tracey, Barraclough et al. 2007).

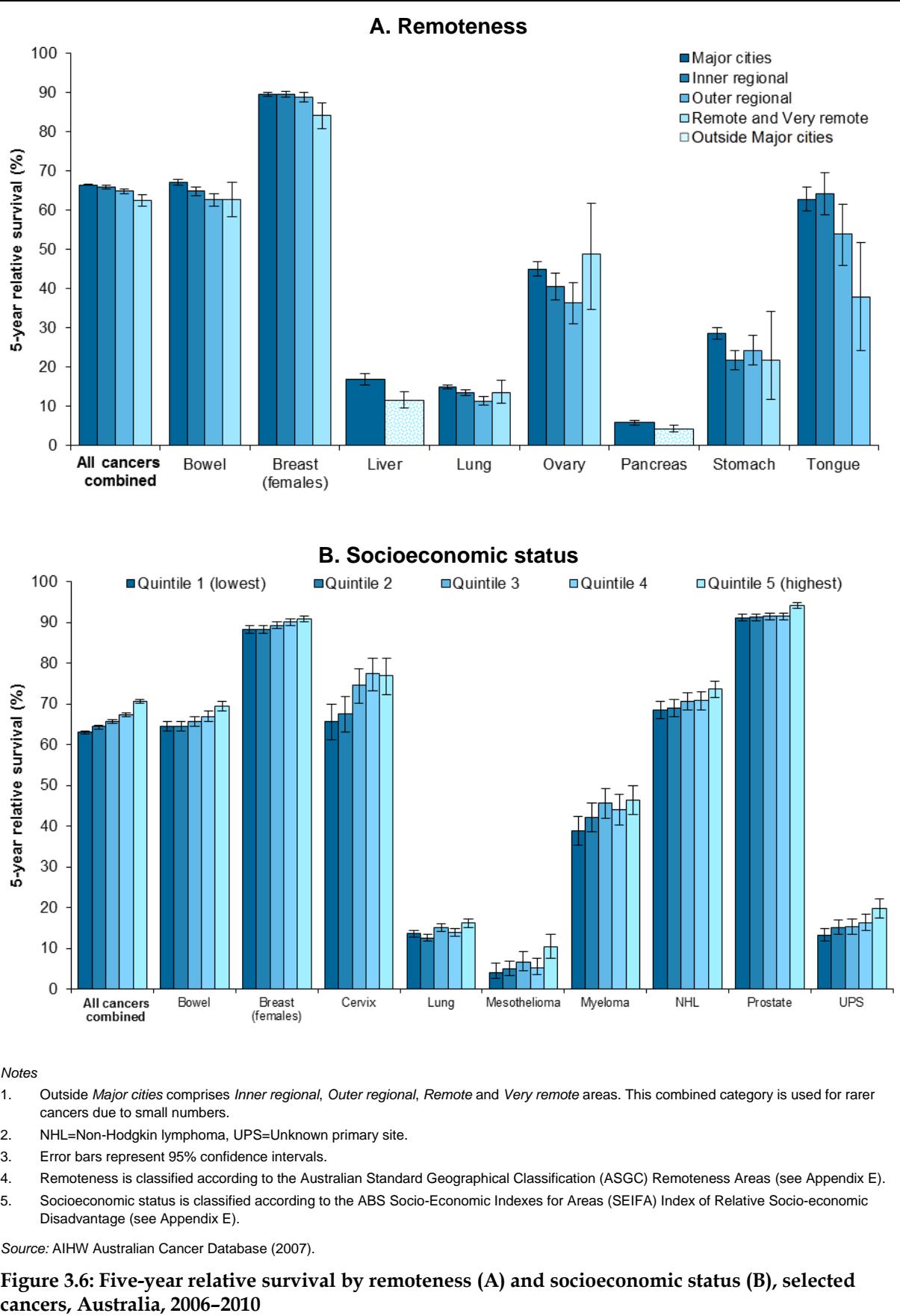
Variation by socioeconomic status

Some cancers demonstrated survival differences by socioeconomic status of the area of residence at diagnosis, as shown in Figure 3.6. In the period 2006–2010, cancers for which 5-year survival was significantly higher in the highest socioeconomic status quintile compared with the lowest quintile were:

- bowel cancer
- breast cancer (females)
- cervical cancer
- lung cancer
- mesothelioma
- myeloma
- non-Hodgkin lymphoma
- prostate cancer
- cancer of unknown primary site.

Notably, prostate cancer had significantly higher survival for males in the highest socioeconomic status quintile than for any other quintile. This may be related to PSA testing, which may be more prevalent in socioeconomically advantaged population groups (Brenner & Arndt 2005) and which can lead to earlier detection.

It is worth noting that differences in survival may be affected by the overlap between remoteness and socioeconomic status. For example, an earlier report showed that almost 30% of people with cancer in *Remote and Very remote* areas lived in areas of the lowest socioeconomic status quintile, while almost 95% of people with cancer in the highest socioeconomic status quintile lived in *Major cities* (AIHW et al. 2008).



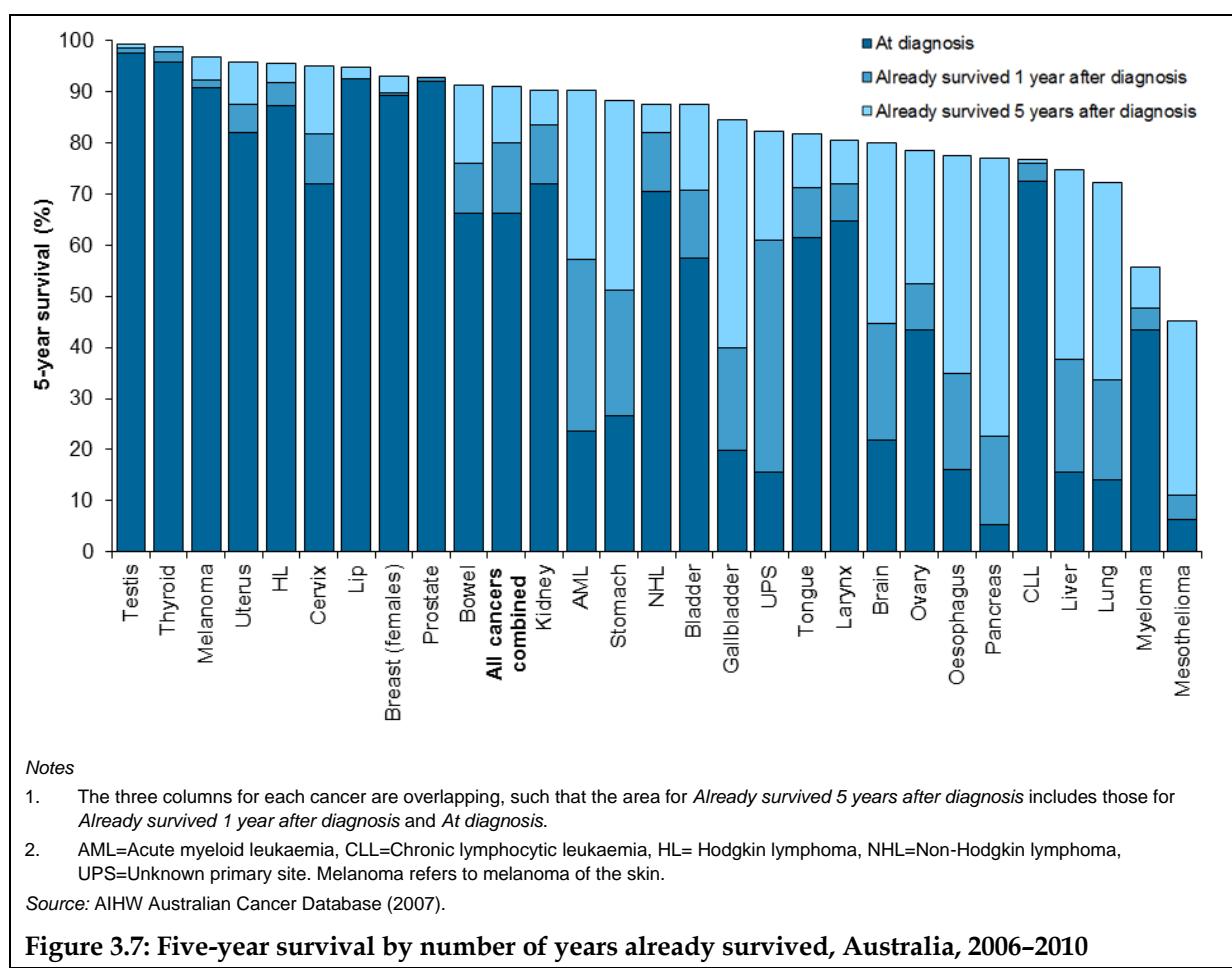
Conditional survival

Figure 3.7 presents the probability of surviving for at least 5 more years by the amount of time already survived: at diagnosis, 1 year after diagnosis, and 5 years after diagnosis. Note that the three columns for each cancer are overlapping, such that the area for *Already survived 5 years after diagnosis* includes those for *Already survived 1 year after diagnosis* and *At diagnosis*.

Conditional survival statistics illustrate a positive aspect of cancer: if those with cancer survived 5 years past their diagnosis, their survival prospects for an additional 5 years were quite high—more than 70% for all but two cancers in the 2006–2010 period.

The relationship between conditional survival and survival at diagnosis varied between cancers. Some cancers had poor survival prospects at diagnosis but conditional survival increased substantially with the number of additional years survived. These included cancers of the stomach, gallbladder and unknown primary site, as well as acute myeloid leukaemia. All of these had a 5-year survival at diagnosis of less than 30%; however, at 5 years after diagnosis, survival for an additional 5 years was greater than 80%.

Some cancers had comparatively high survival at diagnosis although their conditional survival by 5 years after diagnosis improved only a little. For example, survival from chronic lymphocytic leukaemia was comparatively high at diagnosis, but was ranked fifth lowest by 5 years after diagnosis. Compared with other cancers, the risk of death for these cancers did not diminish as quickly with each additional year survived.



Prevalence by cancer type

Twenty-six-year prevalence refers to the number of Australians alive at the end of 2007 who were diagnosed with cancer in the previous 26 years. Figure 3.8 presents in descending order the 26-year prevalence of the cancers in this report. Four major cancers stood out with a higher prevalence: breast cancer, melanoma, prostate cancer and bowel cancer. At the end of 2007, there were more than 151,000 Australian women alive, comprising 1.4% of the female population, who were diagnosed with breast cancer in the previous 26 years. Likewise, almost 130,000 Australian men, comprising 1.2% of the male population, were diagnosed with prostate cancer in the previous 26 years. These cancers had both high incidence and high survival, that is, they were commonly diagnosed and individuals with the disease tended to live for a long time compared with those with other cancers.

Another factor that contributed to higher prevalence was age at diagnosis. Cancers that were often diagnosed in younger people, such as melanoma, were also associated with higher prevalence, given that younger people generally live longer.

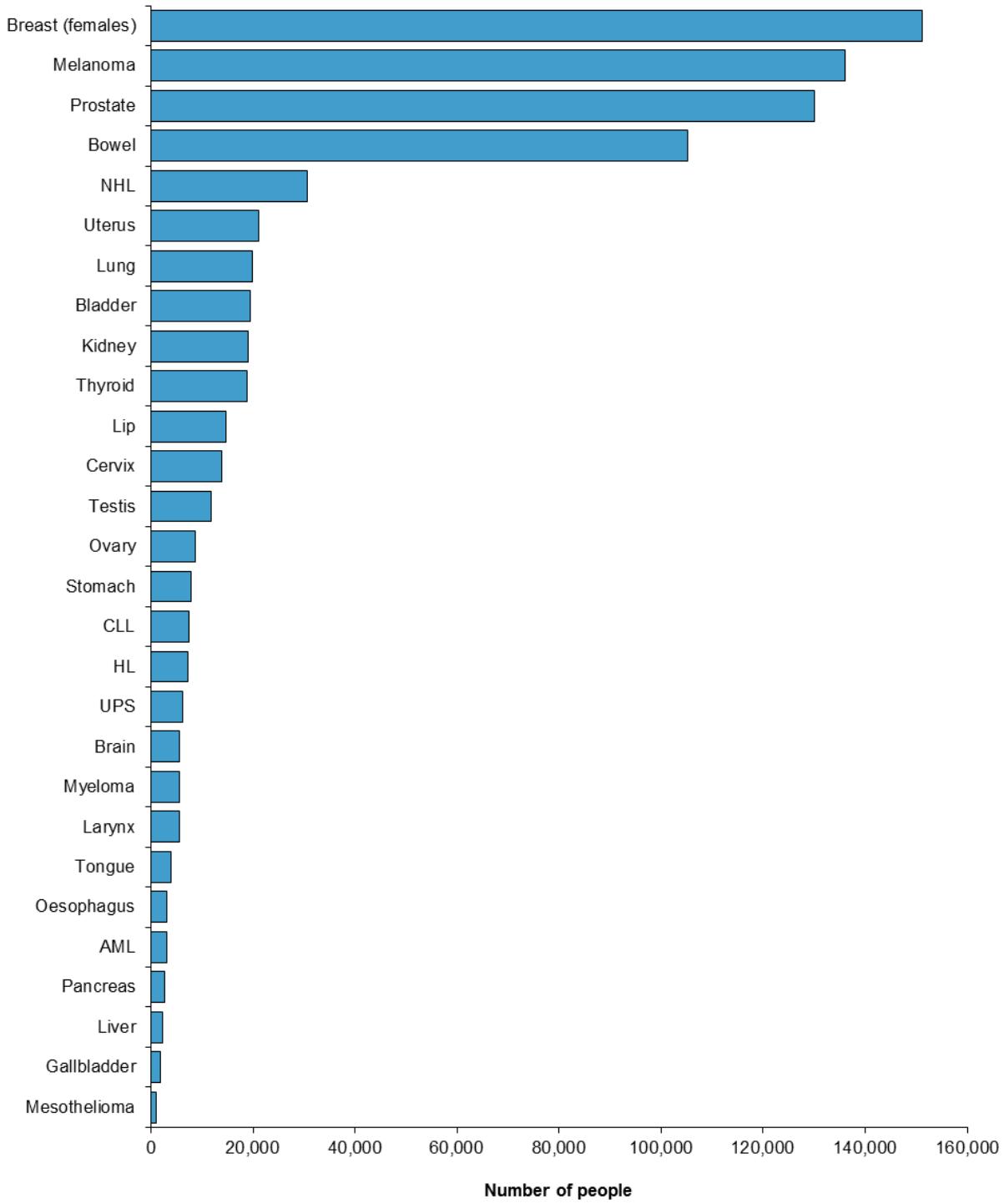
Cancers with a low prevalence tended to be rare and associated with poorer survival outcomes. These included mesothelioma and cancers of the gallbladder, liver and pancreas. There were fewer than 3,000 people alive in Australia at the end of 2007 who were previously diagnosed with each of these cancers.

Effect of incidence and survival on prevalence

The relationship between cancer incidence and survival that underlies these prevalence statistics is presented in Figure 3.9. Cancer incidence is represented by the size of the circles, while cancer survival is measured along the *y*-axis. For ease of presentation, cancer types are arranged along the *x*-axis alphabetically. Cancers that had both high incidence and survival (such as prostate cancer) also had high prevalence, whereas cancers that had both low incidence and survival (such as liver cancer) had low prevalence. Cancers with contrasting incidence and survival (such as lip cancer) had a prevalence that counterbalanced the two.

Figure 3.9 also illustrates another positive finding, that the most common cancers in Australia generally had good survival outcomes. The likelihood of surviving prostate cancer, breast cancer and melanoma of the skin (3 of the 4 most commonly diagnosed cancers) for at least 5 years after diagnosis was about 90% and higher. However, it is worth noting that improved diagnostic sensitivity and lead-time bias can also lead to both higher incidence and survival for some of these cancers.

Conversely, cancers with poorer prognoses also tended to be rare, such as mesothelioma and cancers of the liver and oesophagus. An exception was lung cancer, which was the fifth most commonly diagnosed cancer but had the third lowest 5-year survival, at 14%. Pancreatic cancer too was within the top 10 most common cancers diagnosed but had the lowest 5-year survival of all, at 5.2%.

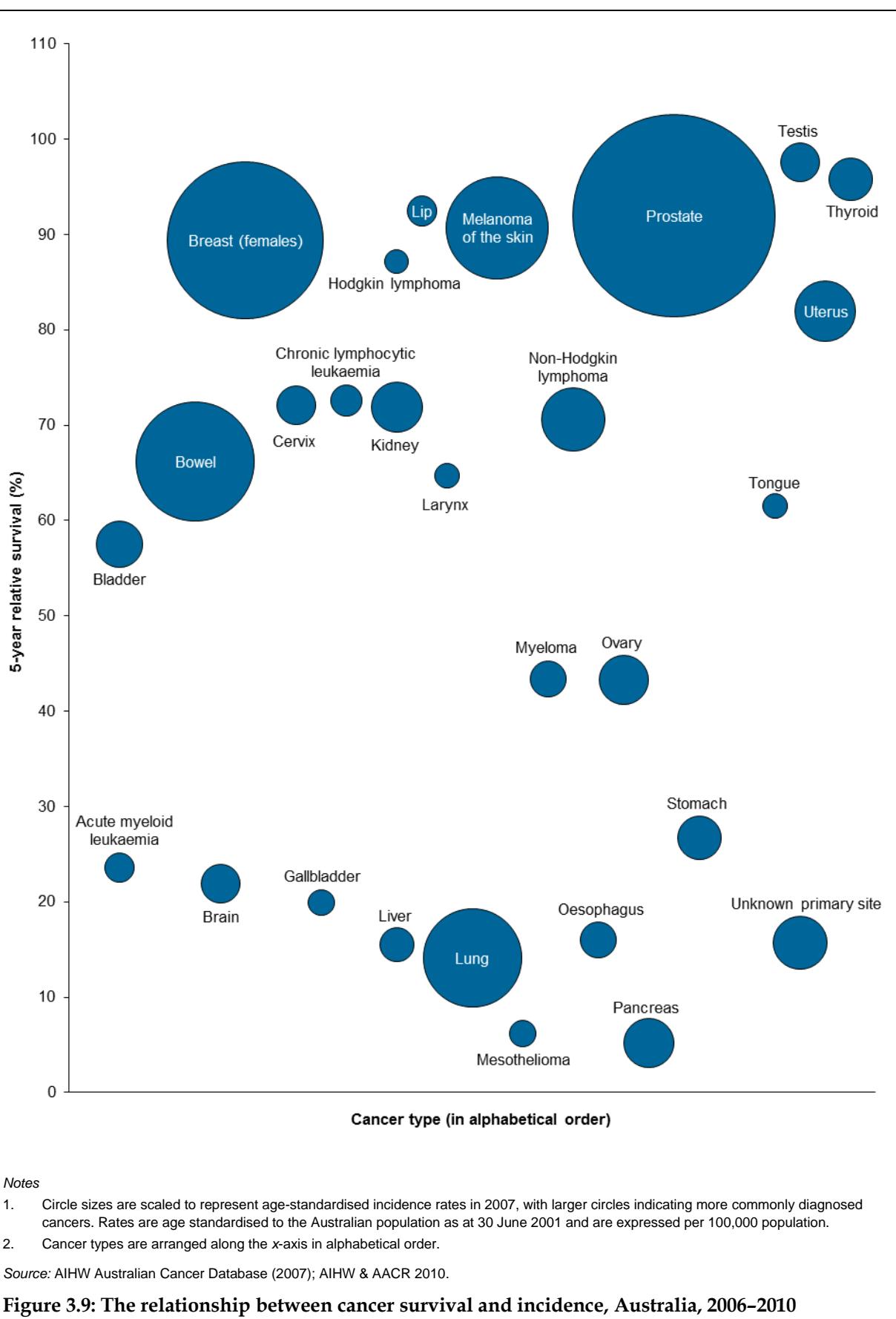


Notes

1. AML=Acute myeloid leukaemia, CLL=Chronic lymphocytic leukaemia, HL= Hodgkin lymphoma, NHL=Non-Hodgkin lymphoma, UPS=Unknown primary site. Melanoma refers to melanoma of the skin.
2. Twenty-six-year prevalence refers to the number of living people diagnosed with cancer with the previous 26 years, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Figure 3.8: Twenty-six-year prevalence, Australia, end of 2007



4 Survival and prevalence summaries

Acute myeloid leukaemia (C92.0, C92.3–C92.5, C93.0, C94.0, C94.2, C94.4, C94.5)

Snapshot: in 2006–2010, individuals with acute myeloid leukaemia had a 24% chance of surviving for at least 5 years compared with the general population.

Acute myeloid leukaemia is a type of cancer affecting the blood and bone marrow, characterised by an overproduction of immature white blood cells (Leukaemia Foundation 2008a). It is rare, accounting for 0.8% of all cancer cases in Australia in 2007. Acute myeloid leukaemia is a heterogeneous disease, with different treatments and survival outcomes depending on the genetic makeup of leukaemic cells (Milligan 2008).

Incidence, mortality and survival trends

Incidence of acute myeloid leukaemia increased slightly between 1982 and 2007, from 3.2 new cases per 100,000 to 3.8. Meanwhile, mortality fluctuated between 3.1 and 3.4 deaths per 100,000 during the latter half of this period.

Survival from acute myeloid leukaemia increased significantly between the periods 1982–1987 and 2006–2010, with 5-year survival more than doubling from 9.9% to 24%. Much of this increase occurred between the late 1990s and the early 2000s.

Survival in the period 2006–2010

Sex: Survival did not differ significantly between males and females.

Age: Older age at diagnosis was associated with lower survival. Five-year survival was 66% for those aged under 40 compared with 2.5% for those aged 70 and over.

Population group: There were no significant differences in survival by remoteness.

Survival varied by socioeconomic status although the association was not clear. Five-year survival was highest for people in the fourth highest socioeconomic status quintile (28%) compared with other socioeconomic status quintiles (20%–25%).

Conditional survival

At diagnosis, the probability of surviving for at least 5 years was 24%. However, once those with acute myeloid leukaemia had survived 1 year after diagnosis, the probability of surviving another 5 or more years had more than doubled to 57%. By the time they had survived 14 years after diagnosis, this probability had reached 100%.

Prevalence at the end of 2007

At the end of 2007, there were almost 3,000 Australians alive who were diagnosed with acute myeloid leukaemia in the previous 26 years, including 1,400 diagnosed in the previous 5 years. This represented a 26-year prevalence of 14 people per 100,000 population.

Table 4.1: Summary of new cases, deaths and prevalence for acute myeloid leukaemia, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	8,928	7,652	775	1,561	14.8
Females	7,208	5,998	622	1,424	13.3
Persons	16,136	13,650	1,397	2,985	14.1

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.2: Summary of relative survival from acute myeloid leukaemia, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	40.0	37.1–43.0	22.9	20.7–25.2	20.2	18.1–22.4
Females	39.9	36.4–43.2	24.5	21.9–27.2	22.6	20.1–25.2
Persons	39.9	37.7–42.2	23.6	22.0–25.4	21.3	19.7–22.9
<i>Previous time periods</i>						
1982–1987	27.3	25.5–29.0	9.9	8.5–11.4	n.a.	n.a.
1988–1993	31.0	29.4–32.7	11.7	10.6–12.9	9.6	8.4–10.9
1994–1999	30.4	28.9–31.9	13.8	12.7–14.9	12.1	11.0–13.2
2000–2005	38.0	36.6–39.4	20.8	19.6–22.1	18.9	17.6–20.1

Note: Additional data are presented in online tables S2.1 and S2.2.

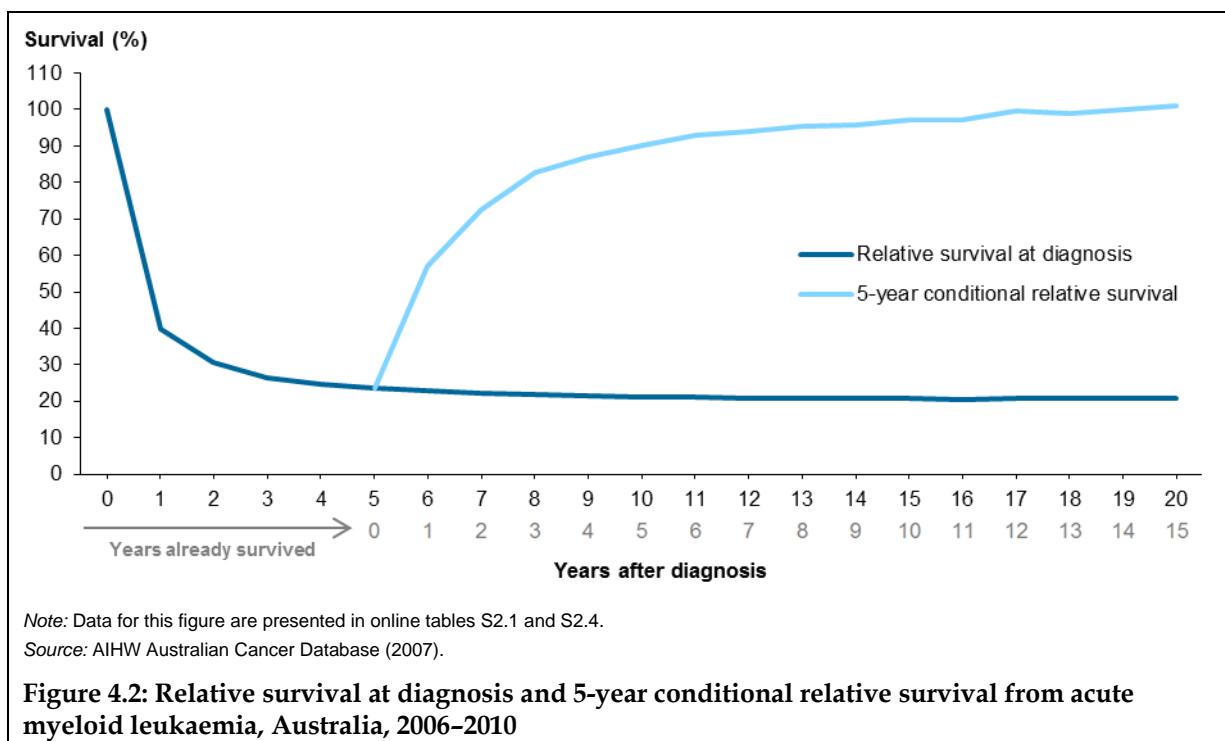
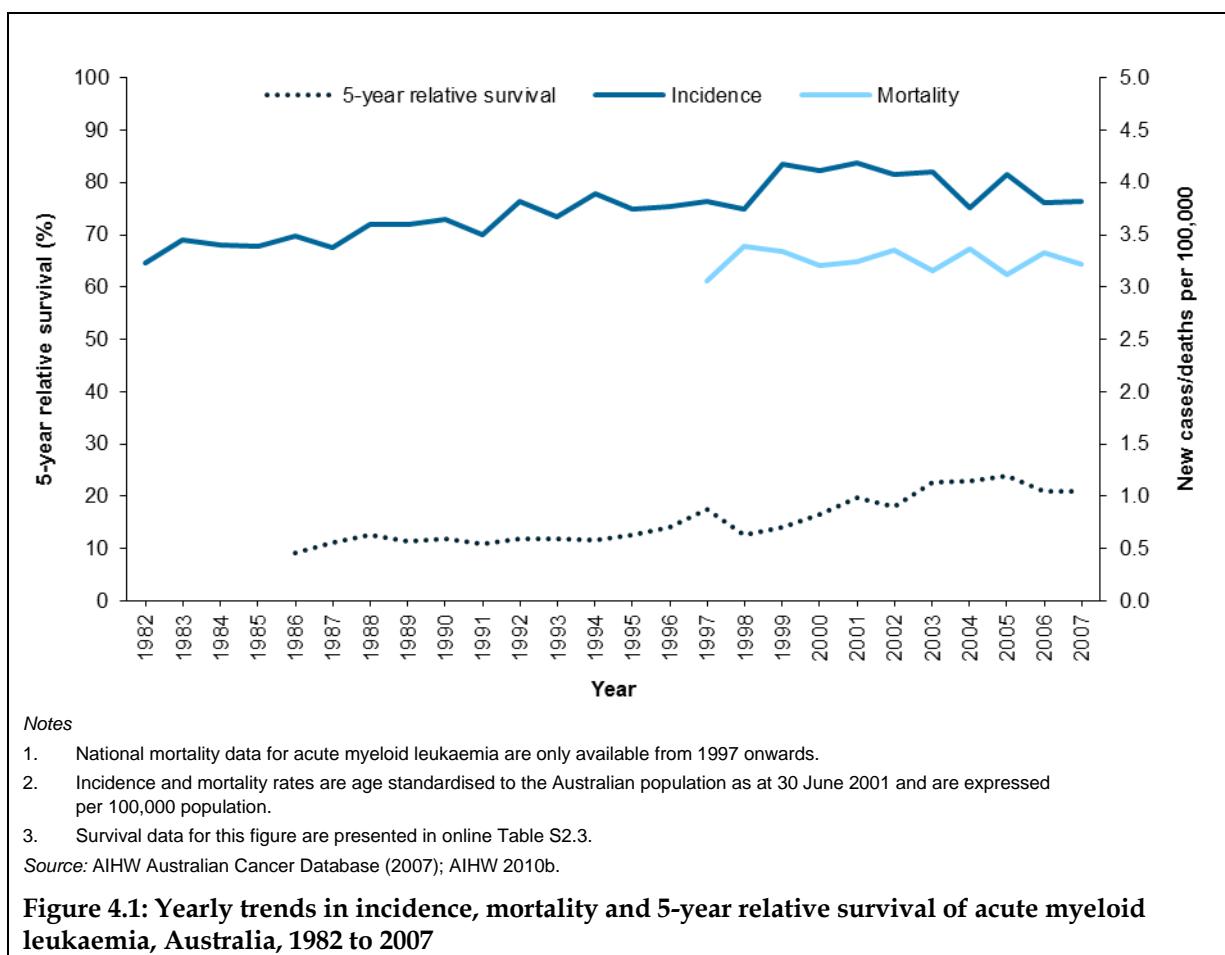
Source: AIHW Australian Cancer Database (2007).

Table 4.3: Summary of conditional relative survival from acute myeloid leukaemia, Australia, 2006–2010

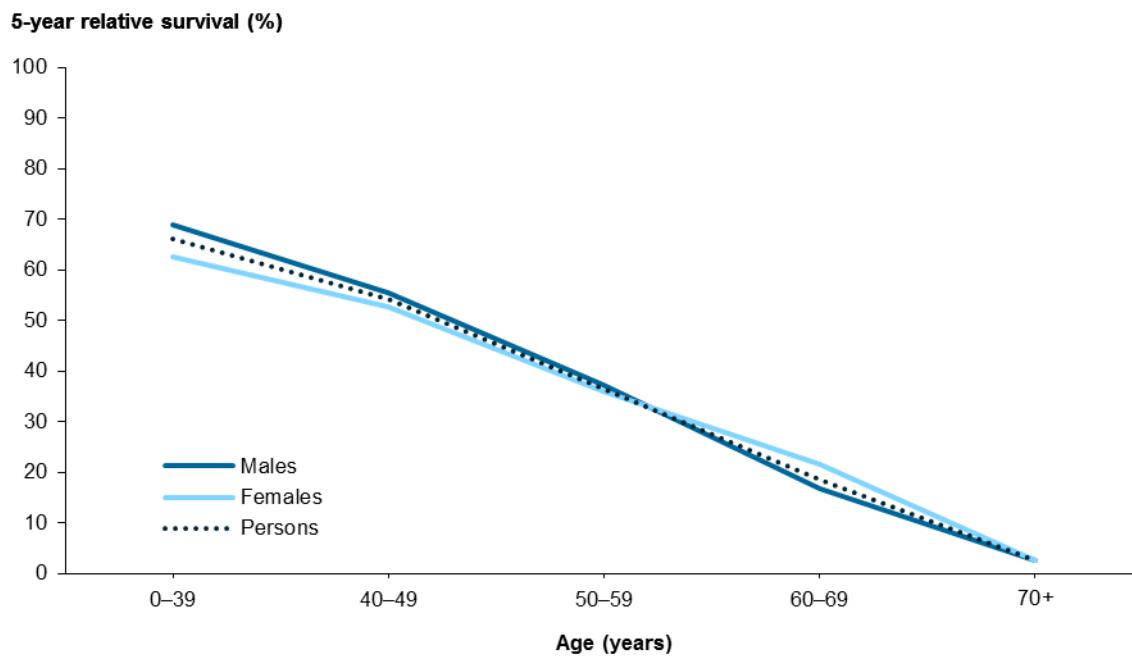
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	23.6	22.0–25.4
Already survived 1 year after diagnosis	57.1	53.0–61.3
Already survived 5 years after diagnosis	90.3	88.0–92.5
Already survived 10 years after diagnosis	97.2	95.1–99.3

Note: Additional data are presented in online Table S2.4.

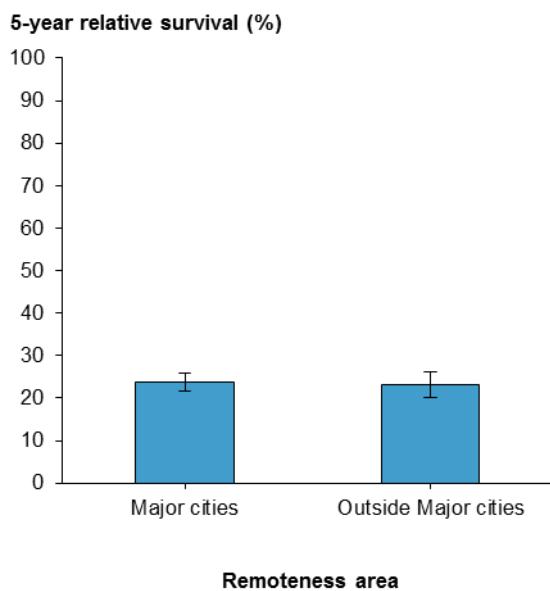
Source: AIHW Australian Cancer Database (2007).



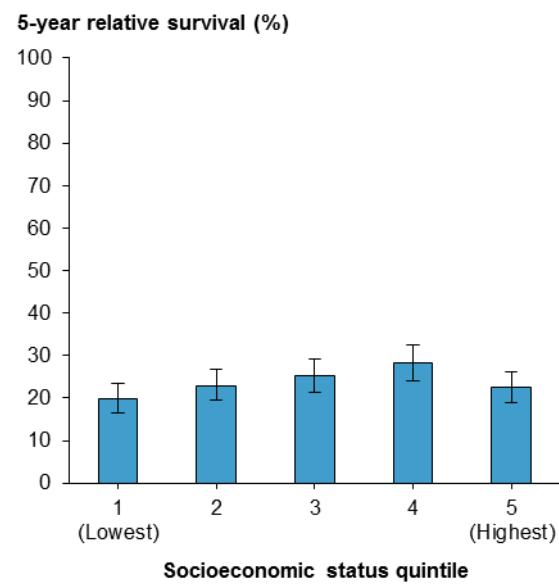
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S2.5 and S2.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.3: Five-year relative survival from acute myeloid leukaemia by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Bladder cancer (C67)

Snapshot: in 2006–2010, individuals with bladder cancer had a 58% chance of surviving for at least 5 years compared with the general population.

Bladder cancer accounted for 2.0% of all cancer cases, making it the tenth most common cancer in Australia. It was far more common in males than females, with males three times as likely to be diagnosed and to die from it. The classification of invasive bladder tumours has undergone several revisions over time, which complicates interpretation of incidence and survival trends.

Incidence, mortality and survival trends

Between 1982 and 2007, bladder cancer incidence dropped by almost half to 9.8 new cases per 100,000. This decreasing trend may be related to changes in the coding and classification of *in situ* and invasive cancers, as well as reductions in risk factors such as smoking and occupational exposure (Luke et al. 2010). Mortality from bladder cancer dropped only slightly, from 5.4 to 4.0 deaths per 100,000.

Bladder cancer was one of the few cancers to show a significant decline in survival trend over time. Between the periods 1982–1987 and 2006–2010, 5-year survival fell by 10 percentage points to 58%. This trend has been observed elsewhere in Australia and has been attributed to changes in coding and age at diagnosis (English et al. 2007; Tracey, Barracough et al. 2007; Duncombe et al. 2009; Luke et al. 2010).

Survival in the period 2006–2010

Sex: Five-year survival was 60% for males, significantly higher than that for females (50%), and this difference became more apparent with older age. This survival advantage for males is unusual compared with other cancers, and has been documented elsewhere in Australia and internationally (Shah et al. 2008; Tracey et al. 2009).

Age: Survival decreased with age, particularly after age 60. Five-year survival was 41% in those aged 80 and over.

Histology: There were marked differences in survival by the histological subtype of bladder cancer. Papillary transitional cell carcinoma develops from the cells lining the inside of the bladder and tends to grow in finger-like projections towards the centre of the bladder. It had the highest 5-year survival at 73%. Squamous cell carcinoma develops from the thin, flat cells lining the bladder and had the lowest survival (27%). Survival from all other transitional cell carcinoma and from adenocarcinoma was similar (45%).

Population group: There were no significant differences in survival by remoteness. Likewise, survival showed little variation by socioeconomic status.

Conditional survival

The probability of surviving for at least 5 years was 58% at diagnosis, compared with 71% at 1 year after diagnosis and 88% at 5 years after diagnosis.

Prevalence at the end of 2007

At the end of 2007, there were more than 19,300 Australians alive who had been diagnosed with bladder cancer in the previous 26 years, including 7,200 diagnosed in the previous 5 years. This represented a 26-year prevalence of 91 people per 100,000 population.

Table 4.4: Summary of new cases, deaths and prevalence for bladder cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	42,196	30,920	5,564	14,560	137.9
Females	14,365	10,598	1,614	4,789	44.8
Persons	56,561	41,518	7,178	19,349	91.1

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.5: Summary of relative survival from bladder cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	81.7	80.4–83.0	60.0	58.4–61.6	52.4	50.7–54.1
Females	69.9	67.2–72.4	49.6	46.9–52.3	43.8	41.1–46.6
Persons	78.8	77.6–79.9	57.5	56.1–58.8	50.3	48.8–51.8
<i>Previous time periods</i>						
1982–1987	85.4	84.6–86.1	67.9	66.4–69.4	n.a.	n.a.
1988–1993	83.6	82.9–84.4	66.5	65.4–67.5	58.1	56.7–59.6
1994–1999	81.4	80.6–82.1	62.6	61.6–63.7	55.4	54.1–56.7
2000–2005	80.4	79.6–81.1	60.3	59.2–61.3	52.9	51.6–54.1

Note: Additional data are presented in online tables S3.1 and S3.2.

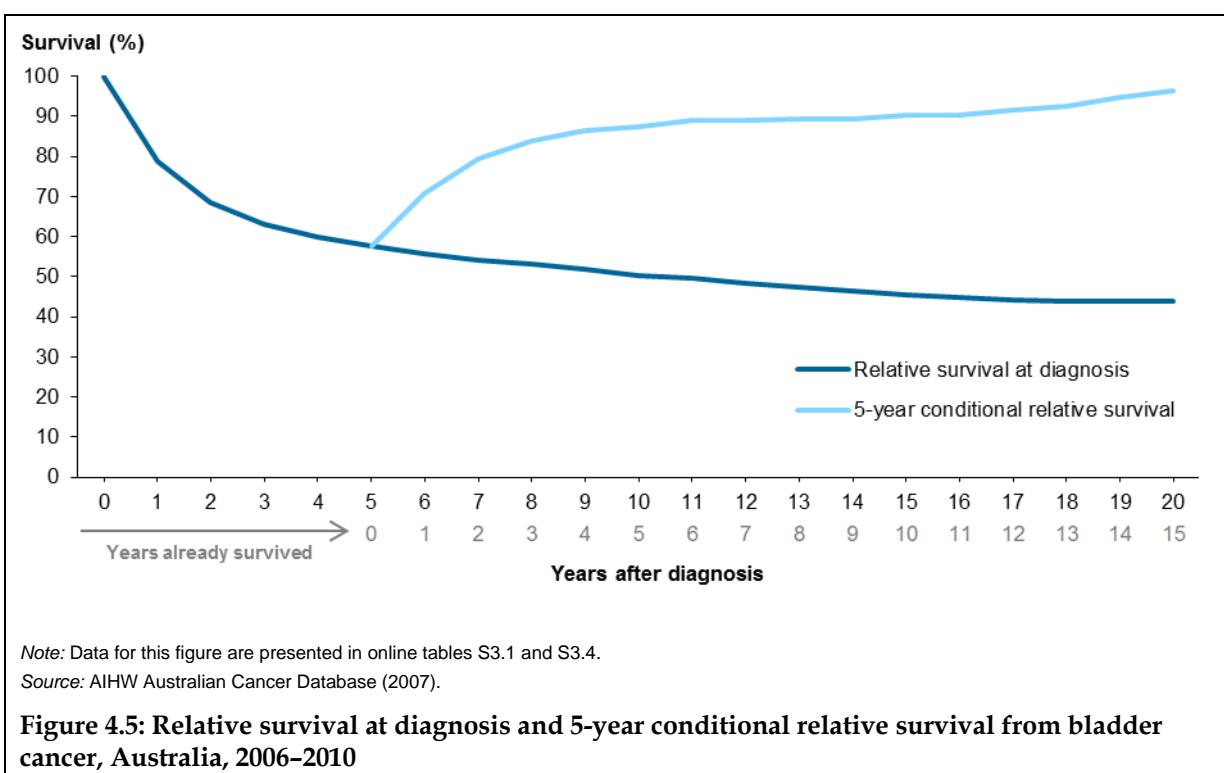
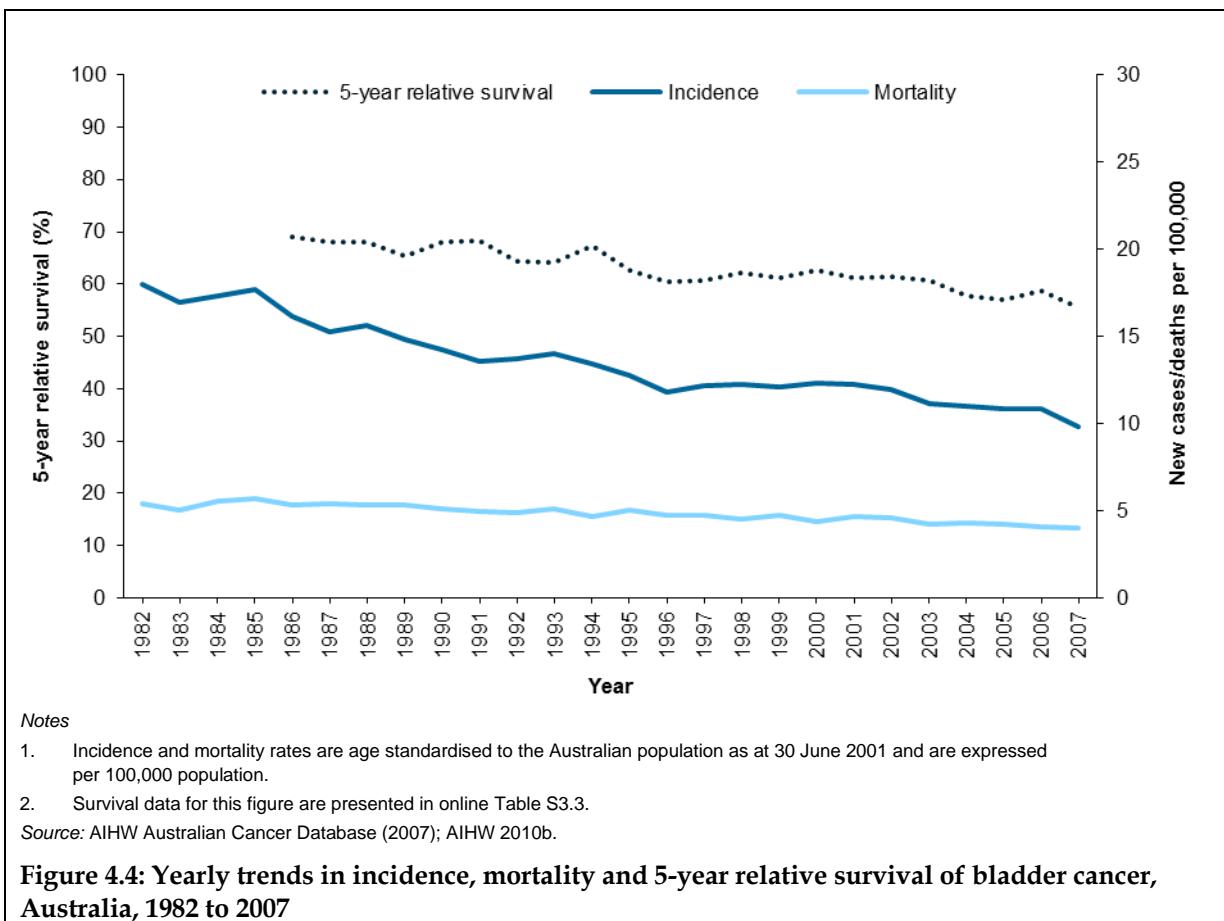
Source: AIHW Australian Cancer Database (2007).

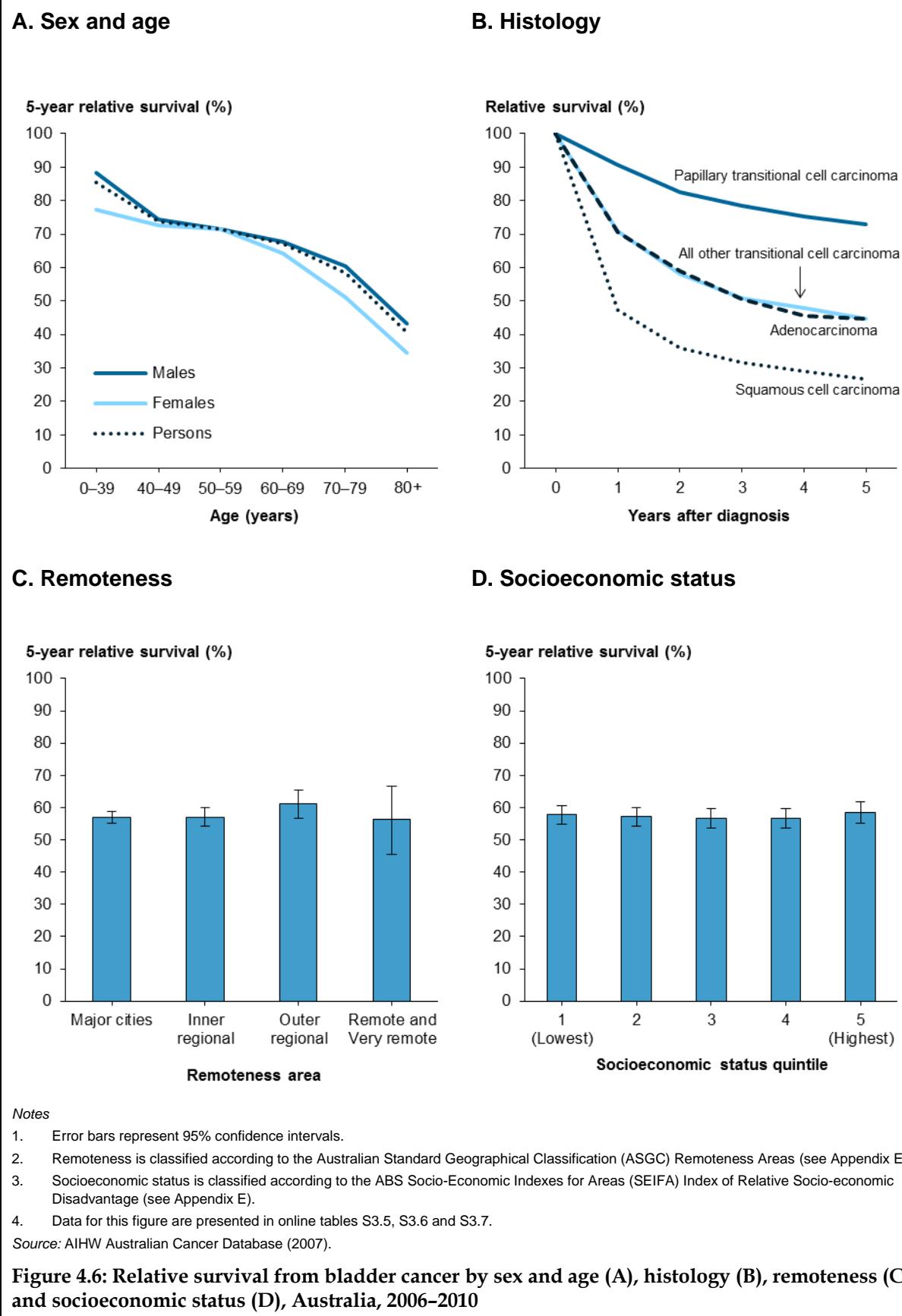
Table 4.6: Summary of conditional relative survival from bladder cancer, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	57.5	56.1–58.8
Already survived 1 year after diagnosis	70.7	69.0–72.4
Already survived 5 years after diagnosis	87.5	86.0–88.9
Already survived 10 years after diagnosis	90.3	88.5–92.0

Note: Additional data are presented in online Table S3.4.

Source: AIHW Australian Cancer Database (2007).





Bowel cancer (C18–C20)

Snapshot: in 2006–2010, individuals with bowel cancer had a 66% chance of surviving for at least 5 years compared with the general population.

Bowel cancer, which includes cancers of the colon, rectosigmoid junction and rectum, is a leading cancer in Australia. It was the second most common cancer diagnosed and the second most common cause of cancer death. The National Bowel Cancer Screening Program was introduced in 2006 to reduce both incidence and mortality from bowel cancer. Worldwide, there have been a number of developments in bowel cancer diagnostics, surgical techniques, and perioperative and postoperative therapies (Acheson & Scholefield 2008).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of bowel cancer rose slightly, although much of this increase had occurred before 1997 and was observed mostly for males (AIHW 2012). In contrast to this increase, mortality from bowel cancer dropped considerably by 43% to 18 deaths per 100,000 in 2007.

Consistent with falling mortality, survival from bowel cancer increased steadily and significantly over time. Five-year survival rose from 48% to 66% between the periods 1982–1987 and 2006–2010.

Survival in the period 2006–2010

Sex: Females generally had higher survival than males. Five-year survival was 67% for females compared with 65% for males.

Age: Five-year survival did not vary much under the age of 70, but dropped to 66% for those in their 70s, and to 58% for those aged 80 and over.

Histology: Five-year survival from mucinous adenocarcinoma and adenocarcinoma, not otherwise specified, was similar (65% and 66%, respectively). Survival was significantly higher for adenocarcinoma in villous adenoma (79%). It was highest for adenocarcinoma in tubulovillous adenoma and adenocarcinoma in adenomatous polyp (87% and 88%, respectively).

Population group: Survival varied by remoteness area: 5-year survival was significantly higher in *Major cities* (67%) than in *Inner regional* (65%) and *Outer regional* (63%) areas.

Survival also decreased with greater socioeconomic disadvantage. Five-year survival was significantly higher in the highest socioeconomic status quintile (69%) than in the three lowest socioeconomic status quintiles (65% or 66%).

Conditional survival

The probability of surviving for at least 5 more years was 66% at diagnosis compared with 76% at 1 year after diagnosis. By the time people with bowel cancer had survived 15 years after diagnosis, 5-year conditional survival had reached almost 100%.

Prevalence at the end of 2007

Bowel cancer is one of the most common cancers in Australia. At the end of 2007, there were more than 105,100 Australians alive who were diagnosed with bowel cancer in the previous 26 years, representing about 0.5% of the population. Prevalence also increased with age, with 4.1% of Australians aged 80 and over who had a history of bowel cancer.

Table 4.7: Summary of new cases, deaths and prevalence for bowel cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	143,984	98,688	25,066	55,457	525.2
Females	121,707	79,978	20,697	49,687	465.3
Persons	265,691	178,666	45,763	105,144	495.1

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.8: Summary of relative survival from bowel cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	85.5	85.0–86.1	65.3	64.6–66.0	59.1	58.3–59.9
Females	84.3	83.6–84.9	67.1	66.4–67.9	62.3	61.3–63.2
Persons	85.0	84.5–85.4	66.2	65.6–66.7	60.5	59.9–61.1
<i>Previous time periods</i>						
1982–1987	72.7	72.3–73.2	48.0	47.2–48.8	n.a.	n.a.
1988–1993	76.2	75.8–76.6	53.5	53.0–54.1	49.1	48.4–49.8
1994–1999	78.4	78.1–78.8	57.2	56.7–57.7	51.8	51.2–52.4
2000–2005	81.4	81.1–81.7	62.0	61.6–62.5	56.5	55.9–57.0

Note: Additional data are presented in online tables S4.1 and S4.2.

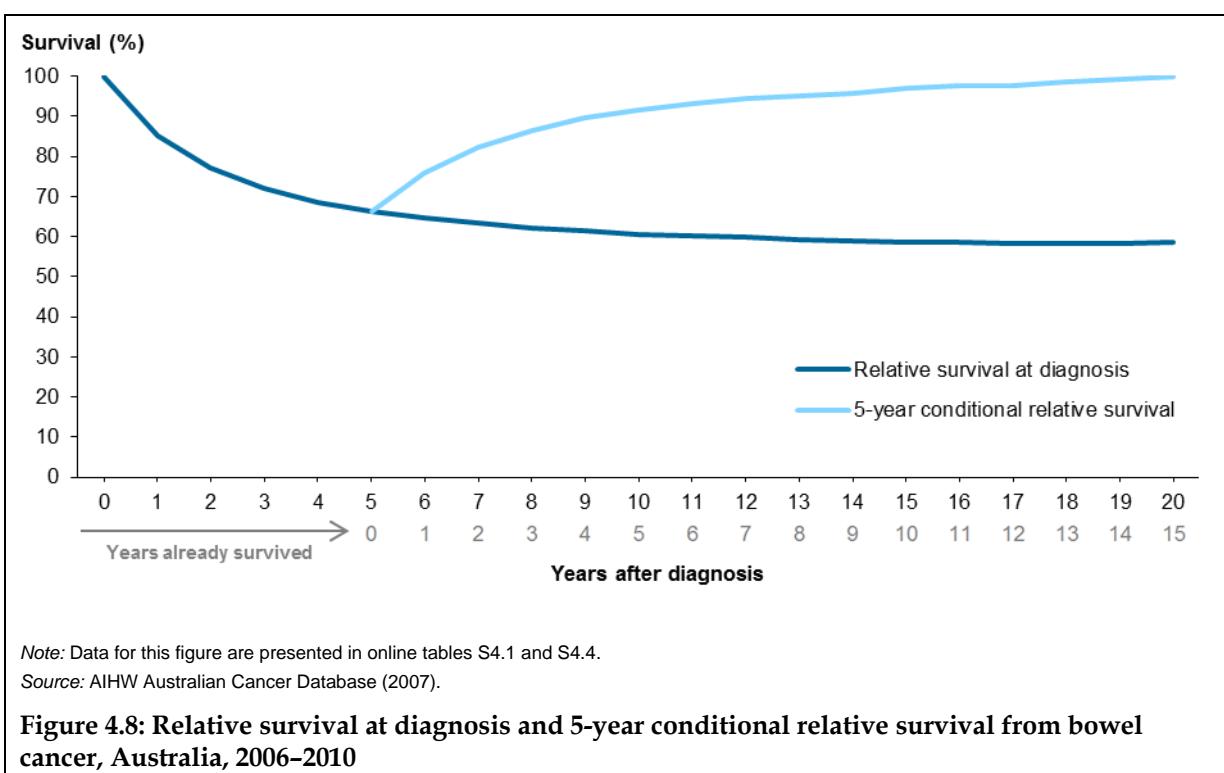
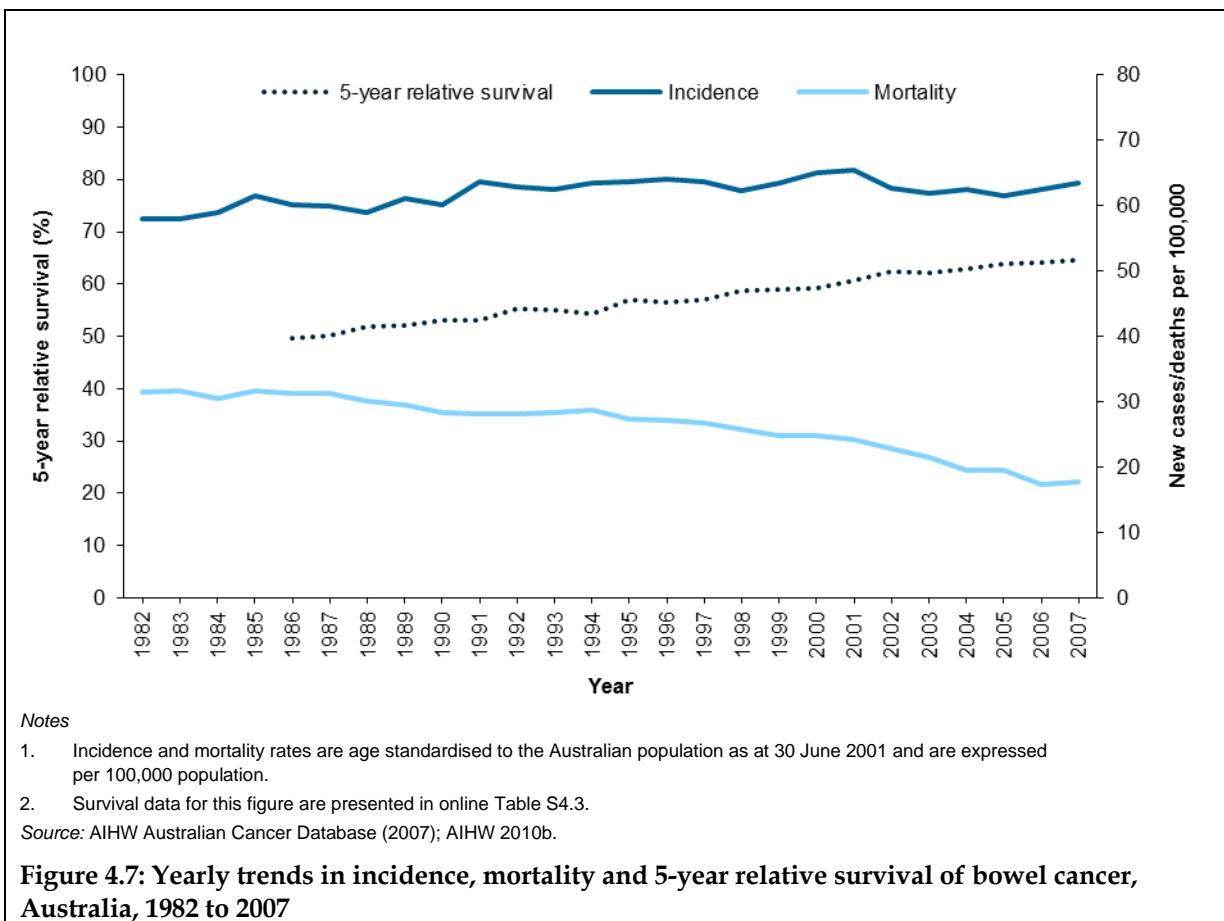
Source: AIHW Australian Cancer Database (2007).

Table 4.9: Summary of conditional relative survival from bowel cancer, Australia, 2006–2010

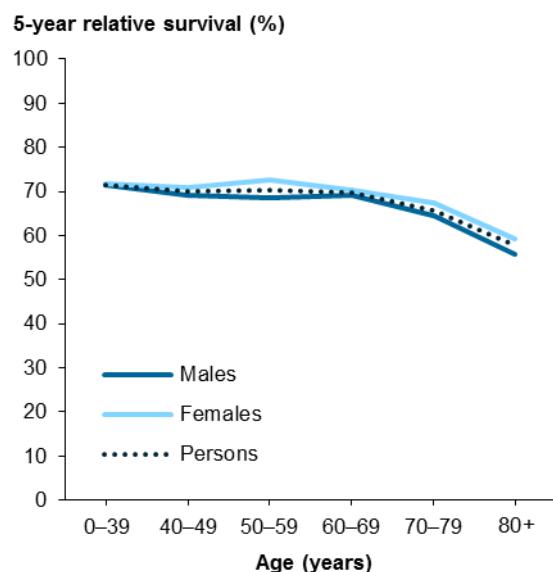
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	66.2	65.6–66.7
Already survived 1 year after diagnosis	75.9	75.3–76.5
Already survived 5 years after diagnosis	91.4	90.9–91.9
Already survived 10 years after diagnosis	96.9	96.2–97.5

Note: Additional data are presented in online Table S4.4.

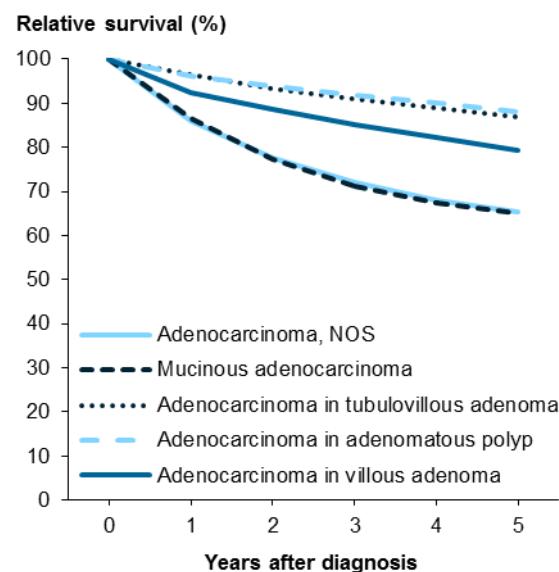
Source: AIHW Australian Cancer Database (2007).



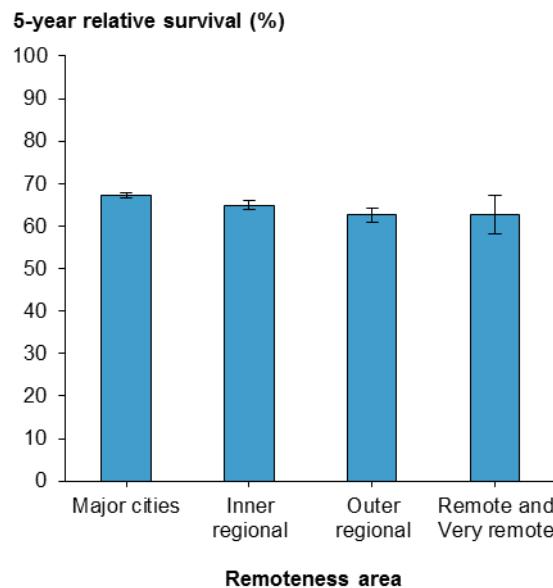
A. Sex and age



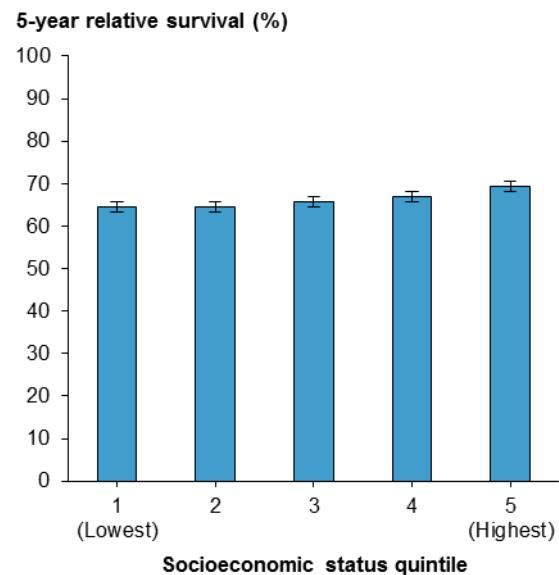
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S4.5, S4.6 and S4.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.9: Relative survival from bowel cancer by sex and age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Brain cancer (C71)

Snapshot: in 2006–2010, individuals with brain cancer had a 22% chance of surviving for at least 5 years compared with the general population.

Brain cancer accounted for 1.4% of all cancer cases and almost 3% of all cancer deaths in Australia. It was one of the most common cancers and leading causes of cancer death in young Australians (AIHW 2011). Despite developments in imaging, diagnostics and treatment, the prognosis of brain cancer varies according to the histology and grade of the tumour, with some types of tumours responding poorly to treatment (Rachet et al. 2008; Short 2008).

Incidence, mortality and survival trends

Between 1982 and 2007, brain cancer incidence and mortality trends showed little change. While the rate of new cases of brain cancer was low at about 7 per 100,000, the rate of deaths from brain cancer remained relatively high at about 5.5 per 100,000.

Survival was low and showed little improvement until the 2000s. Until 2006–2010, 5-year survival remained at about 20%, but increased slightly to 22% by this period.

Survival in the period 2006–2010

Sex: Five-year survival was slightly higher for females (24%) than for males (20%).

Age: Five-year survival was highest for those aged 0–39 (59%) and dropped steeply with age thereafter. Survival was less than 5% for those aged 70–79 and older.

Histology: There were large differences in survival by histological subtype. Ependymoma tends to grow in the cells that line the fluid-filled spaces of the brain and had the highest 5-year survival (71%). Astrocytoma develops from star-shaped cells that support and nourish other nerve cells, and had the lowest survival (13%).

Population group: Survival varied a little by remoteness: 1-year survival was significantly higher in *Major cities* compared with *Inner regional* areas, although this difference had disappeared for 5-year survival.

For both 1- and 5-year survival, survival was highest for people in the highest socioeconomic status quintile (52% and 24% respectively).

Conditional survival

While the probability of surviving for at least 5 years was 22% at diagnosis, once those with brain cancer had survived 1 year after diagnosis, their survival prospects for 5 more years had doubled to 45%. This nearly doubled again to 80% by 5 years after diagnosis.

Prevalence at the end of 2007

Prevalence of brain cancer was low due to both low incidence and low survival. At the end of 2007, there were almost 5,600 Australians alive who were diagnosed with brain cancer in the previous 26 years, including 2,400 diagnosed in the previous 5 years. This represented a 26-year prevalence of 26 people per 100,000 population.

Table 4.10: Summary of new cases, deaths and prevalence for brain cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	17,001	14,665	1,416	3,158	29.9
Females	12,517	10,573	1,028	2,424	22.7
Persons	29,518	25,238	2,444	5,582	26.3

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.11: Summary of relative survival from brain cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	47.0	44.8–49.2	20.4	18.9–21.9	15.8	14.5–17.2
Females	46.8	44.1–49.4	23.9	22.0–25.9	19.9	18.1–21.8
Persons	46.9	45.2–48.6	21.9	20.7–23.1	17.5	16.4–18.6
<i>Previous time periods</i>						
1982–1987	38.6	37.3–40.0	20.1	18.7–21.6	n.a.	n.a.
1988–1993	37.9	36.7–39.1	20.3	19.3–21.3	15.6	14.6–16.6
1994–1999	37.4	36.3–38.6	18.7	17.8–19.6	14.9	14.1–15.8
2000–2005	42.2	41.1–43.3	19.4	18.5–20.3	15.1	14.3–16.0

Note: Additional data are presented in online tables S5.1 and S5.2.

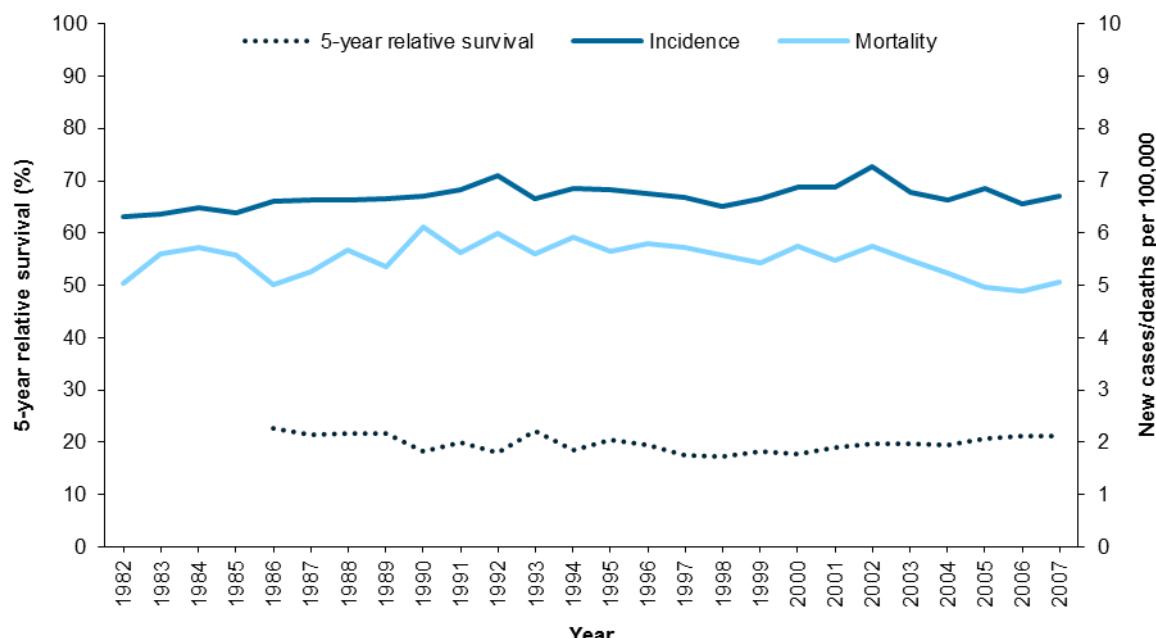
Source: AIHW Australian Cancer Database (2007).

Table 4.12: Summary of conditional relative survival from brain cancer, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	21.9	20.7–23.1
Already survived 1 year after diagnosis	44.6	40.8–48.4
Already survived 5 years after diagnosis	79.9	77.5–82.4
Already survived 10 years after diagnosis	86.3	83.8–88.7

Note: Additional data are presented in online Table S5.4.

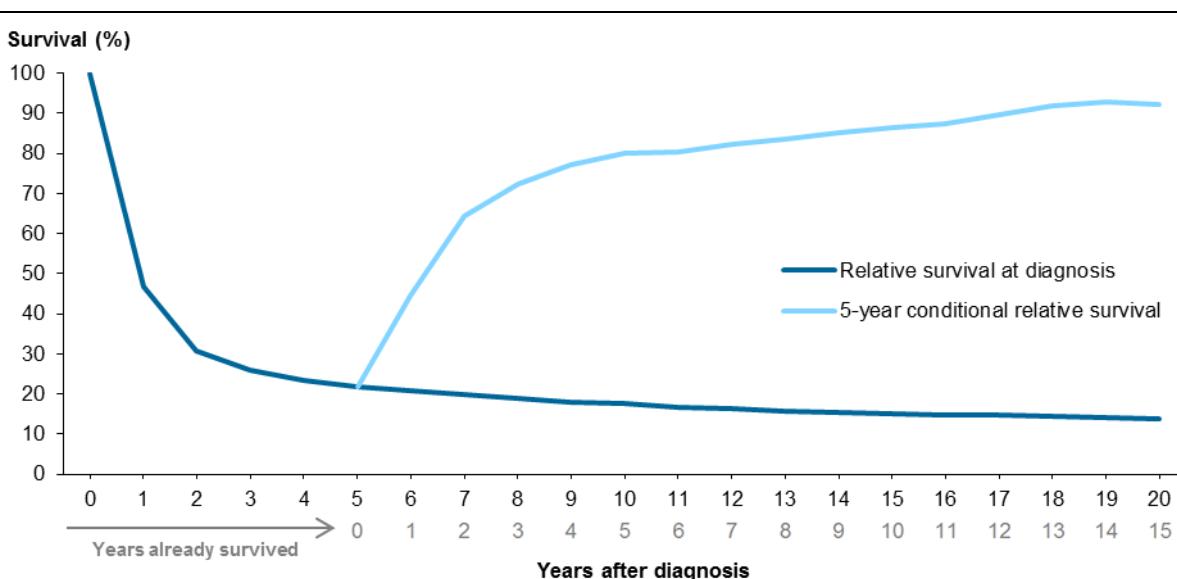
Source: AIHW Australian Cancer Database (2007).



Notes

1. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
 2. Survival data for this figure are presented in online Table S5.3.
- Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 4.10: Yearly trends in incidence, mortality and 5-year relative survival of brain cancer, Australia, 1982 to 2007

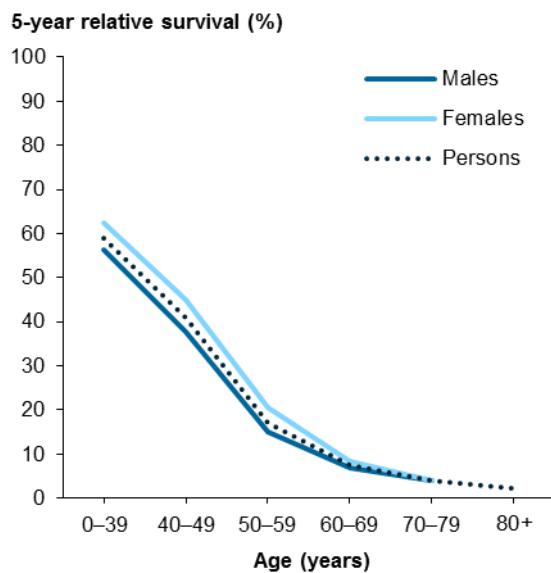


Note: Data for this figure are presented in online tables S5.1 and S5.4.

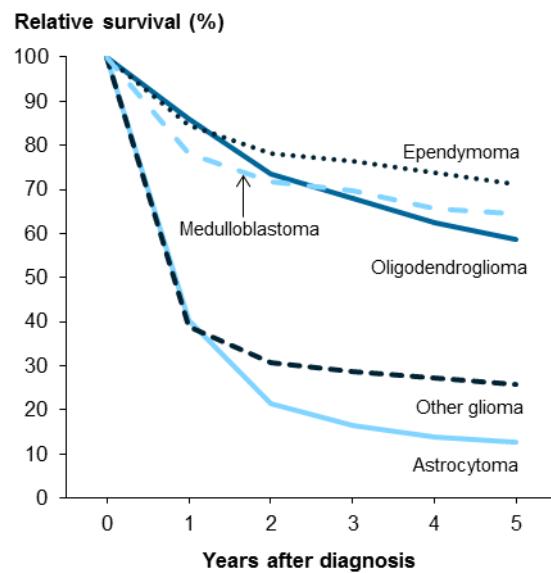
Source: AIHW Australian Cancer Database (2007).

Figure 4.11: Relative survival at diagnosis and 5-year conditional relative survival from brain cancer, Australia, 2006–2010

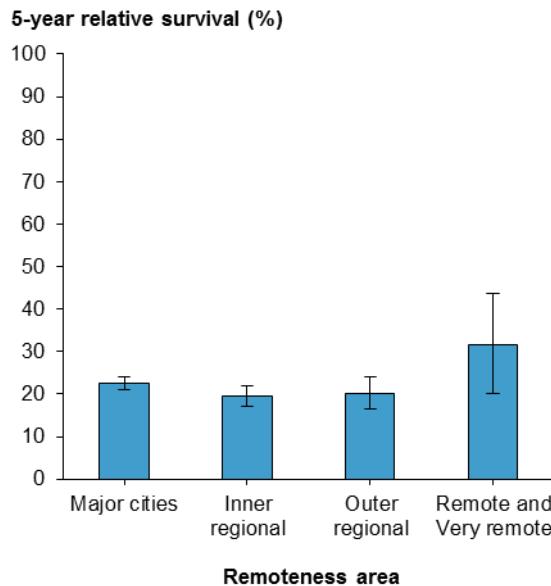
A. Sex and age



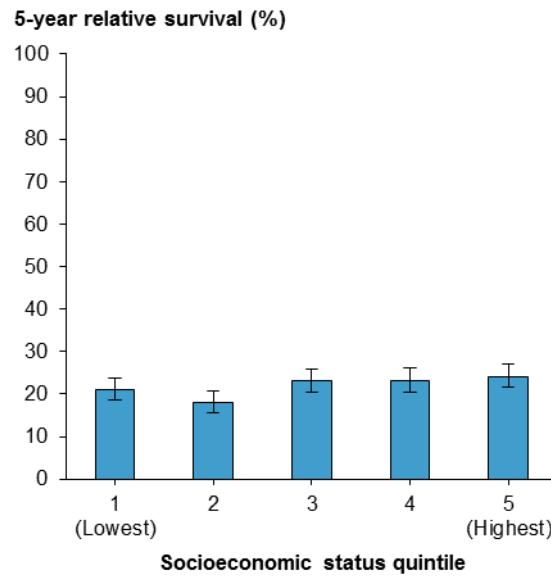
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Survival data are not presented if there were less than 20 individuals alive at the start of the follow-up year.
2. Error bars represent 95% confidence intervals.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S5.5, S5.6 and S5.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.12: Relative survival from brain cancer by sex and age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Breast cancer in females (C50)

Snapshot: in 2006–2010, women with breast cancer had an 89% chance of surviving for at least 5 years compared with the general population.

Breast cancer was the most common cancer among Australian women, representing more than a quarter of all cancer cases. One in 9 women will have developed breast cancer and 1 in 37 will have died from it before the age of 85. Males can also develop breast cancer; however, it is quite rare with 103 cases diagnosed in 2007. For this reason, survival analyses of breast cancer in this report are limited to females.

BreastScreen Australia was established in 1991 to provide screening mammograms at a population level to reduce mortality and morbidity from breast cancer in women. Worldwide, other developments in breast cancer control have included improved public and professional awareness, the emergence of effective adjuvant therapies and advances in the management of early breast cancer and metastatic disease (Leary & Smith 2008).

Incidence, mortality and survival trends

Incidence of breast cancer increased rapidly between the 1980s and the late 1990s, before levelling off at 109 new cases per 100,000 women by 2007. Breast cancer mortality dropped considerably, especially after the mid-1990s, falling by 27% to 22 deaths per 100,000 women.

Between the periods 1982–1987 and 2006–2010, 5-year survival rose from 72% to 89%. It has been suggested that improvements in breast cancer survival were due to earlier and more effective treatment through mammography screening and therapeutic advances, including widespread use of systemic adjuvant treatment (Giordano et al. 2003; Berry et al. 2005; Sant et al. 2006; Duffy et al. 2010). While mammography screening may also inflate the increase in survival by introducing lead time between diagnosis and death, this bias is believed to be modest (Dickman & Adami 2006).

Survival in the period 2006–2010

Age: Five-year survival was highest in females aged between 40 and 69 (91%–93%). This may be related to mammography screening, which targets the 50–69-year age group.

Histology: The two most common types of breast cancer are invasive ductal carcinoma and invasive lobular carcinoma. Both types had similar 5-year survival – 90% for invasive ductal carcinoma and 92% for invasive lobular carcinoma. Five-year survival was highest for tubular and invasive cribriform carcinoma (about 100%).

Population group: Survival decreased with increasing remoteness and with socioeconomic disadvantage. Five-year survival was significantly higher in *Major cities* (90%) compared with *Remote and Very remote areas* (84%). Likewise, 5-year survival was higher for females in the highest socioeconomic status quintile (91%) compared with those in the lowest socioeconomic status quintile (88%).

Conditional survival

Compared with other cancers, gains in conditional survival from breast cancer with the number of years already survived were small. The probability of surviving for at least 5 years

was 89% at diagnosis, compared with 90% at 1 year after diagnosis and 93% at 5 years after diagnosis.

Prevalence at the end of 2007

Breast cancer was the most prevalent of all cancers, largely due to its high incidence and high survival. At the end of 2007, there were almost 151,200 women living in Australia who were diagnosed with breast cancer in the previous 26 years, including about 55,500 diagnosed in the previous 5 years. This 26-year prevalence represented 1.4% of the entire female population.

Table 4.13: Summary of new cases, deaths and prevalence for breast cancer, females, Australia, 1982–2010

No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
			No. as at end of 2007	Rate per 100,000 population
236,985	100,701	55,537	151,152	1,415.5

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.14: Summary of relative survival from breast cancer, females, Australia, 1982–1987 to 2006–2010

Time period	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
1982–1987	93.7	93.4–94.0	71.9	71.0–72.7	n.a.	n.a.
1988–1993	95.6	95.3–95.8	76.7	76.2–77.2	64.0	63.3–64.8
1994–1999	96.6	96.4–96.8	83.1	82.7–83.5	72.3	71.8–72.9
2000–2005	97.3	97.2–97.5	87.4	87.1–87.7	79.3	78.9–79.8
2006–2010	97.9	97.6–98.1	89.4	89.1–89.8	83.2	82.7–83.6

Note: Additional data are presented in online tables S6.1 and S6.2.

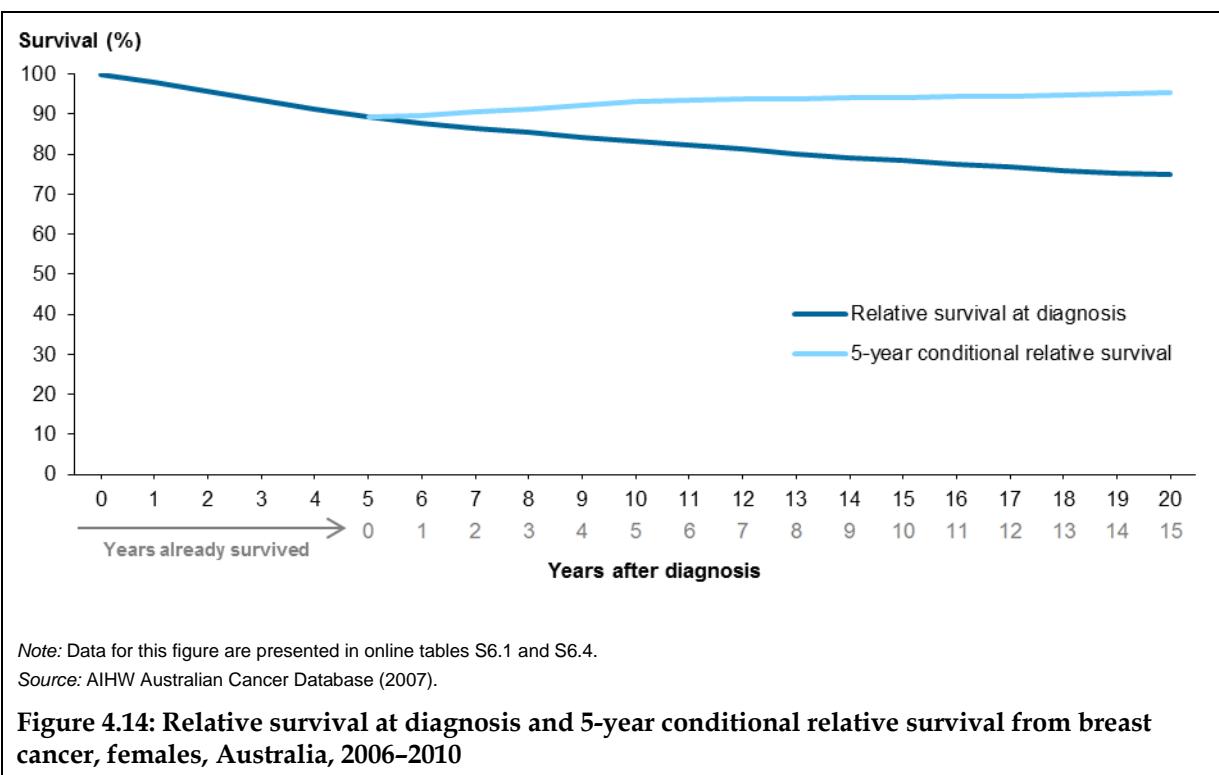
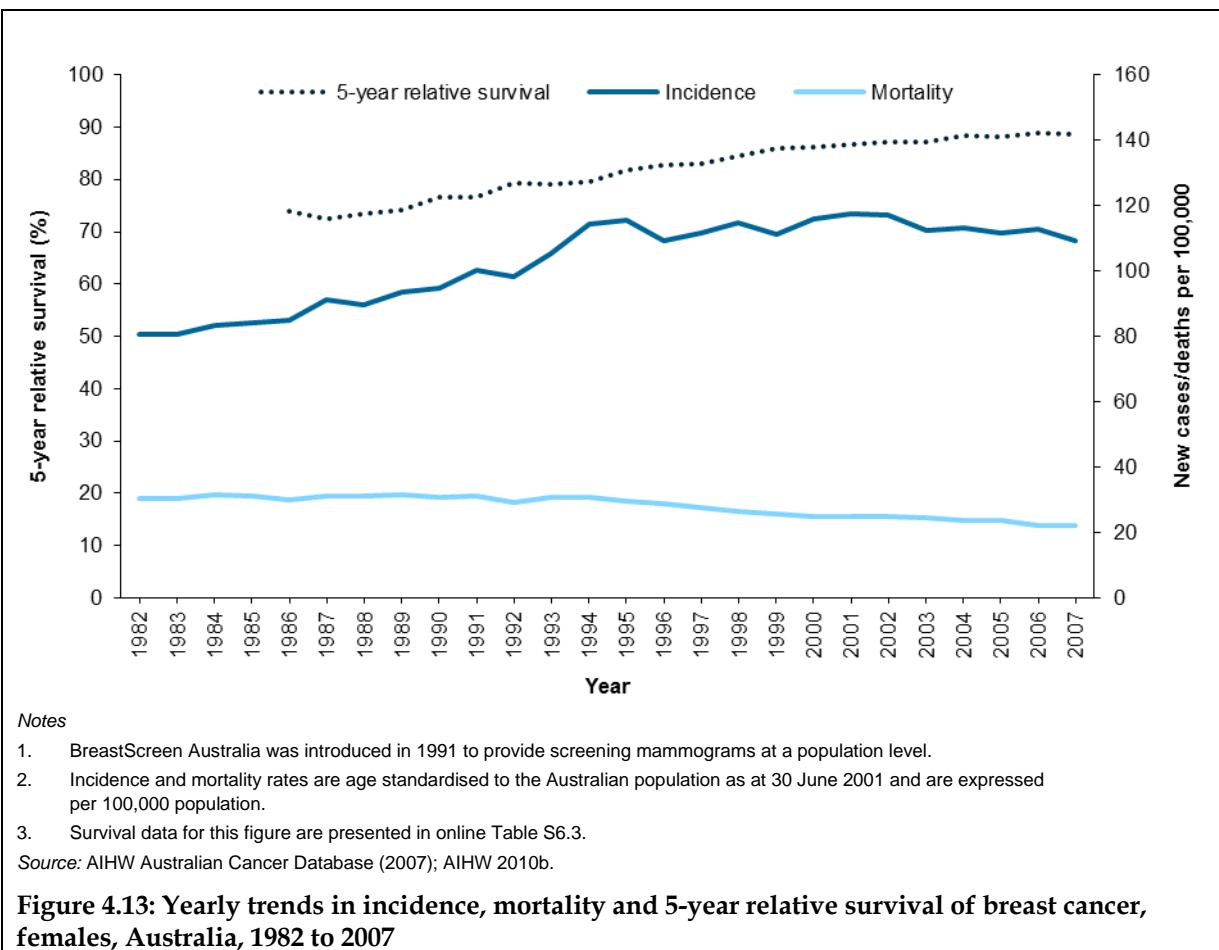
Source: AIHW Australian Cancer Database (2007).

Table 4.15: Summary of conditional relative survival from breast cancer, females, Australia, 2006–2010

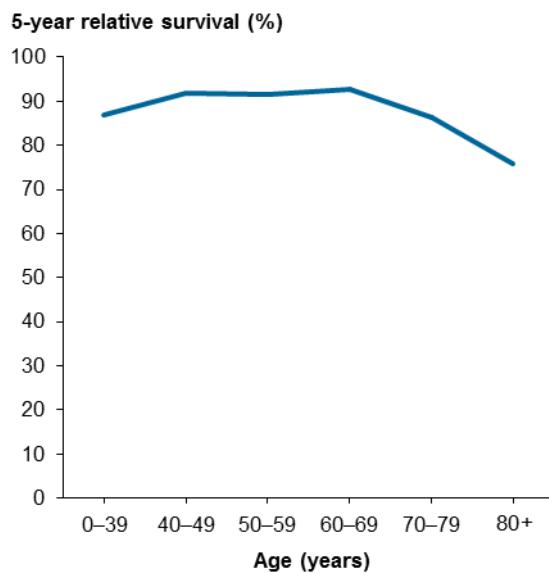
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	89.4	89.1–89.8
Already survived 1 year after diagnosis	89.7	89.4–90.0
Already survived 5 years after diagnosis	93.1	92.7–93.4
Already survived 10 years after diagnosis	94.1	93.7–94.5

Note: Additional data are presented in online Table S6.4.

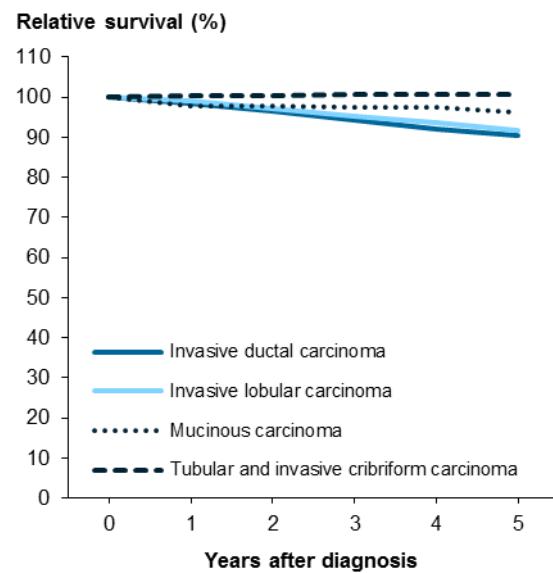
Source: AIHW Australian Cancer Database (2007).



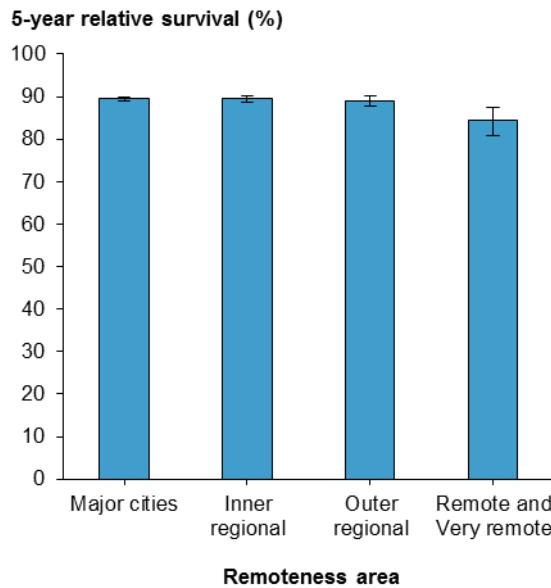
A. Age



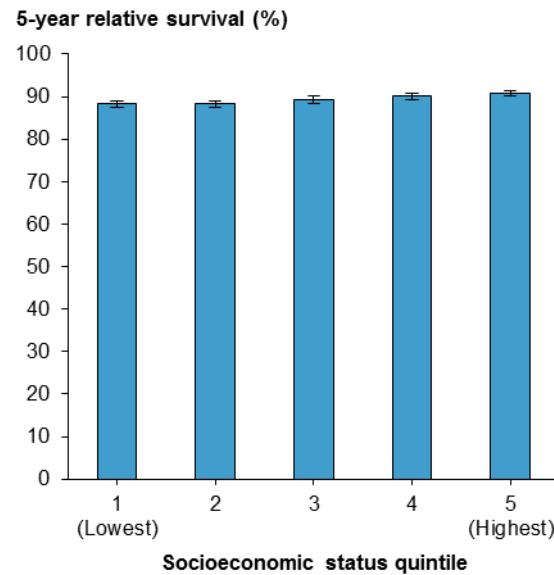
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Note the difference in the scale of the y-axis between figures.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S6.5, S6.6 and S6.7

Source: AIHW Australian Cancer Database (2007).

Figure 4.15: Relative survival from breast cancer by age (A), histology (B), remoteness (C) and socioeconomic status (D), females, Australia, 2006–2010

Cervical cancer (C53)

Snapshot: in 2006–2010, women with cervical cancer had a 72% chance of surviving for at least 5 years compared with the general population.

Cervical cancer was the twelfth most common cancer diagnosed and the nineteenth most common cause of cancer death among Australian women. The National Cervical Screening Program was introduced in the early 1990s. It targets women aged between 20 and 69 and aims to reduce incidence and mortality by detecting and treating pre-cancerous abnormalities.

Incidence, mortality and survival trends

A decreasing trend was observed for both incidence and mortality from cervical cancer. Between 1982 and 2007, the rate of new cases dropped by more than half to 6.8 per 100,000 women. The rate of deaths dropped to 1.8 per 100,000 – roughly a third of the rate 25 years earlier.

While survival from cervical cancer increased from 68% to 71% between the early 1980s and the early 1990s, it did not change significantly thereafter. The lack of improvement in survival from cervical cancer has also been observed in other countries (Brenner & Hakulinen 2002b; Quinn et al. 2008) and may be related to a selection effect resulting from population-level cervical screening.

Survival in the period 2006–2010

Age: Survival dropped steeply with age. Five-year survival was highest for women diagnosed aged under age 40 (87%) but fell by two-thirds to 32% for women aged 80 and over.

Histology: The most common type of cervical cancer is squamous cell carcinoma, which makes up two-thirds of total cervical cancer and arises from the cells covering the outer surface of the cervix. It had significantly lower 5-year survival (72%) compared with the second most common type of cervical cancer, adenocarcinoma (79%), which develops from the glandular cells in the cervical canal.

Population group: Survival decreased with increasing remoteness and with greater socioeconomic disadvantage. Five-year survival was 74% in *Major cities*, significantly higher than in *Remote and Very remote areas* (58%).

Likewise, 5-year survival was about 10 percentage points higher in the two highest socioeconomic status quintiles (77%–78%) compared with the two lowest quintiles (66%–68%).

Conditional survival

The probability of surviving for at least 5 years was 72% at diagnosis, compared with 82% by 1 year after diagnosis and 95% by 5 years after diagnosis.

Prevalence at the end of 2007

At the end of 2007, there were more than 13,800 Australian women alive who were diagnosed with cervical cancer in the previous 26 years, including 2,800 diagnosed in the previous 5 years. This represented a 26-year prevalence of 130 women per 100,000 female population.

Table 4.16: Summary of new cases, deaths and prevalence for cervical cancer, Australia, 1982–2010

No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
			No. as at end of 2007	Rate per 100,000 population
23,693	10,765	2,845	13,830	129.5

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.17: Summary of relative survival from cervical cancer, Australia, 1982–1987 to 2006–2010

Time period	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
1982–1987	88.0	87.1–88.9	68.0	66.3–69.7	n.a.	n.a.
1988–1993	88.5	87.6–89.3	71.3	70.1–72.5	65.3	63.8–66.7
1994–1999	88.8	87.9–89.6	73.2	71.9–74.4	68.1	66.7–69.4
2000–2005	86.9	85.8–87.9	71.4	69.9–72.7	66.8	65.3–68.2
2006–2010	86.6	84.9–88.1	72.1	70.1–74.0	68.6	66.6–70.6

Note: Additional data are presented in online tables S7.1 and S7.2.

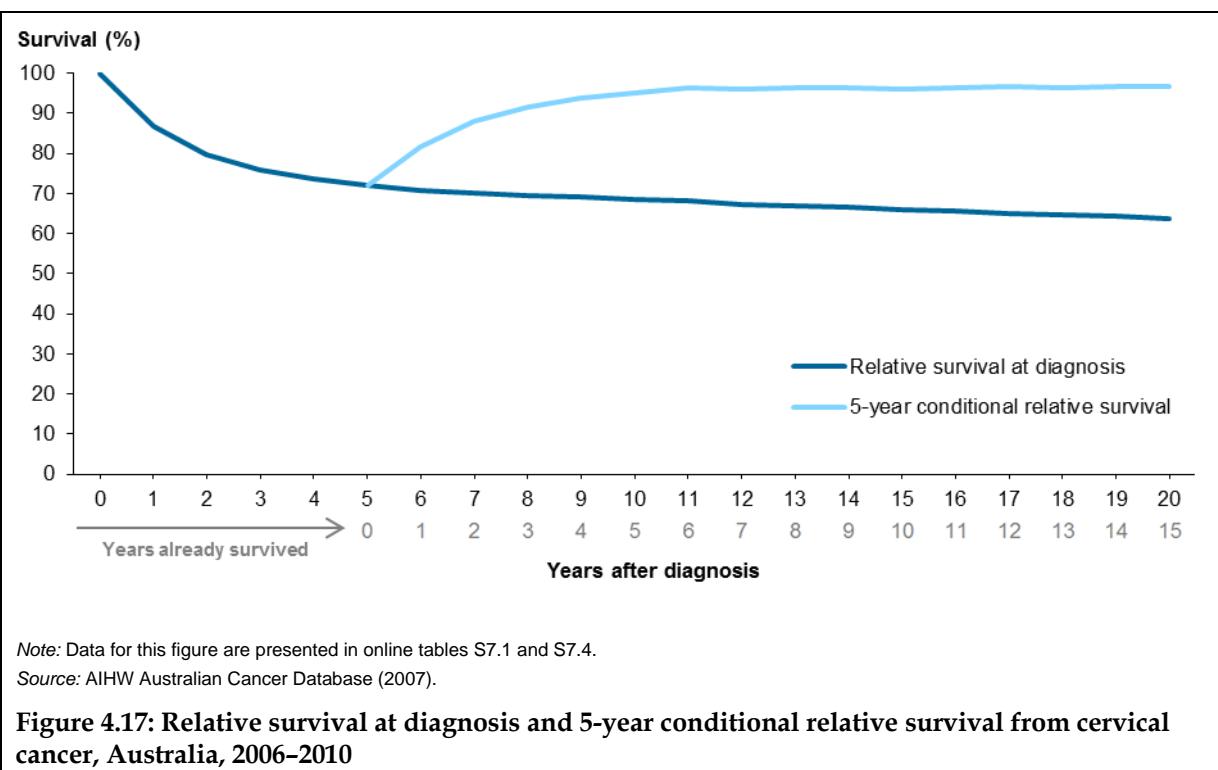
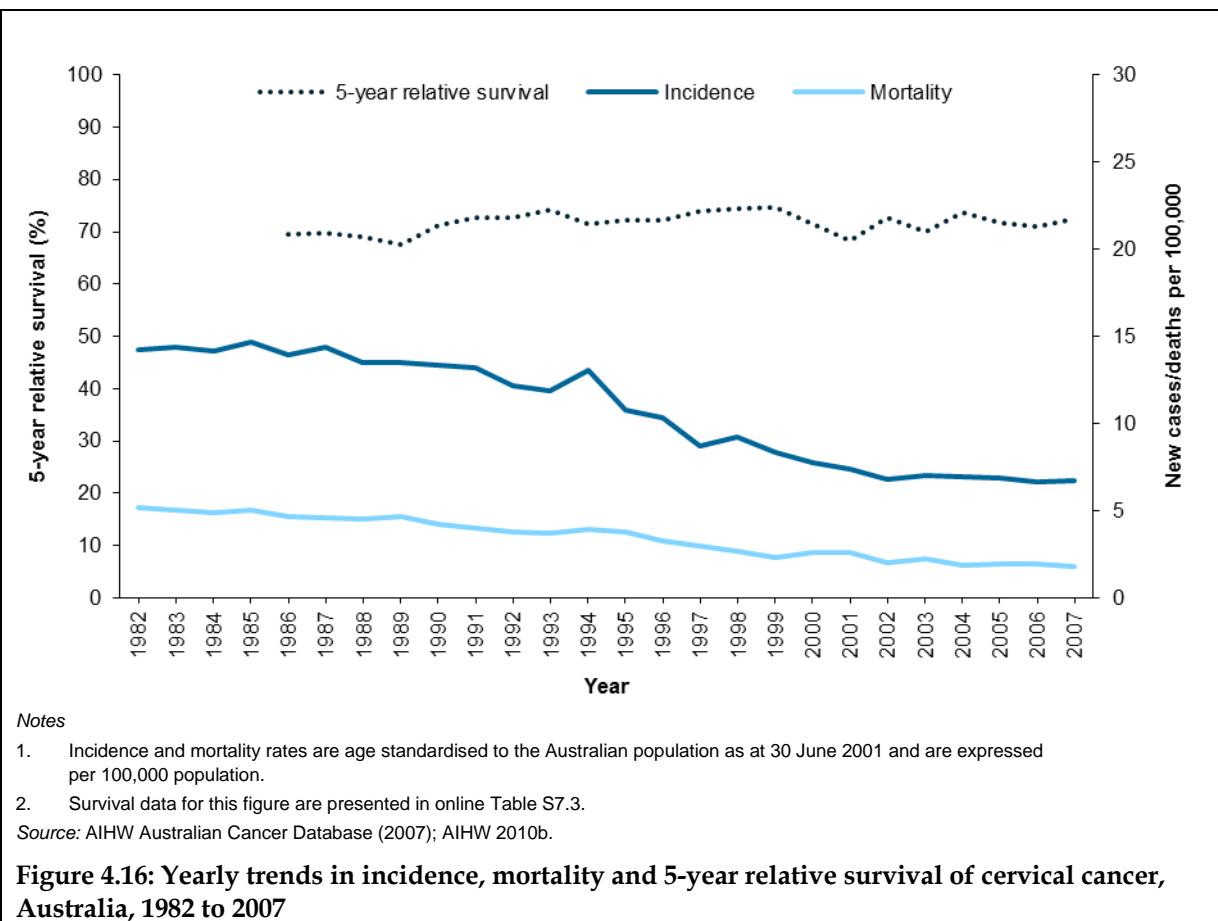
Source: AIHW Australian Cancer Database (2007).

Table 4.18: Summary of conditional relative survival from cervical cancer, Australia, 2006–2010

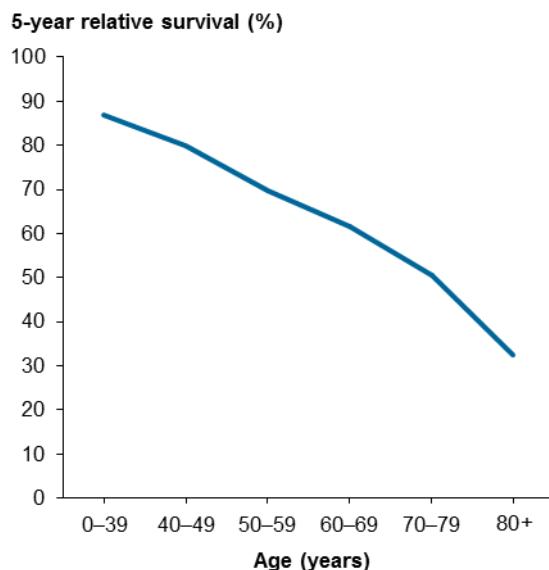
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	72.1	70.1–74.0
Already survived 1 year after diagnosis	81.8	80.0–83.5
Already survived 5 years after diagnosis	95.1	94.2–96.1
Already survived 10 years after diagnosis	96.1	95.1–97.0

Note: Additional data are presented in online Table S7.4.

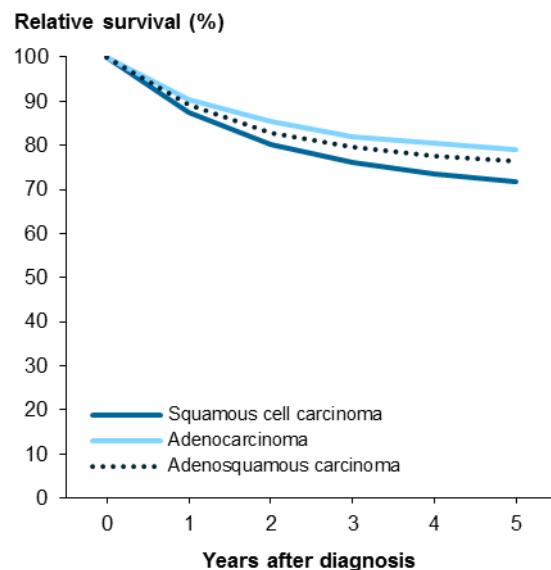
Source: AIHW Australian Cancer Database (2007).



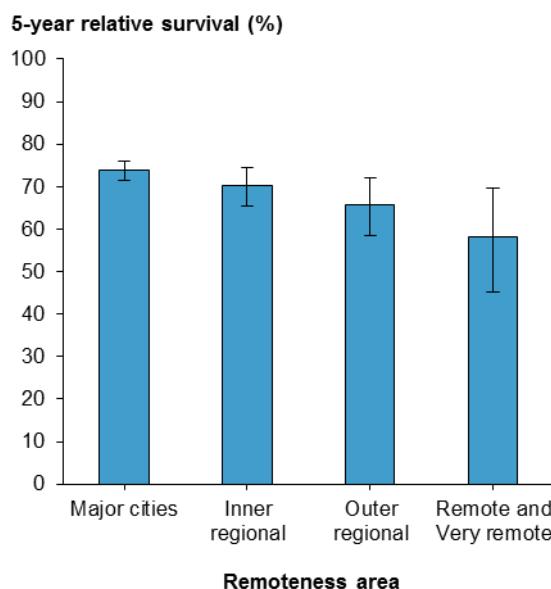
A. Age



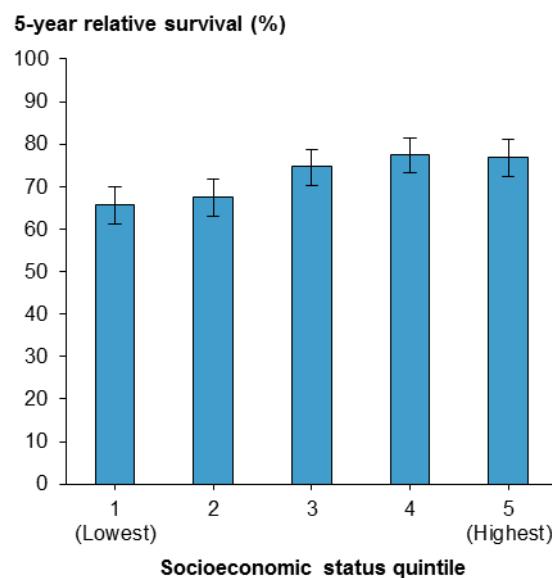
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S7.5, S7.6 and S7.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.18: Relative survival from cervical cancer by age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Chronic lymphocytic leukaemia (C91.1)

Snapshot: in 2006–2010, individuals with chronic lymphocytic leukaemia had a 73% chance of surviving for at least 5 years compared with the general population.

Chronic lymphocytic leukaemia is a cancer of the blood and bone marrow that is characterised by an overproduction of lymphocytes, a specialised type of white blood cell (Leukaemia Foundation 2008b). It is a rare cancer, accounting for 0.9% of all cancer cases and ranking twentieth for incidence in 2007. Although chronic lymphocytic leukaemia is generally slow growing and can remain stable for long periods of time, its natural course varies between individuals. Important predictors of prognosis include cellular and genetic markers, as well as the rate at which leukaemic cells multiply (Montserrat 2004; Leukaemia Foundation 2010).

Incidence, mortality and survival trends

There was very little change in incidence and mortality of chronic lymphocytic leukaemia between 1982 and 2007, despite fluctuations in the rates due to small numbers. Likewise, survival from chronic lymphocytic leukaemia did not change significantly over time, with 5-year survival remaining at about 70%–74% between the periods 1982–1987 and 2006–2010.

Survival in the period 2006–2010

Sex: Five-year survival was 71% for males, slightly lower than that for females (76%), although this difference was not statistically significant. However, this gap had widened for survival to 10 years after diagnosis, with survival for females (62%) statistically significantly higher than for males (52%).

Age: Survival was high (greater than 86%) for ages under 60 and declined with age thereafter. Five-year survival was 45% for those aged 80 and over.

Population group: There were no significant differences in survival by remoteness or socioeconomic status.

Conditional survival

Compared with other cancers, the gains in conditional survival due to the number of years already survived were small. At diagnosis, those with chronic lymphocytic leukaemia faced a 73% probability of surviving for at least 5 years. These survival prospects increased only slightly to 76% by 1 year after diagnosis, and to 77% by 5 years after diagnosis.

Prevalence at the end of 2007

At the end of 2007, there were about 7,400 Australians alive who were diagnosed with chronic lymphocytic leukaemia in the previous 26 years, including 3,500 diagnosed in the previous 5 years. This represented a 26-year prevalence of 35 people per 100,000 population.

Table 4.19: Summary of new cases, deaths and prevalence for chronic lymphocytic leukaemia, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	10,991	7,707	2,207	4,328	41.0
Females	7,173	4,758	1,338	3,032	28.4
Persons	18,164	12,465	3,545	7,360	34.7

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.20: Summary of relative survival from chronic lymphocytic leukaemia, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
2006–2010						
Males	90.1	88.1–91.7	70.7	68.3–73.1	51.9	49.1–54.6
Females	91.7	89.3–93.7	75.8	72.7–78.7	61.8	58.2–65.3
Persons	90.7	89.2–92.0	72.6	70.7–74.5	55.7	53.5–57.9
<i>Previous time periods</i>						
1982–1987	89.7	88.3–91.1	70.3	66.7–73.7	n.a.	n.a.
1988–1993	90.8	89.7–91.9	73.7	71.6–75.7	51.1	47.8–54.4
1994–1999	90.8	89.7–91.8	71.4	69.6–73.2	49.8	47.6–52.1
2000–2005	91.5	90.5–92.3	74.0	72.4–75.6	53.5	51.4–55.6

Note: Additional data are presented in online tables S8.1 and S8.2.

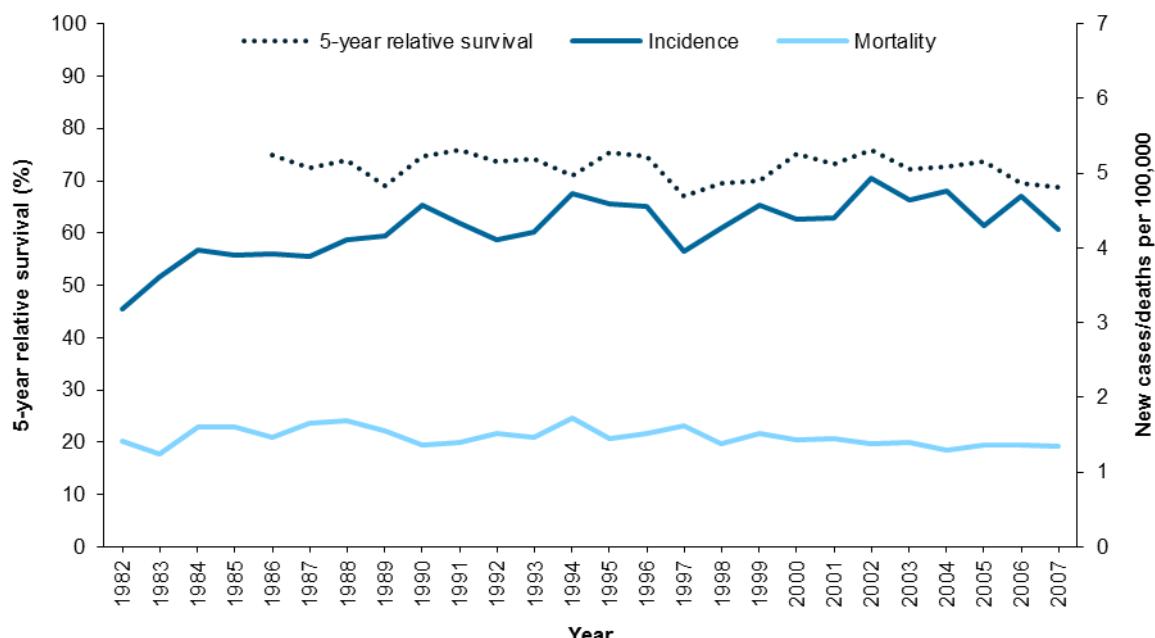
Source: AIHW Australian Cancer Database (2007).

Table 4.21: Summary of conditional relative survival from chronic lymphocytic leukaemia, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	72.6	70.7–74.5
Already survived 1 year after diagnosis	76.1	74.0–78.1
Already survived 5 years after diagnosis	76.7	74.3–79.2
Already survived 10 years after diagnosis	75.4	71.7–79.1

Note: Additional data are presented in online Table S8.4.

Source: AIHW Australian Cancer Database (2007).

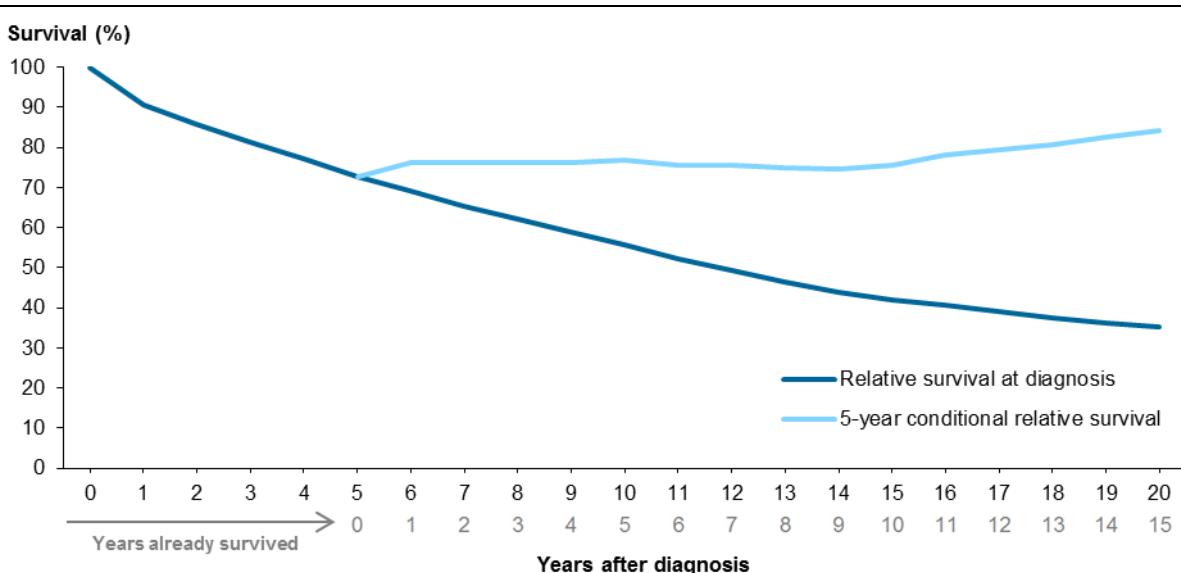


Notes

1. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
2. Survival data for this figure are presented in online Table S8.3.

Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 4.19: Yearly trends in incidence, mortality and 5-year relative survival of chronic lymphocytic leukaemia, Australia, 1982 to 2007

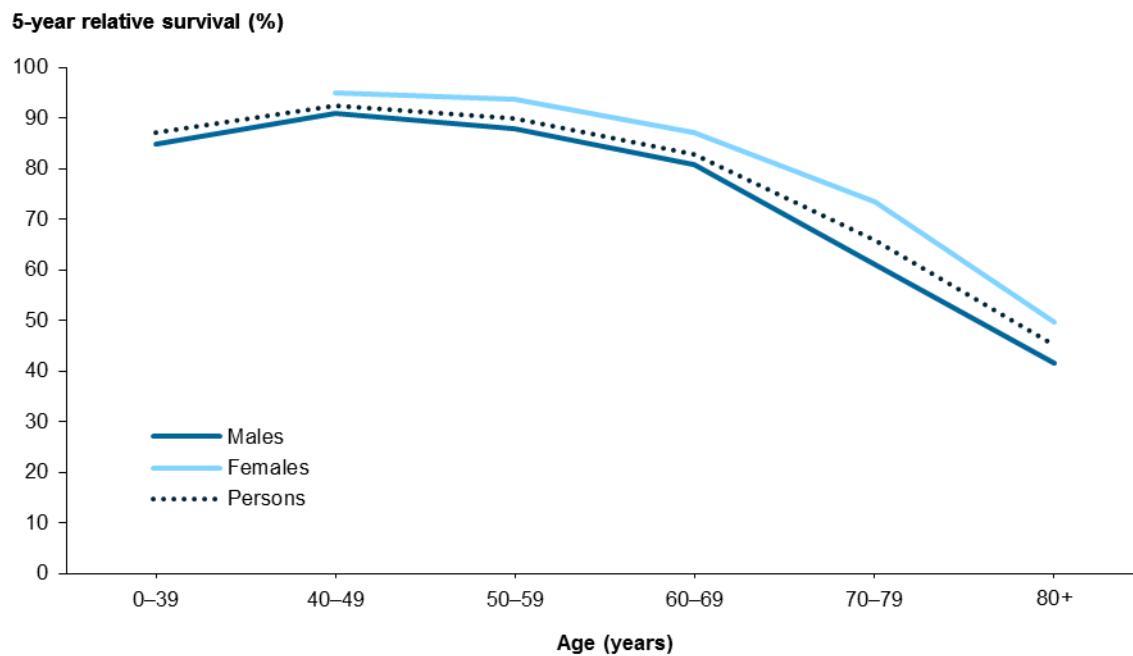


Note: Data for this figure are presented in online tables S8.1 and S8.4.

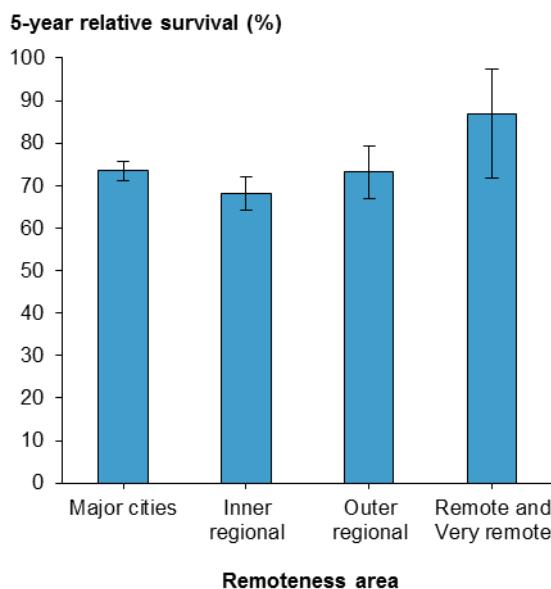
Source: AIHW Australian Cancer Database (2007).

Figure 4.20: Relative survival at diagnosis and 5-year conditional relative survival from chronic lymphocytic leukaemia, Australia, 2006–2010

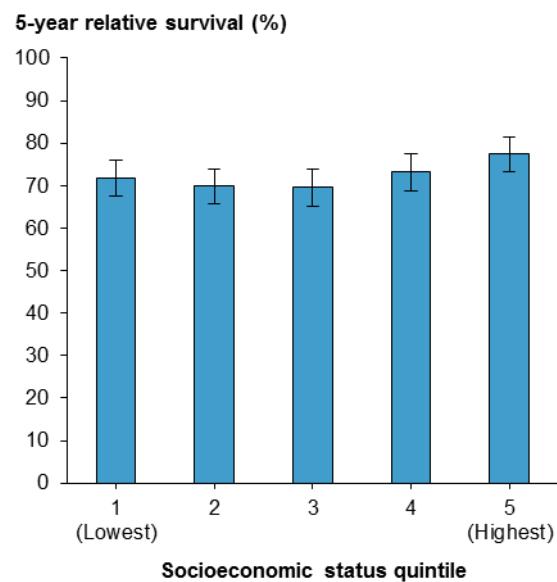
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Survival data are not presented if there were less than 20 individuals alive at the start of the follow-up year.
2. Error bars represent 95% confidence intervals.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S8.5 and S8.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.21: Five-year relative survival from chronic lymphocytic leukaemia by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Cancer of the gallbladder and bile ducts (C23–C24)

Snapshot: in 2006–2010, individuals with cancer of the gallbladder and bile ducts had a 20% chance of surviving for at least 5 years compared with the general population.

Cancer of the gallbladder and bile ducts is rare, accounting for 0.6% of all cancer cases in 2007. While males and females were equally likely to be diagnosed with the disease, females were more likely to die from it. Gallbladder cancer is often associated with diagnosis at an advanced stage when it is more difficult to treat the cancer through surgery (Kiran et al. 2006; Konstantinidis et al. 2009).

Incidence, mortality and survival trends

Both incidence and mortality of cancer of the gallbladder and bile ducts have decreased over time. Incidence fell to 3.0 new cases per 100,000 in 2007, while mortality dropped by more than half to 1.2 deaths per 100,000.

Despite being low, survival from gallbladder cancer increased significantly over time. Between the periods 1982–1987 and 2006–2010, 5-year survival doubled from 10% to 20%.

Survival in the period 2006–2010

Sex: Five-year survival was 23% for males, slightly higher than that for females (18%), although this difference was not statistically significant.

Age: Survival fell gradually with age: 5-year survival was 34% in people aged under 50 and 14% in those aged 70 and over.

Population group: There were no significant differences in survival by remoteness or by socioeconomic status.

Conditional survival

Survival increased rapidly with the number of years already survived. At diagnosis, the probability of surviving for at least 5 years was 20%. Survival prospects doubled to 40% by 1 year after diagnosis. By 5 years after diagnosis, those with gallbladder cancer had an 84% probability of surviving for at least 5 more years – more than four times their survival prospects at diagnosis.

Prevalence at the end of 2007

Prevalence from cancer of the gallbladder and bile ducts was very low due to its low incidence and survival. At the end of 2007, there were about 1,800 Australians alive who were diagnosed with it in the previous 26 years, representing 8.6 people per 100,000 population.

Table 4.22: Summary of new cases, deaths and prevalence for cancer of the gallbladder and bile ducts, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	5,837	5,300	506	852	8.1
Females	7,961	7,300	511	970	9.1
Persons	13,798	12,600	1,017	1,822	8.6

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.23: Summary of relative survival from cancer of the gallbladder and bile ducts, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
2006–2010						
Males	52.2	48.3–56.0	22.5	19.7–25.5	18.5	15.7–21.5
Females	40.6	37.2–44.0	17.7	15.4–20.1	15.2	13.0–17.6
Persons	45.9	43.3–48.4	19.9	18.1–21.8	16.8	15.0–18.6
<i>Previous time periods</i>						
1982–1987	23.3	21.7–25.0	10.1	8.6–11.8	n.a.	n.a.
1988–1993	30.6	29.0–32.3	12.0	10.8–13.4	10.5	9.0–12.0
1994–1999	35.8	34.2–37.4	14.8	13.5–16.2	12.8	11.4–14.3
2000–2005	41.3	39.6–42.9	17.3	16.0–18.7	13.3	12.0–14.7

Note: Additional data are presented in online tables S9.1 and S9.2.

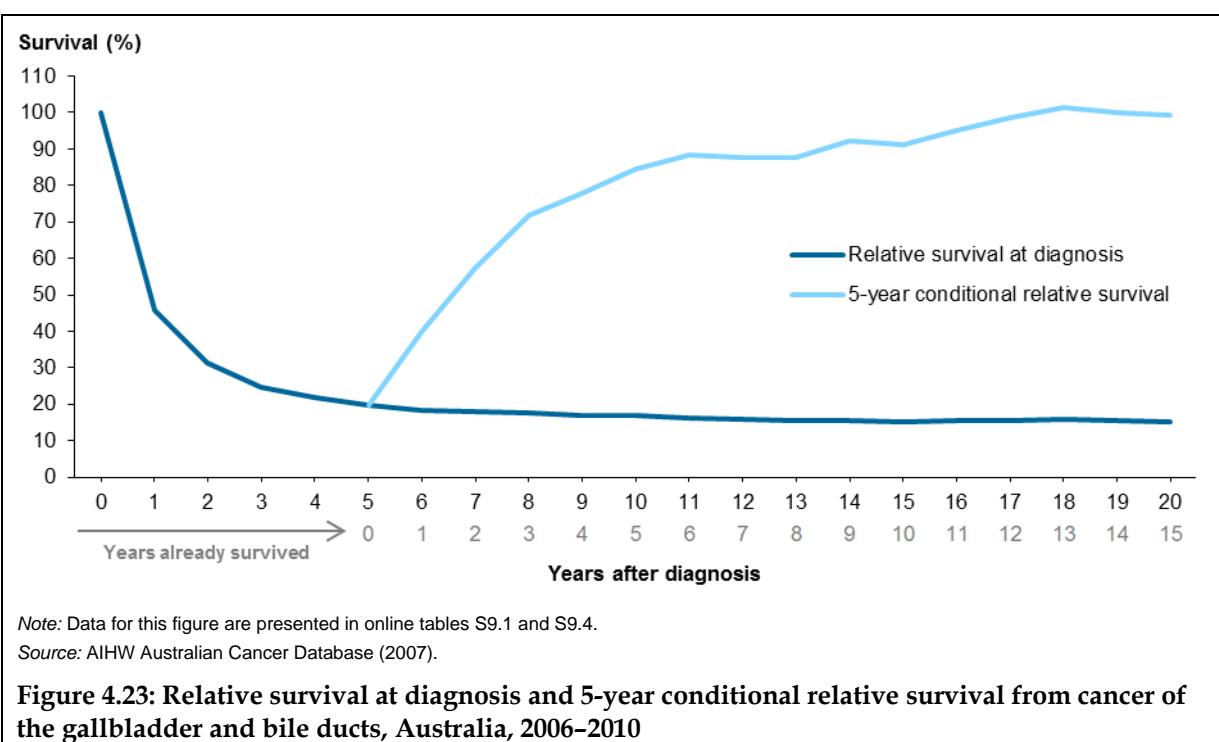
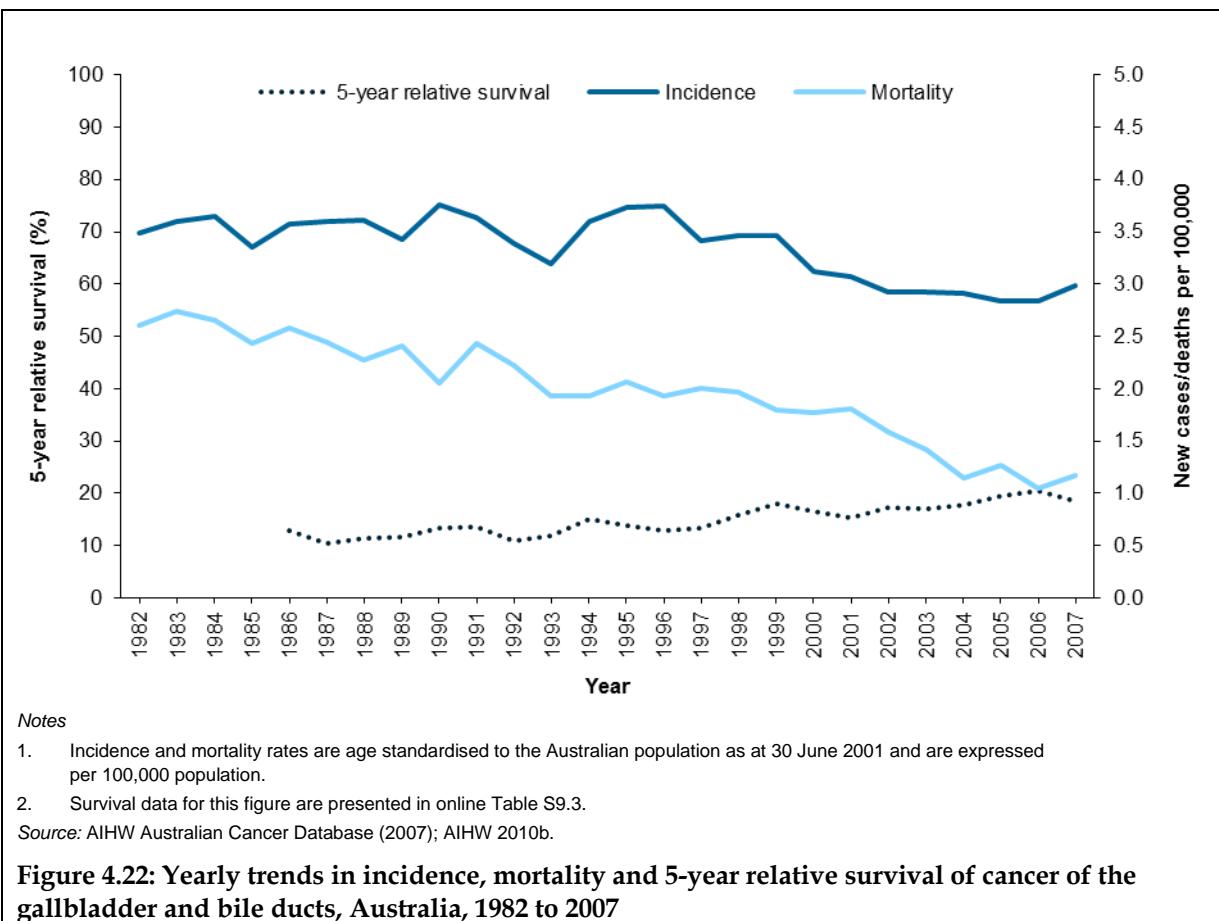
Source: AIHW Australian Cancer Database (2007).

Table 4.24: Summary of conditional relative survival from cancer of the gallbladder and bile ducts, Australia, 2006–2010

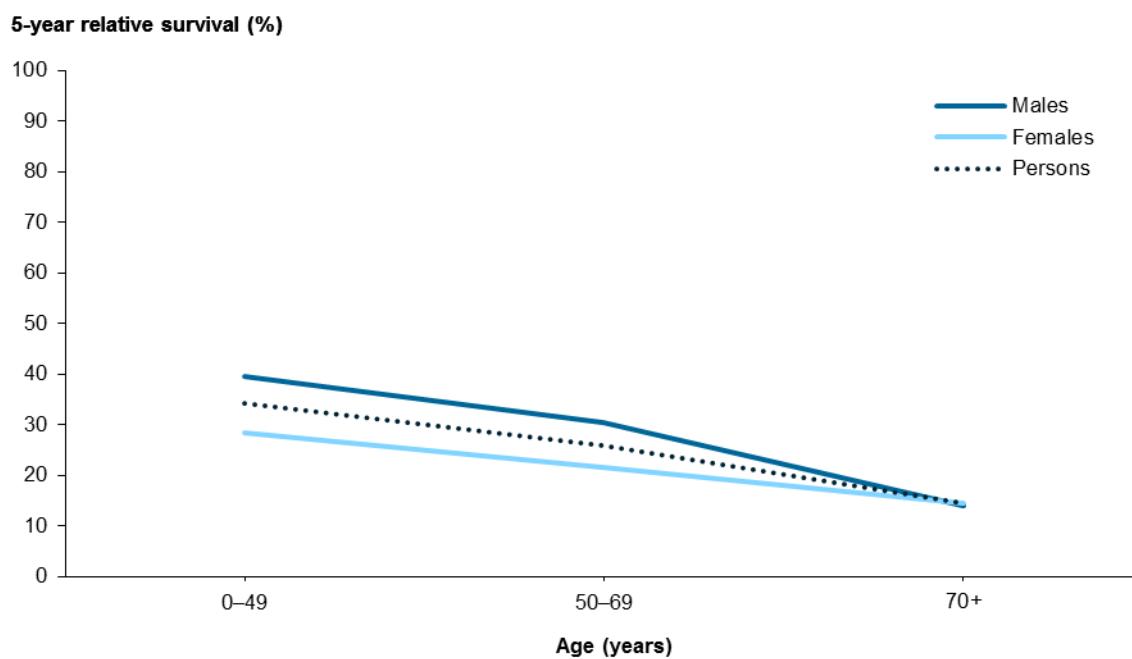
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	19.9	18.1–21.8
Already survived 1 year after diagnosis	39.9	32.9–46.8
Already survived 5 years after diagnosis	84.4	79.6–89.2
Already survived 10 years after diagnosis	91.1	85.1–97.1

Note: Additional data are presented in online Table S9.4.

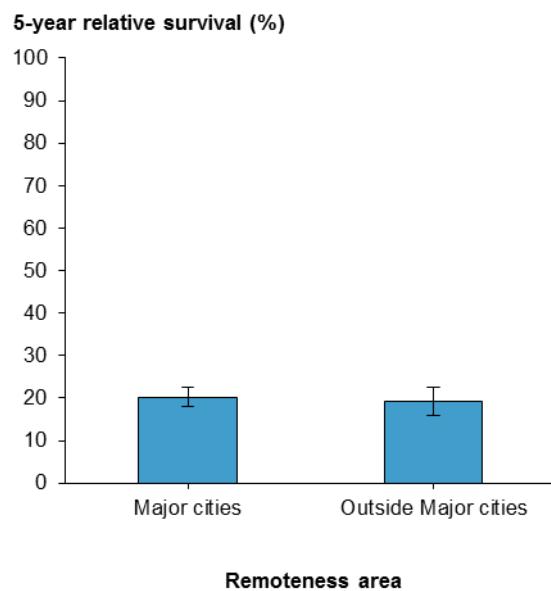
Source: AIHW Australian Cancer Database (2007).



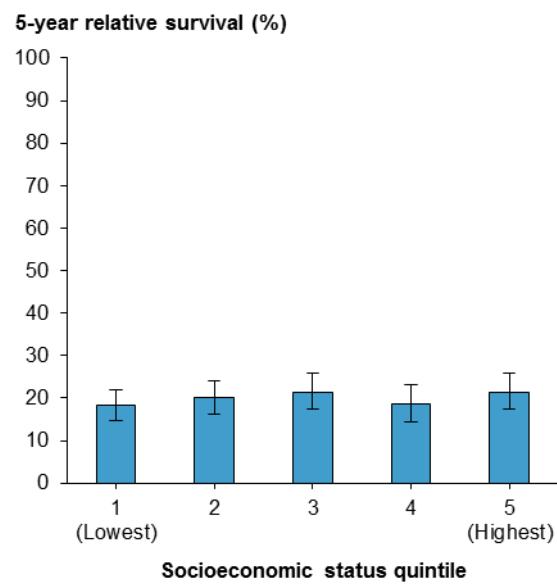
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S9.5 and S9.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.24: Five-year relative survival from cancer of the gallbladder and bile ducts by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Hodgkin lymphoma (C81)

Snapshot: in 2006–2010, individuals with Hodgkin lymphoma had an 87% chance of surviving for at least 5 years compared with the general population.

Hodgkin lymphoma is a cancer arising from the lymphatic cells of the immune system (Leukaemia Foundation 2008c). While it is a rare cancer overall, accounting for 0.5% of all cancer cases, it is one of the most common cancers diagnosed in young Australians (AIHW 2011). Hodgkin lymphoma is known to be one of the most treatable cancers in young adults, although it is associated with an increased risk of other cancers later in life which may affect long-term survival (Wilson et al. 2010).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of Hodgkin lymphoma changed only a little, increasing slightly to 2.5 new cases per 100,000. Mortality from Hodgkin lymphoma was low and dropped from 0.9 to 0.3 deaths per 100,000.

Consistent with low and falling mortality, survival from Hodgkin lymphoma was high with 5-year survival increasing from 72% in the period 1982–1987 to 87% in 2006–2010.

Survival in the period 2006–2010

Sex: Survival was not significantly different between males and females.

Age: Survival was highest for people aged under 40 and decreased with age. Five-year survival for those aged in their 70s (48%) and over (36%) were less than half of that for those aged under 40 (97%).

Population group: Survival did not differ significantly by remoteness or by socioeconomic status.

Conditional survival

The probability of surviving for at least 5 years was 87% at diagnosis, compared with 92% by 1 year after diagnosis and 96% by 5 years after diagnosis.

Prevalence at the end of 2007

While survival from Hodgkin lymphoma was comparatively high, it was less common than many other cancers, resulting in a low prevalence. At the end of 2007, there were about 7,200 Australians alive who were diagnosed with Hodgkin lymphoma in the previous 26 years, including 2,200 diagnosed in the previous 5 years. This represented a 26-year prevalence of 34 people per 100,000 population.

Table 4.25: Summary of new cases, deaths and prevalence for Hodgkin lymphoma, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	5,603	1,928	1,166	3,877	36.7
Females	4,438	1,276	1,034	3,291	30.8
Persons	10,041	3,204	2,200	7,168	33.8

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.26: Summary of relative survival from Hodgkin lymphoma, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
2006–2010						
Males	93.5	91.3–95.3	85.9	83.2–88.3	81.2	78.3–83.9
Females	94.3	92.0–96.0	88.8	86.1–91.0	85.8	82.9–88.4
Persons	93.9	92.4–95.1	87.2	85.4–88.9	83.3	81.3–85.2
<i>Previous time periods</i>						
1982–1987	87.9	86.2–89.4	71.5	68.5–74.3	n.a.	n.a.
1988–1993	89.9	88.5–91.2	76.5	74.4–78.4	69.9	67.4–72.3
1994–1999	92.4	91.2–93.5	82.8	81.0–84.5	76.5	74.4–78.5
2000–2005	92.5	91.4–93.5	84.5	82.9–86.0	80.0	78.2–81.8

Note: Additional data are presented in online tables S10.1 and S10.2.

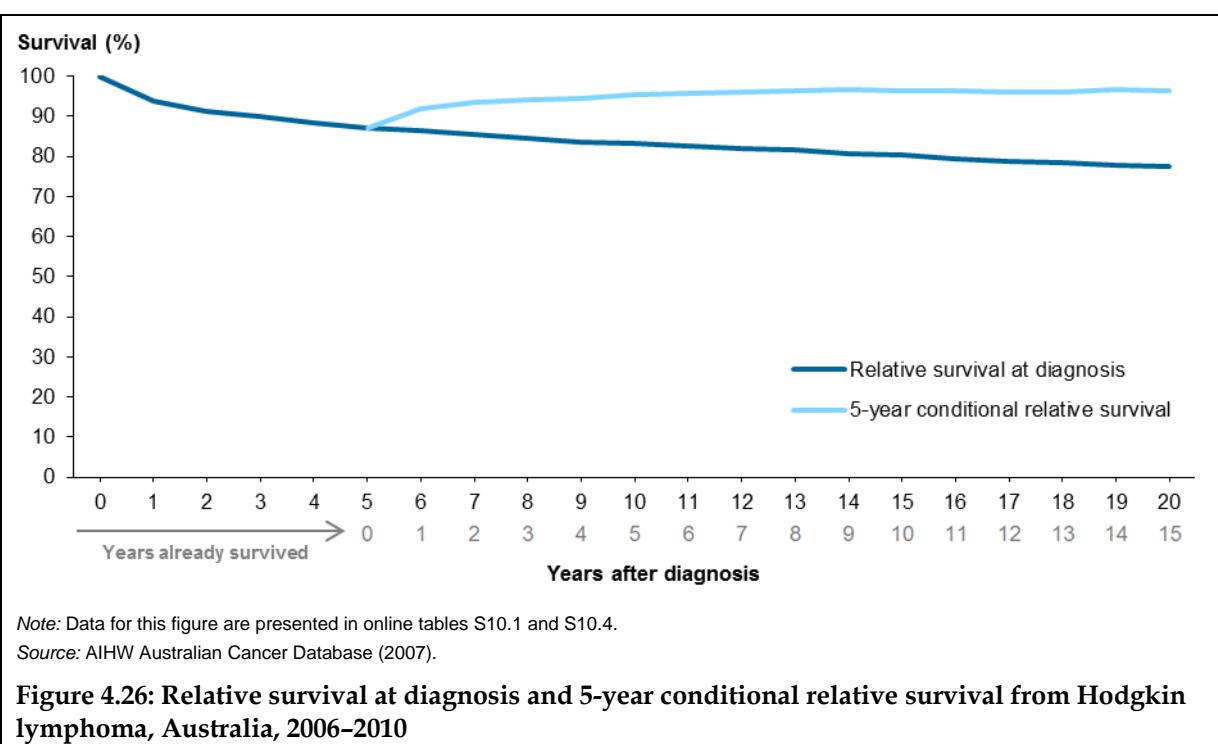
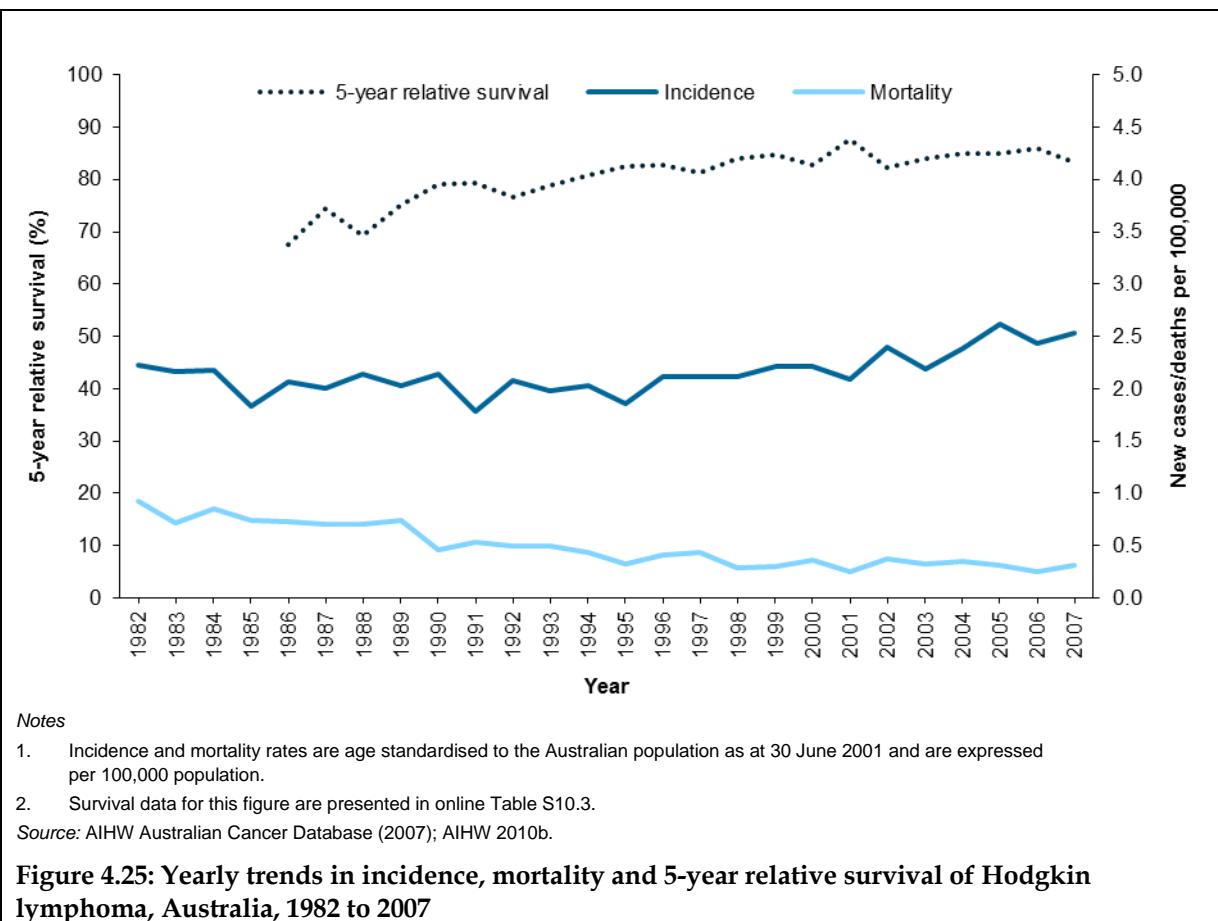
Source: AIHW Australian Cancer Database (2007).

Table 4.27: Summary of conditional relative survival from Hodgkin lymphoma, Australia, 2006–2010

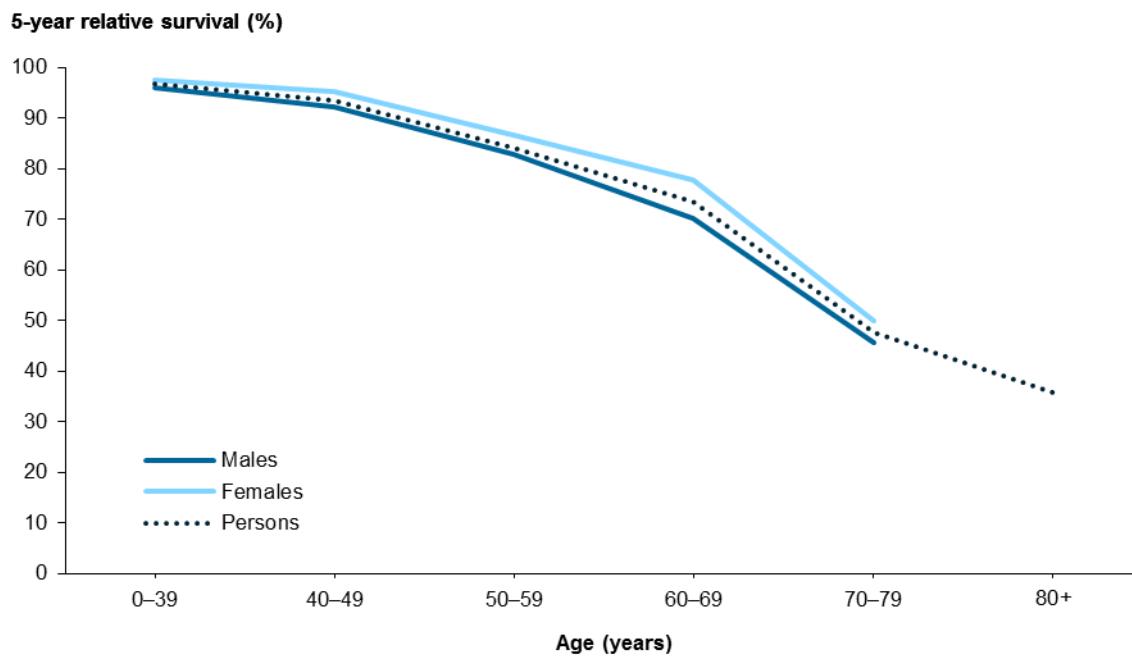
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	87.2	85.4–88.9
Already survived 1 year after diagnosis	91.9	90.6–93.2
Already survived 5 years after diagnosis	95.5	94.5–96.6
Already survived 10 years after diagnosis	96.3	95.1–97.4

Note: Additional data are presented in online Table S10.4.

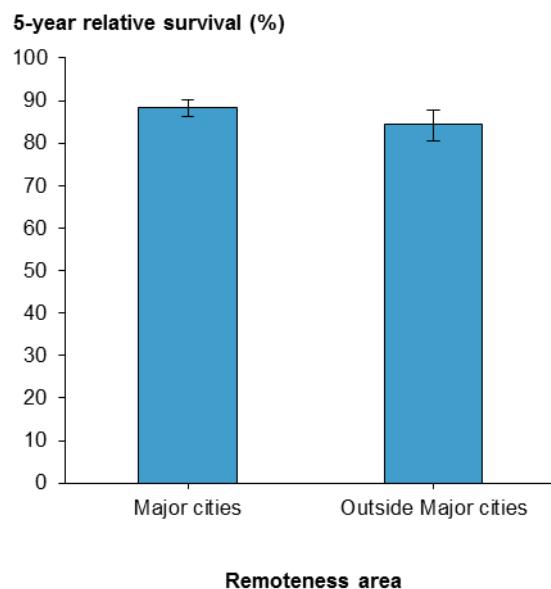
Source: AIHW Australian Cancer Database (2007).



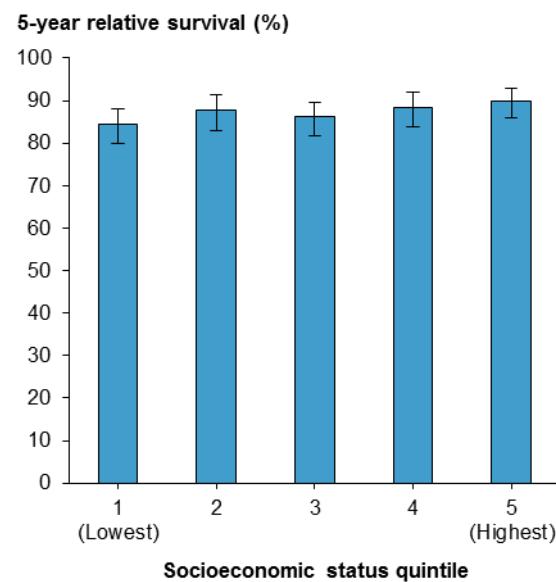
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Survival data are not presented if there were less than 20 individuals alive at the start of the follow-up year.
2. Error bars represent 95% confidence intervals.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S10.5 and S10.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.27: Five-year relative survival from Hodgkin lymphoma by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Kidney cancer (C64)

Snapshot: in 2006–2010, individuals with kidney cancer had a 72% chance of surviving for at least 5 years compared with the general population.

Kidney cancer was the eighth most common cancer diagnosed and the fifteenth most common cause of cancer death in Australia in 2007. The risk of kidney cancer was more than twice as high for males than for females. Surgery is the main treatment, performed either curatively or to reduce tumour size for advanced disease, and new treatments have been developed and tested in clinical trials (Hancock 2008; Cancer Council Victoria 2010).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of kidney cancer almost doubled, from 6.2 to 12 new cases per 100,000 while mortality from kidney cancer changed very little, remaining largely constant at about 4 deaths per 100,000.

Survival from kidney cancer increased greatly over time: 5-year survival rose from 47% in the period 1982–1987 to 72% in 2006–2010. Similar trends have been reported internationally – these were largely driven by increases in the detection and survival of early-stage renal cell carcinoma, the most common form of kidney cancer (Sun et al. 2011).

Survival in the period 2006–2010

Sex: Survival was similar for males and females overall, although females aged 50–59 (5-year survival of 83%) had a slight survival advantage over males of the same age (76%).

Age: Survival was highest for those aged under 50 and dropped with age thereafter. Five-year survival was 45% for those aged 80 and over.

Histology: The most common type of kidney cancer is renal cell carcinoma, which develops from the cells lining the small tubes of the kidneys. It had a five-year survival of 75%, almost three times that of all other carcinoma combined (27%).

Population group: One-year survival from kidney cancer was significantly higher in *Major cities* (85%) compared with *Remote and Very remote* areas (75%). However, these differences were no longer significant for survival to 5 years after diagnosis.

Survival was highest in the highest socioeconomic status quintile (5-year survival of 76%), however this survival advantage was not statistically significant.

Conditional survival

The probability of surviving for at least 5 years was 72% at the time of diagnosis, increasing to 84% by 1 year after diagnosis and 90% by 5 years after diagnosis.

Prevalence at the end of 2007

At the end of 2007, there were about 18,900 people in Australia who were diagnosed with kidney cancer in the previous 26 years, including around 8,600 diagnosed in the previous 5 years. This represented a 26-year prevalence of 89 people per 100,000 population.

Table 4.28: Summary of new cases, deaths and prevalence for kidney cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	25,583	15,598	5,620	11,830	112.0
Females	14,580	8,352	2,962	7,104	66.5
Persons	40,163	23,950	8,582	18,934	89.2

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.29: Summary of relative survival from kidney cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	84.6	83.4–85.8	71.6	70.1–73.0	63.9	62.2–65.6
Females	83.9	82.2–85.6	72.5	70.5–74.5	66.8	64.5–69.0
Persons	84.4	83.4–85.4	71.9	70.7–73.1	65.0	63.6–66.3
<i>Previous time periods</i>						
1982–1987	65.4	63.9–66.8	47.4	45.3–49.5	n.a.	n.a.
1988–1993	70.0	68.8–71.1	52.9	51.5–54.2	45.0	43.2–46.8
1994–1999	76.3	75.4–77.2	60.3	59.1–61.4	51.6	50.2–53.1
2000–2005	80.8	80.0–81.5	66.2	65.2–67.2	58.2	56.9–59.5

Note: Additional data are presented in online tables S11.1 and S11.2.

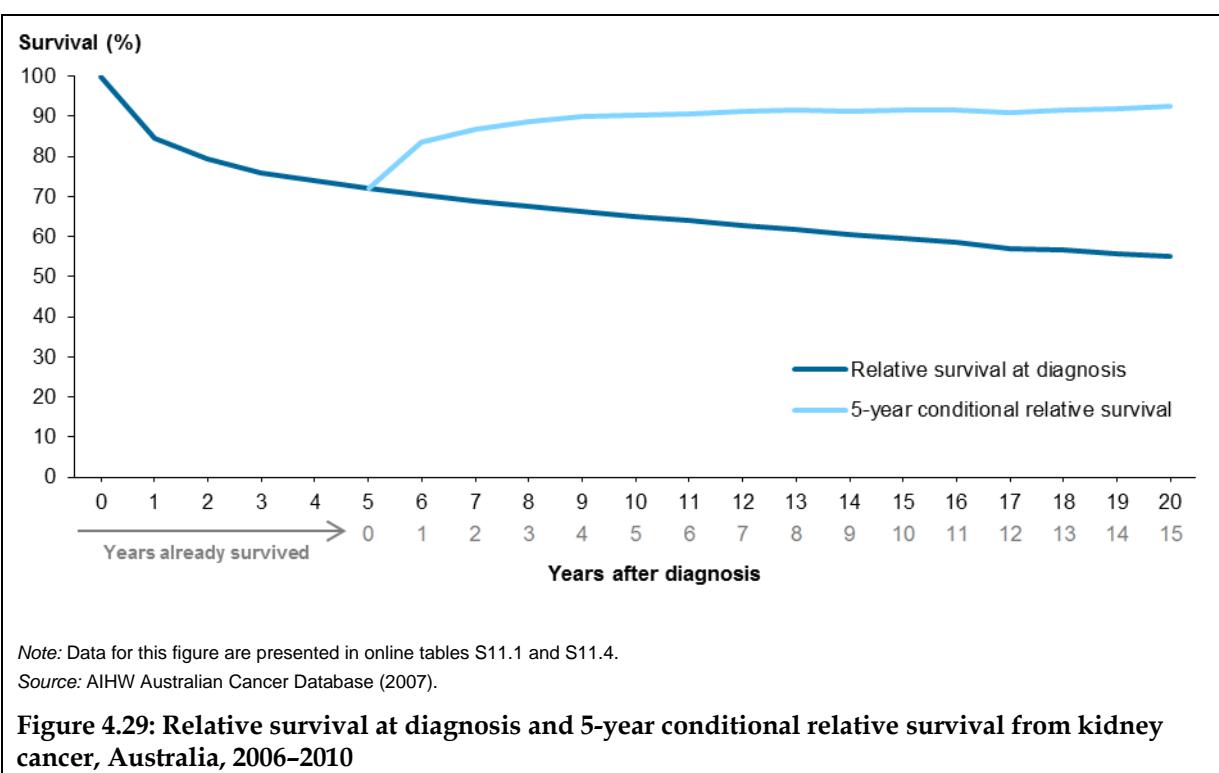
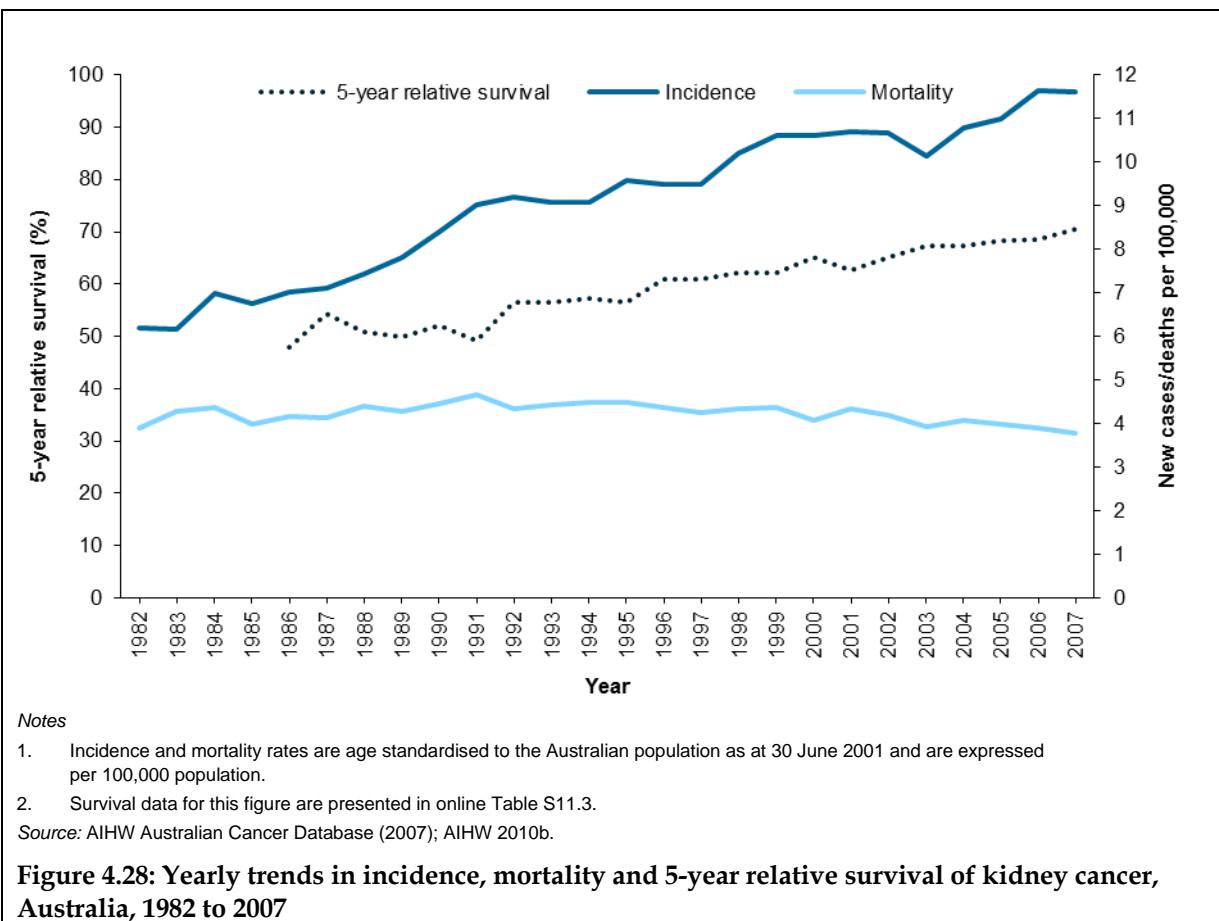
Source: AIHW Australian Cancer Database (2007).

Table 4.30: Summary of conditional relative survival from kidney cancer, Australia, 2006–2010

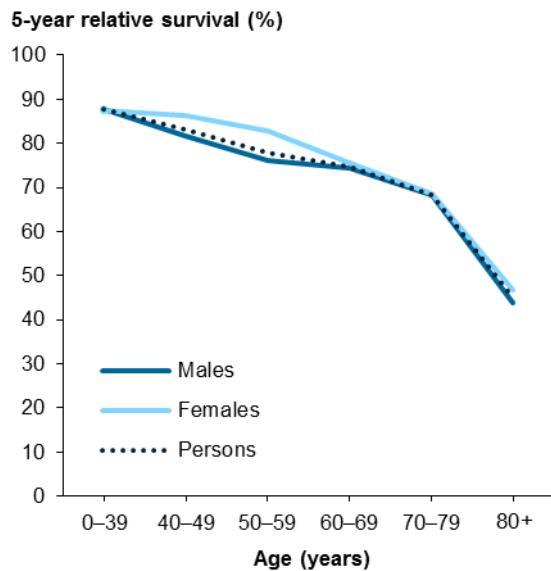
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	71.9	70.7–73.1
Already survived 1 year after diagnosis	83.5	82.4–84.6
Already survived 5 years after diagnosis	90.4	89.3–91.5
Already survived 10 years after diagnosis	91.4	89.9–92.9

Note: Additional data are presented in online Table S11.4.

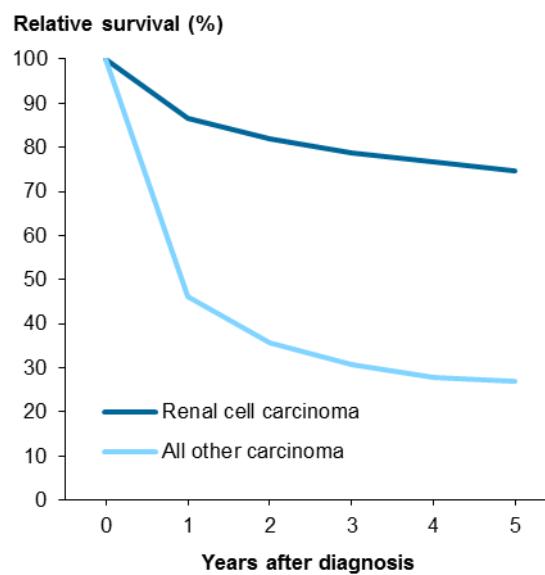
Source: AIHW Australian Cancer Database (2007).



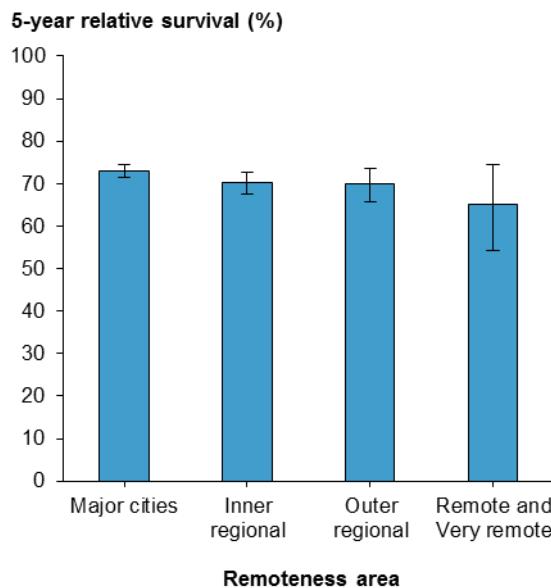
A. Sex and age



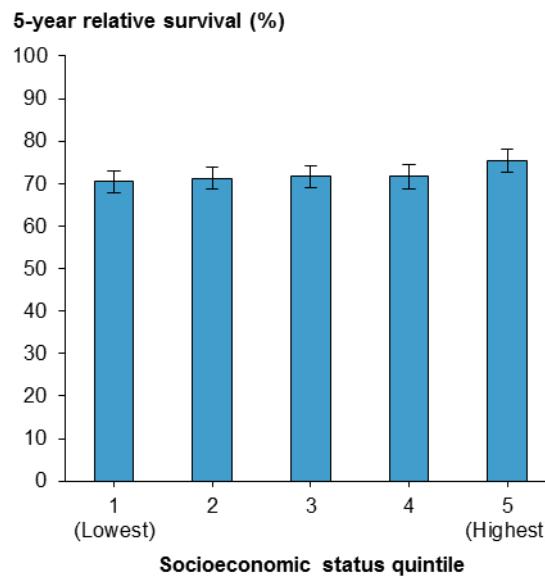
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S11.5, S11.6 and S11.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.30: Relative survival from kidney cancer by sex and age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Laryngeal cancer (C32)

Snapshot: in 2006–2010, individuals with laryngeal cancer had a 65% chance of surviving for at least 5 years compared with the general population.

Cancer of the larynx (also known as the voice box) was relatively rare and accounted for 0.5% of all cancer cases. It was far more common in males than in females, with males almost 10 times more likely to be diagnosed with and to die from it. Internationally, there have been improvements in the diagnosis and staging of laryngeal cancer, as well as changing patterns in its management (Hoffman et al. 2006; Nutting et al. 2008).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence and mortality of laryngeal cancer showed similar negative trends, with the rate of both dropping by about 40%. Incidence fell to 2.6 new cases per 100,000 while mortality fell to 0.9 deaths per 100,000.

Survival from laryngeal cancer did not change significantly over time, with 5-year survival remaining at about 63%–68% between the periods 1982–1987 and 2006–2010.

Survival in the period 2006–2010

Sex: Survival did not differ significantly between males and females. Because laryngeal cancer predominantly occurs in males, survival for males was almost identical to that for persons.

Age: Survival decreased slightly with age. Five-year survival was 77% for those aged under 50 and 58% for those aged 70 and over.

Population group: There were no significant differences in survival by remoteness.

There was no clear association between survival and socioeconomic status: 5-year survival was lowest in the lowest socioeconomic status quintile (56%), although it was only significantly lower than the second and fourth highest quintiles.

Conditional survival

The probability of surviving for at least 5 years was 65% at diagnosis, compared with 72% by 1 year after diagnosis and 81% by 5 years after diagnosis.

Prevalence at the end of 2007

Laryngeal cancer is rare and as a result, has a low prevalence. At the end of 2007, there were about 5,400 Australians alive who were diagnosed with laryngeal cancer in the previous 26 years, including 2,100 diagnosed in the previous 5 years. Sex differences in the incidence of laryngeal cancer were also reflected in its prevalence: the 26-year prevalence was 46 males per 100,000 compared with 5.7 females per 100,000.

Table 4.31: Summary of new cases, deaths and prevalence for laryngeal cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	13,395	9,638	1,910	4,833	45.8
Females	1,619	1,137	216	609	5.7
Persons	15,014	10,775	2,126	5,442	25.6

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.32: Summary of relative survival from laryngeal cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	86.3	84.1–88.2	64.8	62.3–67.3	52.5	49.7–55.2
Females	87.9	80.8–92.8	64.0	56.3–71.1	49.5	41.8–57.1
Persons	86.4	84.4–88.2	64.7	62.3–67.1	52.1	49.5–54.7
<i>Previous time periods</i>						
1982–1987	87.3	85.9–88.5	67.9	65.1–70.5	n.a.	n.a.
1988–1993	86.6	85.3–87.8	63.4	61.5–65.3	52.8	50.3–55.3
1994–1999	85.2	83.9–86.5	64.9	63.0–66.8	54.4	52.2–56.7
2000–2005	85.8	84.5–87.0	63.3	61.3–65.1	51.2	49.0–53.3

Note: Additional data are presented in online tables S12.1 and S12.2.

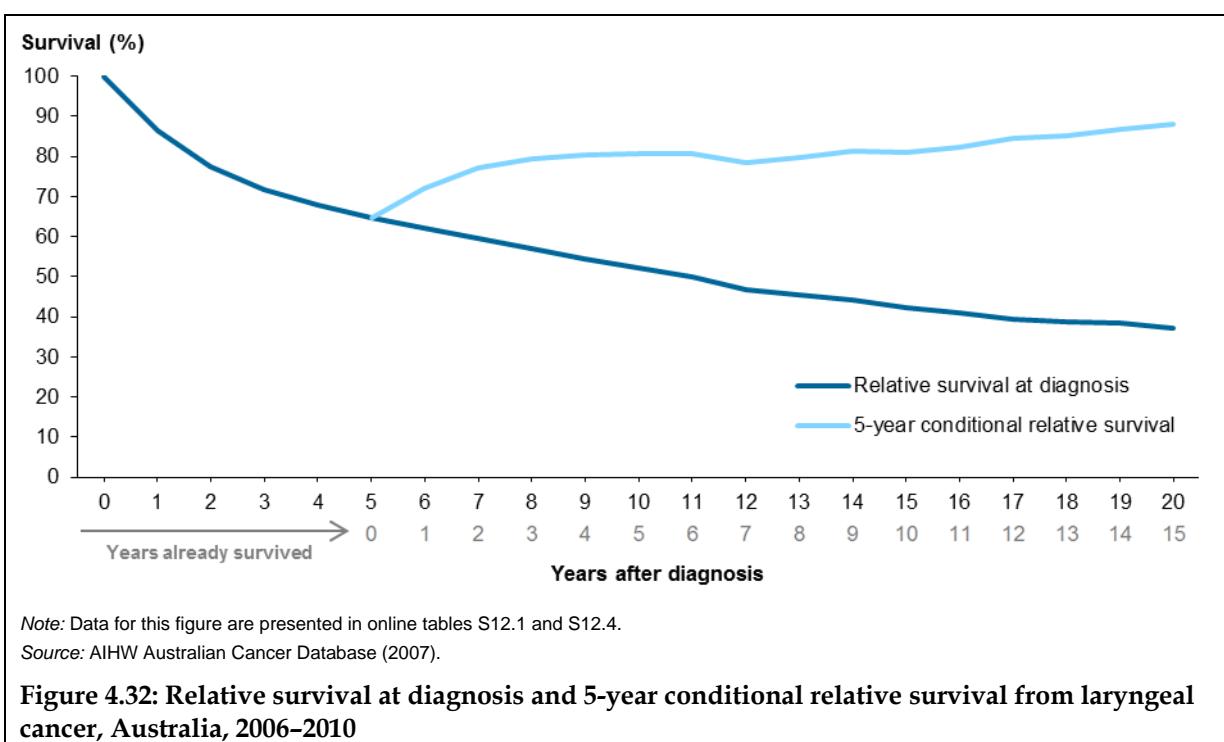
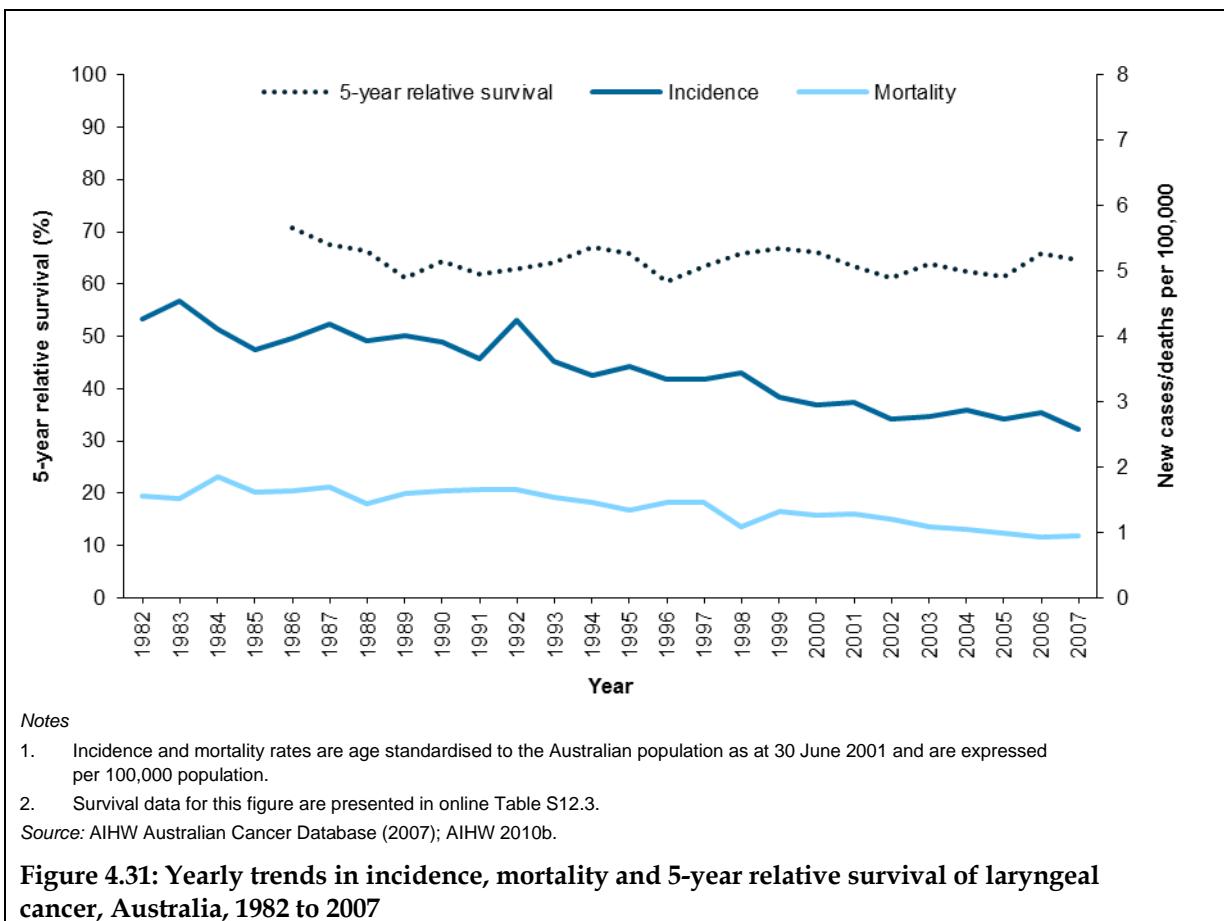
Source: AIHW Australian Cancer Database (2007).

Table 4.33: Summary of conditional relative survival from laryngeal cancer, Australia, 2006–2010

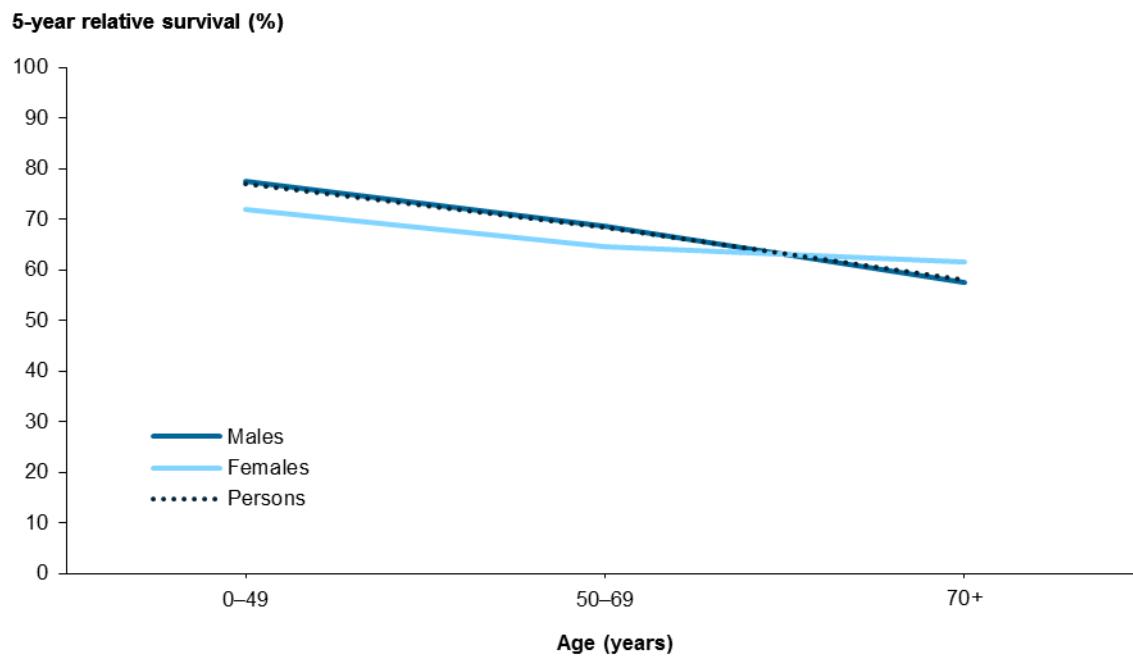
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	64.7	62.3–67.1
Already survived 1 year after diagnosis	71.9	69.1–74.7
Already survived 5 years after diagnosis	80.5	77.8–83.3
Already survived 10 years after diagnosis	81.0	77.6–84.4

Note: Additional data are presented in online Table S12.4.

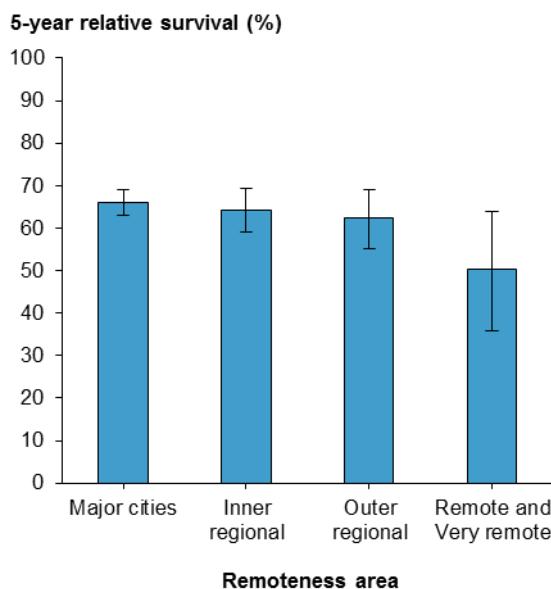
Source: AIHW Australian Cancer Database (2007).



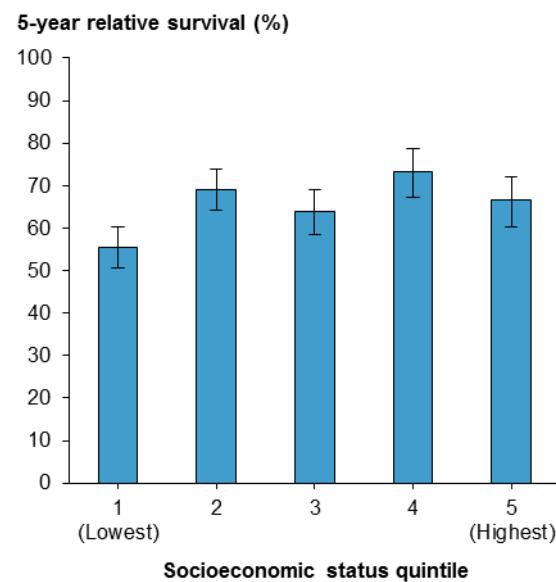
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S12.5 and S12.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.33: Five-year relative survival from laryngeal cancer by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Lip cancer (C00)

Snapshot: in 2006–2010, individuals with lip cancer had a 93% chance of surviving for at least 5 years compared with the general population. This was among the highest survival rates of all the cancers presented in this report.

Lip cancer was the most common oral cancer, although it accounted for only 0.8% of cancer cases overall in 2007. It was three times more likely to be diagnosed in males compared with females. Mortality from lip cancer was very low, with less than 20 deaths annually. Lip cancer tends to be diagnosed at an early stage and can often be treated successfully by surgery and radiotherapy (NCI 2011e).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of lip cancer fluctuated between 4.0 and 6.8 new cases per 100,000. Mortality from lip cancer remained very low throughout this period, with an average of 0.1 deaths per 100,000.

Along with low mortality, survival from lip cancer was high and stayed constant over time. Five-year survival remained at about 93%–94% between the periods 1982–1987 and 2006–2010.

Survival in the period 2006–2010

Sex: Survival was not significantly different between males and females.

Age: Survival was high for almost all ages, but dropped slightly for the very old: 5-year survival was 78% for those aged 80 and over, compared with at least 90% for all other age groups.

Population group: There were no significant differences in lip cancer survival by remoteness.

There was no clear association between survival and socioeconomic status: 5-year survival was similar in the lowest and highest socioeconomic status quintiles (89%). However, both quintiles had significantly lower survival than that in the fourth highest quintile (97%).

Conditional survival

At diagnosis, the probability of surviving for at least 5 years was 93%. Partly because this was already quite high, conditional survival did not increase significantly by 1 or 5 years after diagnosis. By 10 years after diagnosis, those with lip cancer had a 95% probability of surviving for at least 5 more years.

Prevalence at the end of 2007

Although rare, lip cancer had very high survival, contributing to its prevalence. Despite being ranked twenty-first for incidence, it was the eleventh most prevalent cancer presented in this report. At the end of 2007, there were more than 14,600 Australians alive who were diagnosed with lip cancer in the previous 26 years. The majority were males, with a 26-year prevalence of 105 males per 100,000 compared with 33 females per 100,000.

Table 4.34: Summary of new cases, deaths and prevalence for lip cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	17,651	7,741	2,997	11,096	105.1
Females	5,769	2,695	1,063	3,532	33.1
Persons	23,420	10,436	4,060	14,628	68.9

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.35: Summary of relative survival from lip cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	98.9	97.8–99.7	92.8	91.1–94.4	88.1	85.9–90.2
Females	98.5	96.4–99.9	91.5	88.2–94.4	86.7	82.7–90.5
Persons	98.8	97.9–99.5	92.5	91.0–93.9	87.7	85.8–89.6
<i>Previous time periods</i>						
1982–1987	99.1	98.4–99.7	93.4	91.2–95.5	n.a.	n.a.
1988–1993	99.1	98.5–99.6	93.8	92.4–95.0	88.5	86.2–90.7
1994–1999	99.4	98.9–99.9	94.3	93.1–95.4	88.9	87.1–90.6
2000–2005	98.8	98.2–99.2	93.7	92.6–94.8	89.3	87.7–90.8

Note: Additional data are presented in online tables S13.1 and S13.2.

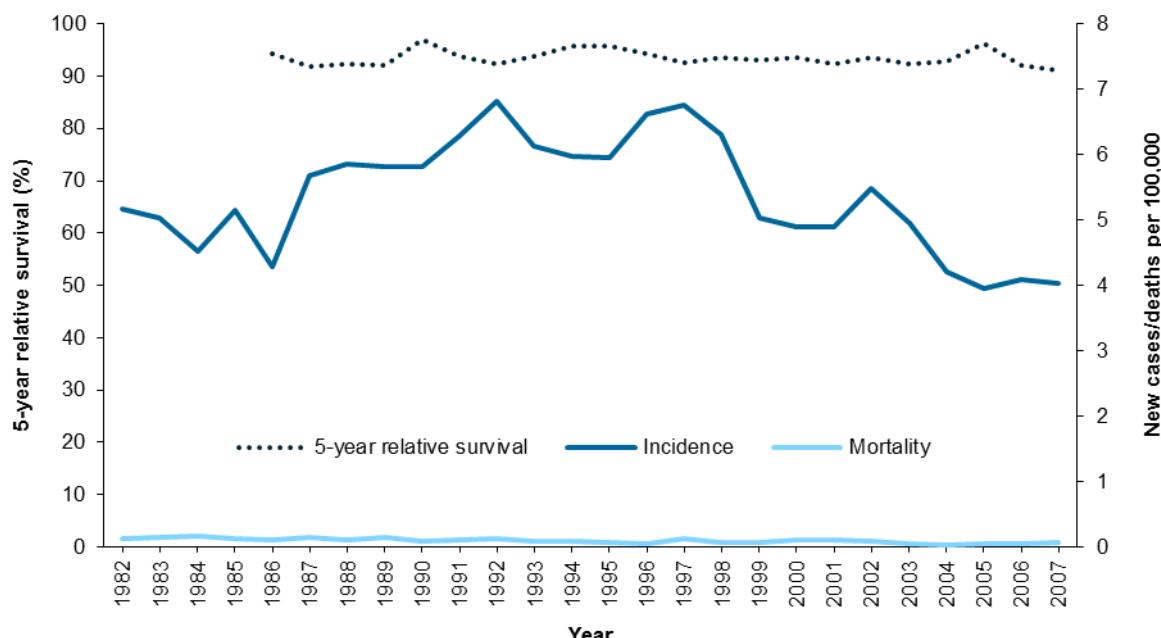
Source: AIHW Australian Cancer Database (2007).

Table 4.36: Summary of conditional relative survival from lip cancer, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	92.5	91.0–93.9
Already survived 1 year after diagnosis	92.2	90.9–93.5
Already survived 5 years after diagnosis	94.8	93.6–96.0
Already survived 10 years after diagnosis	95.3	94.0–96.6

Note: Additional data are presented in online Table S13.4.

Source: AIHW Australian Cancer Database (2007).

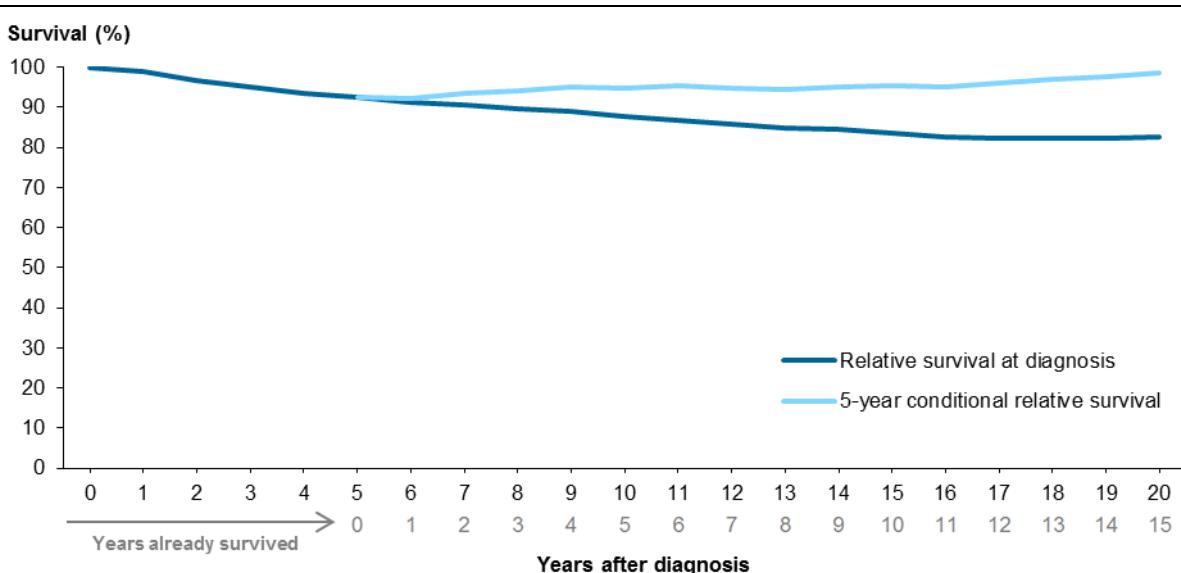


Notes

1. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
2. Survival data for this figure are presented in online Table S13.3.

Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 4.34: Yearly trends in incidence, mortality and 5-year relative survival of lip cancer, Australia, 1982 to 2007

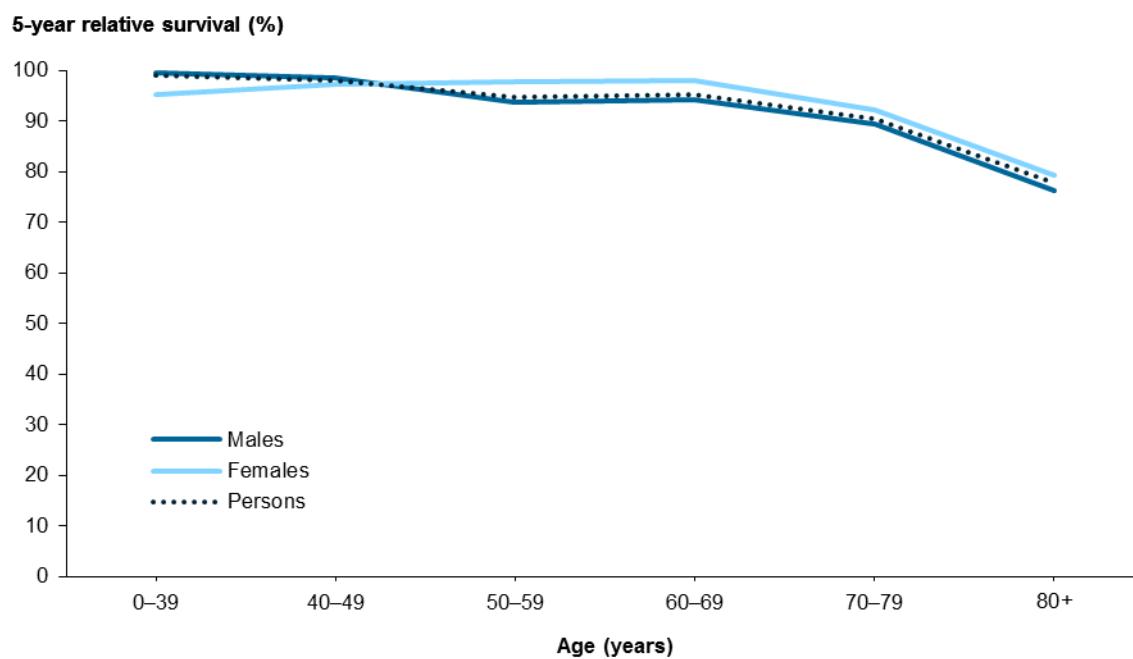


Note: Data for this figure are presented in online tables S13.1 and S13.4.

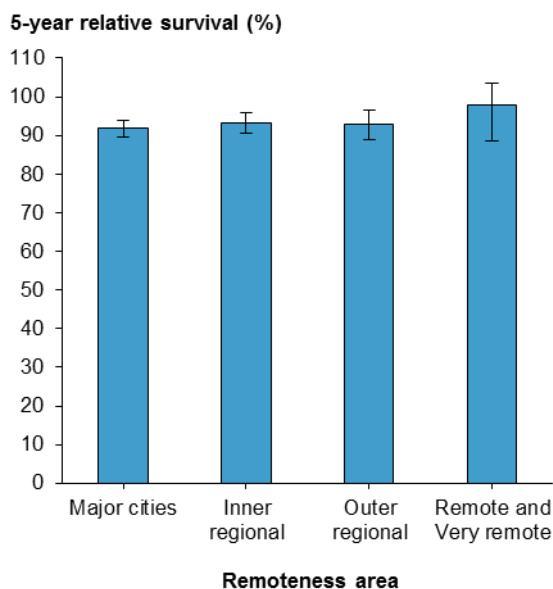
Source: AIHW Australian Cancer Database (2007).

Figure 4.35: Relative survival at diagnosis and 5-year conditional relative survival from lip cancer, Australia, 2006–2010

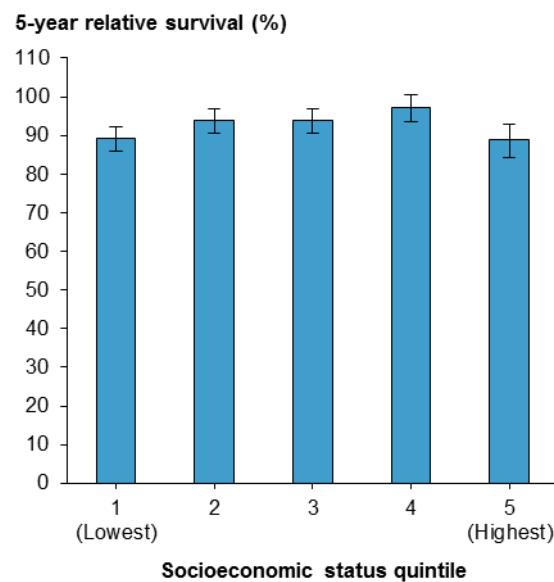
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Note the difference in the scale of the y-axis between figures.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S13.5 and S13.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.36: Five-year relative survival from lip cancer by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Liver cancer (C22)

Snapshot: in 2006–2010, individuals with liver cancer had a 16% chance of surviving for at least 5 years compared with the general population.

Primary liver cancer was the eighteenth most commonly diagnosed cancer and the eleventh most common cause of cancer death in Australia in 2007. Males were 3 times more likely than females to be diagnosed with the disease. Liver cancer tends to be diagnosed at an advanced stage and survival outcomes are affected by comorbidity with other liver problems, such as hepatitis and cirrhosis (Gellert et al. 2007; ACS 2012a).

Incidence, mortality and survival trends

Liver cancer was one of the few cancers for which mortality often exceeded incidence. However, while the rate of both new cancers and deaths grew considerably between 1982 and 2007, the mortality rate did not increase as much. Incidence of liver cancer almost tripled (from 1.8 to 5.2 new cases per 100,000) while mortality doubled (from 2.3 to 4.9 deaths per 100,000).

These trends are also reflected by liver cancer survival which, despite being low, increased significantly in every time period from 1988–1993 to 2006–2010. Five-year survival more than doubled during this time, from 7.0% to 16%.

Survival in the period 2006–2010

Sex: Survival was similar for males and females.

Age: Five-year survival was highest for those aged under 40 (48%) and decreased with age. Survival was 5.8% for those aged 80 and over.

Histology: Hepatocellular carcinoma develops from the glandular cells lining the liver; it was the most common type of liver cancer and accounted for two-thirds of total cases. It had significantly higher survival compared with cholangiocarcinoma, the second most common type of liver cancer (5-year survival of 19% versus 8.5%).

Population group: Five-year survival from liver cancer was significantly higher in *Major cities* (17%) compared with areas outside *Major cities* (12%).

Similarly, 5-year survival was highest in the highest socioeconomic status quintile (18%), although this survival advantage was not statistically significant.

Conditional survival

The probability of surviving for at least 5 years was 16% at diagnosis, compared with 38% by 1 year after diagnosis and 75% by 5 years after diagnosis.

Prevalence at the end of 2007

Prevalence of primary liver cancer was low, given its low incidence and poor survival. At the end of 2007, there were about 2,200 people alive in Australia who were diagnosed with it in the previous 26 years, representing a prevalence of 15 males per 100,000 and 6.1 females per 100,000.

Table 4.37: Summary of new cases, deaths and prevalence for liver cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	10,389	9,440	1,126	1,588	15.0
Females	3,953	3,551	439	650	6.1
Persons	14,342	12,991	1,565	2,238	10.5

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.38: Summary of relative survival from liver cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	38.1	35.9–40.3	15.5	14.1–16.9	11.3	10.0–12.7
Females	37.1	33.7–40.6	15.4	13.2–17.8	12.3	10.2–14.7
Persons	37.8	35.9–39.7	15.5	14.3–16.7	11.6	10.5–12.8
<i>Previous time periods</i>						
1982–1987	11.4	9.9–13.1	n.p.	n.p.	n.a.	n.a.
1988–1993	17.8	16.3–19.4	7.0	5.9–8.2	5.1	3.9–6.5
1994–1999	25.7	24.3–27.2	9.6	8.5–10.7	7.8	6.7–9.0
2000–2005	33.4	32.1–34.7	12.2	11.3–13.2	9.4	8.4–10.4

Notes

1. Survival data are not presented if there were less than 20 individuals alive at the start of the follow-up year.

2. Additional data are presented in online tables S14.1 and S14.2.

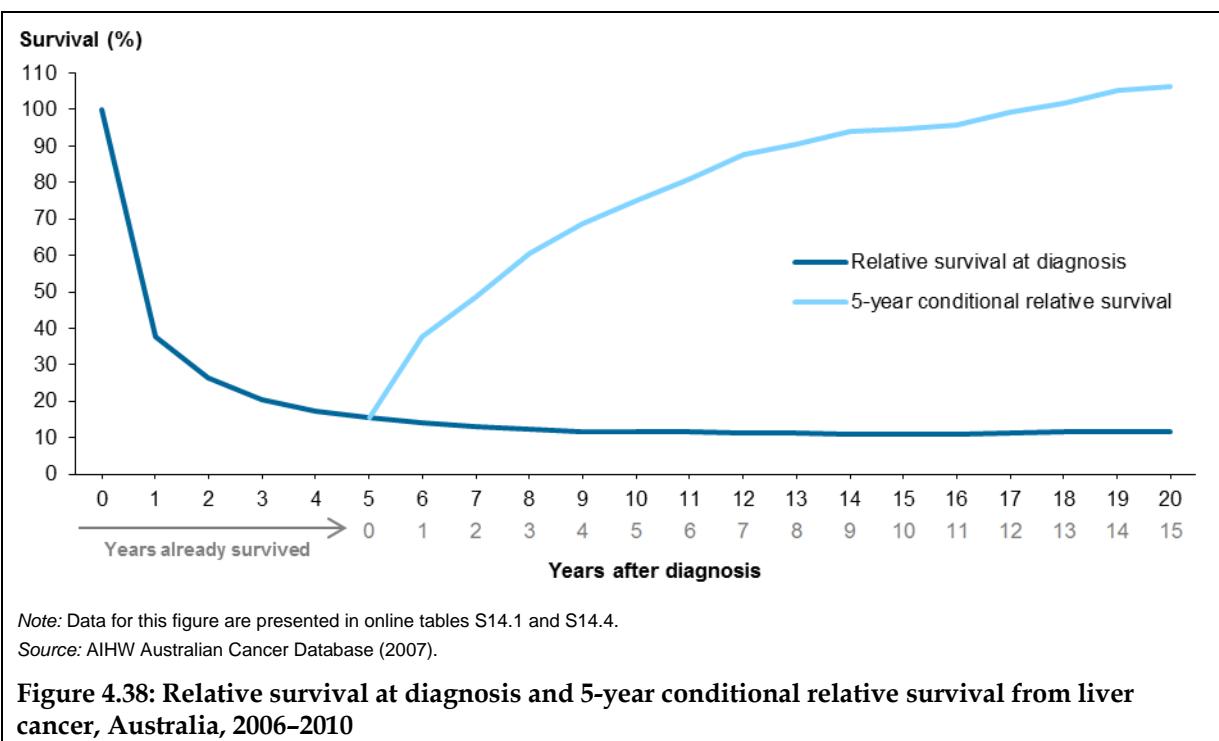
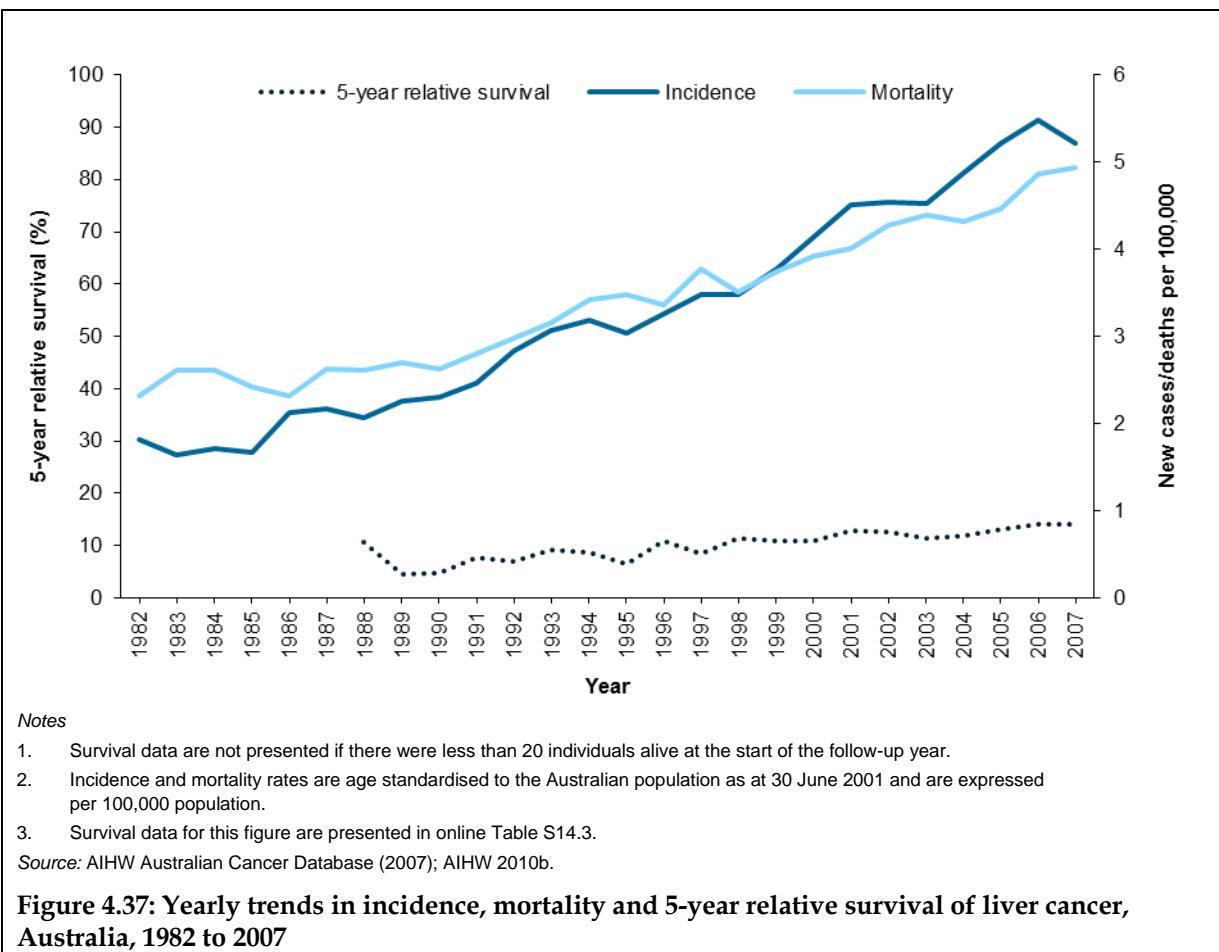
Source: AIHW Australian Cancer Database (2007).

Table 4.39: Summary of conditional relative survival from liver cancer, Australia, 2006–2010

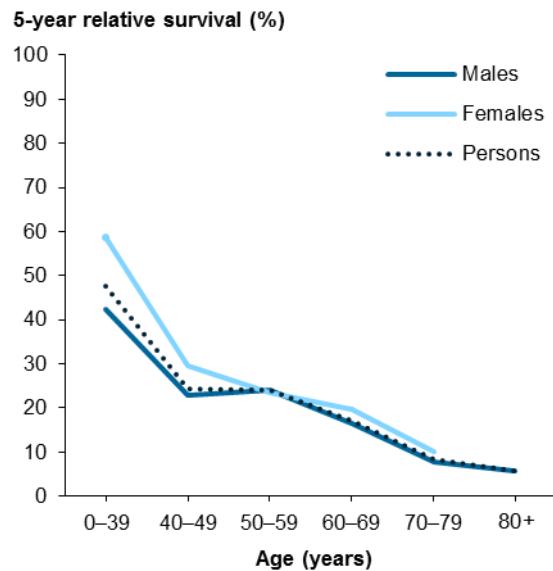
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	15.5	14.3–16.7
Already survived 1 year after diagnosis	37.6	31.8–43.3
Already survived 5 years after diagnosis	74.8	69.8–79.8
Already survived 10 years after diagnosis	94.8	90.0–99.6

Note: Additional data are presented in online Table S14.4.

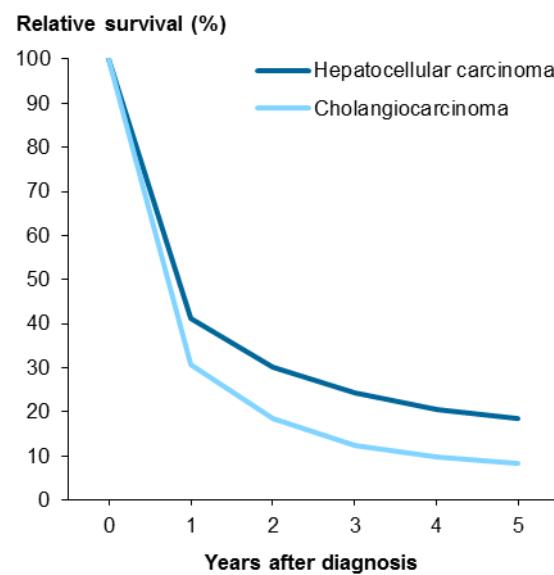
Source: AIHW Australian Cancer Database (2007).



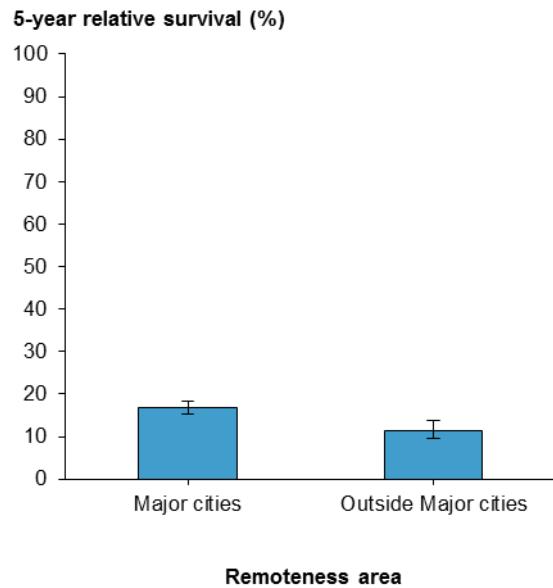
A. Sex and age



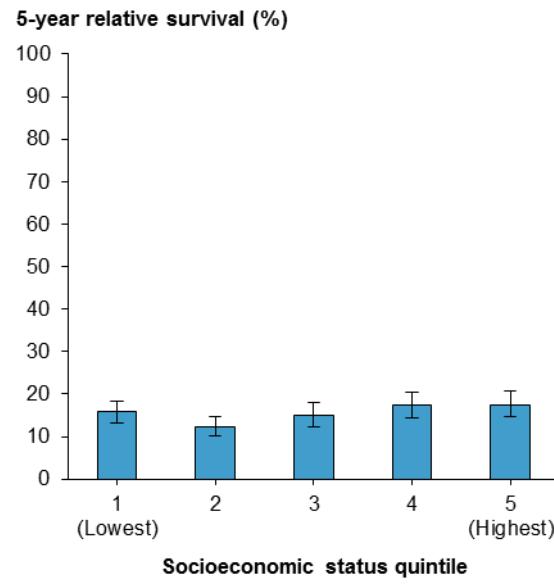
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Survival data are not presented if there were less than 20 individuals alive at the start of the follow-up year.
2. Error bars represent 95% confidence intervals.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S14.5, S14.6 and S14.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.39: Relative survival from liver cancer by sex and age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Lung cancer (C33–C34)

Snapshot: in 2006–2010, individuals with lung cancer had a 14% chance of surviving for at least 5 years compared with the general population.

Lung cancer is a major cause of burden of disease in Australia. It was the leading cause of cancer death and the fifth most commonly diagnosed cancer in 2007. One in 16 Australians will have developed lung cancer before the age of 85 with males twice as likely to be diagnosed as females. The prognosis for lung cancer tends to be poor compared with other cancers, partly because it is often diagnosed at an advanced stage and because it is associated with other smoking-related comorbidities (Tracey et al. 2006; AIHW & CA 2011).

Incidence, mortality and survival trends

Between 1982 and 2007, both incidence and mortality from lung cancer decreased. The rate of new cases dropped slightly from 47 to 43 per 100,000 while the rate of deaths fell more steeply from 42 to 34 per 100,000. These mortality trends are consistent with those of survival, which have improved with time. Five-year survival rose gradually but significantly in every time period between 1982–1987 and 2006–2010, increasing from 8.7% to 14%.

Survival in the period 2006–2010

Sex: Survival was higher for females than for males, especially for those aged 50–79. Five-year survival was 17% for females compared with 13% for males.

Age: Five-year survival was significantly higher for those aged under 40 (42%) compared with all older age groups. Survival fell sharply with age, dropping from 13% for those in their 70s to 6.3% for those aged 80 and over.

Histology: There are several types of lung cancer, differentiated by the type of cell involved and the treatment required (AIHW & CA 2011). Five-year survival from small cell carcinoma was the lowest (6.6%), followed closely by large cell carcinoma (8.3%). Survival from squamous cell carcinoma (18%) and adenocarcinoma (20%) were similar.

Population group: Survival varied significantly by remoteness and socioeconomic status. Five-year survival was higher in *Major cities* (15%) than in *Inner regional* areas (13%) and *Outer regional* areas (11%). Likewise, survival was greatest in the highest socioeconomic status quintile (16%).

Conditional survival

The probability of surviving for at least 5 years was 14% at diagnosis. By 1 year after diagnosis, survival prospects more than doubled to 34%, and by 5 years after diagnosis, they had risen to 72%.

Prevalence at the end of 2007

Prevalence of lung cancer represented a balance between its high incidence and low survival. At the end of 2007, there were almost 19,900 people in Australia diagnosed with it in the previous 26 years, representing a prevalence of 94 people per 100,000 population.

Table 4.40: Summary of new cases, deaths and prevalence for lung cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	132,657	126,145	7,417	11,689	110.7
Females	58,971	53,996	5,189	8,165	76.5
Persons	191,628	180,141	12,606	19,854	93.5

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.41: Summary of relative survival from lung cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	36.0	35.2–36.8	12.6	12.1–13.1	8.8	8.4–9.3
Females	42.4	41.3–43.4	16.5	15.9–17.3	12.3	11.7–13.0
Persons	38.4	37.8–39.1	14.1	13.7–14.5	10.2	9.8–10.5
<i>Previous time periods</i>						
1982–1987	30.2	29.7–30.7	8.7	8.3–9.2	n.a.	n.a.
1988–1993	31.8	31.3–32.2	9.7	9.4–10.0	7.2	6.9–7.6
1994–1999	34.0	33.6–34.4	11.1	10.7–11.4	7.9	7.6–8.2
2000–2005	36.2	35.8–36.6	12.1	11.8–12.4	8.6	8.3–8.9

Note: Additional data are presented in online tables S15.1 and S15.2.

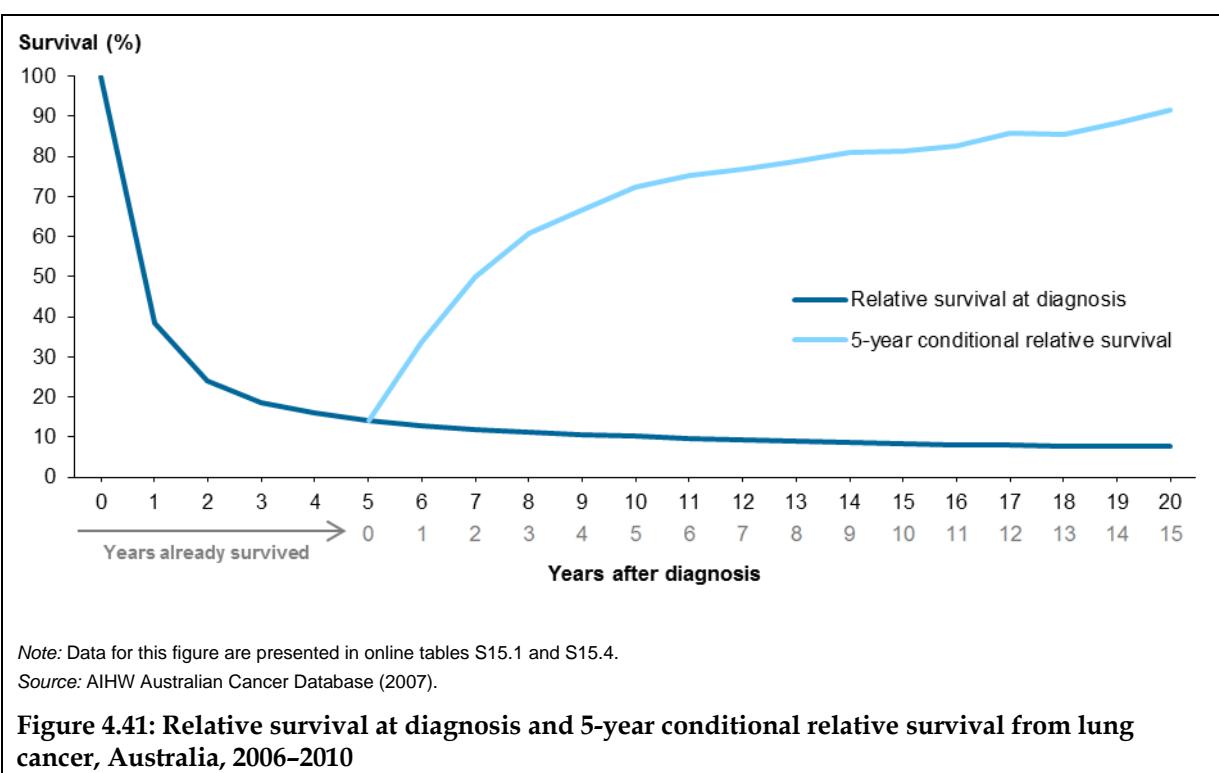
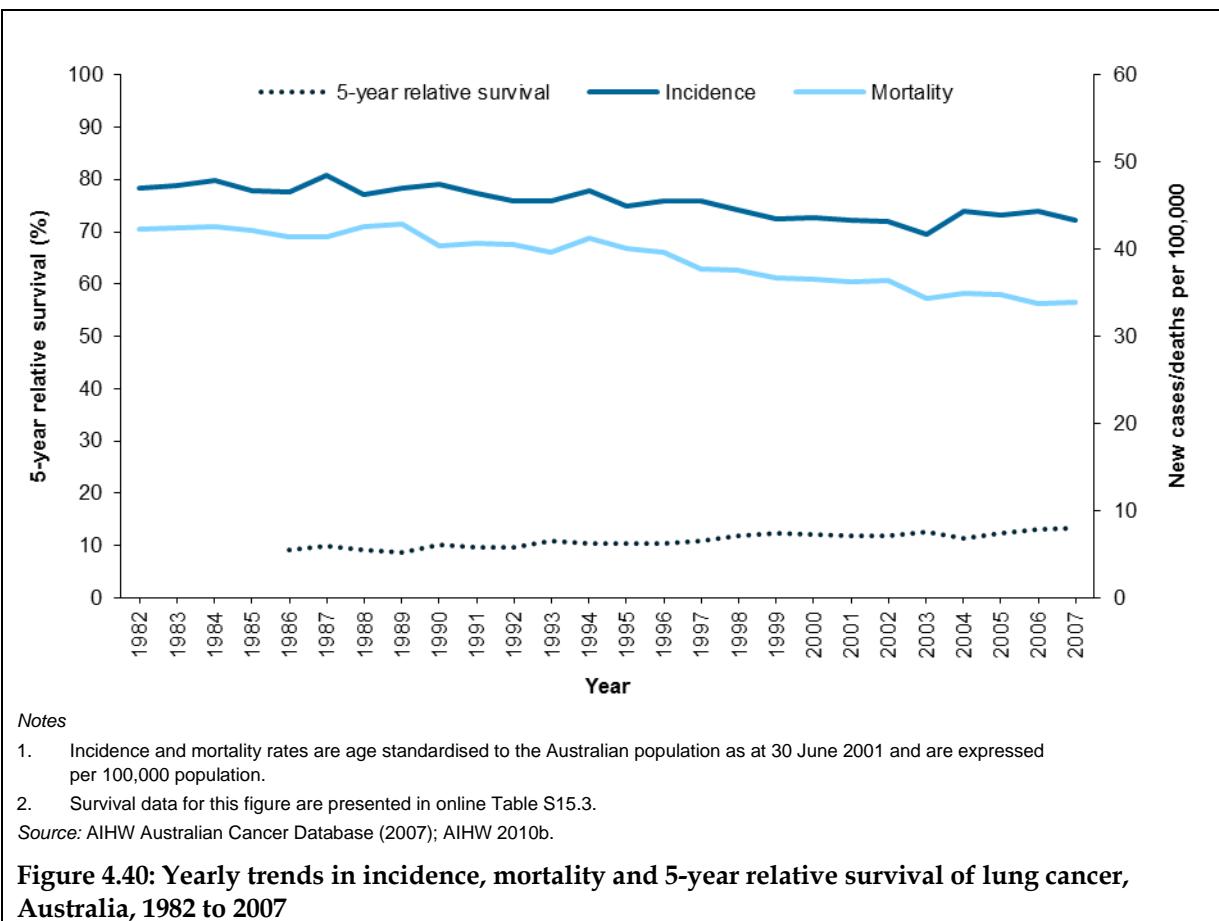
Source: AIHW Australian Cancer Database (2007).

Table 4.42: Summary of conditional relative survival from lung cancer, Australia, 2006–2010

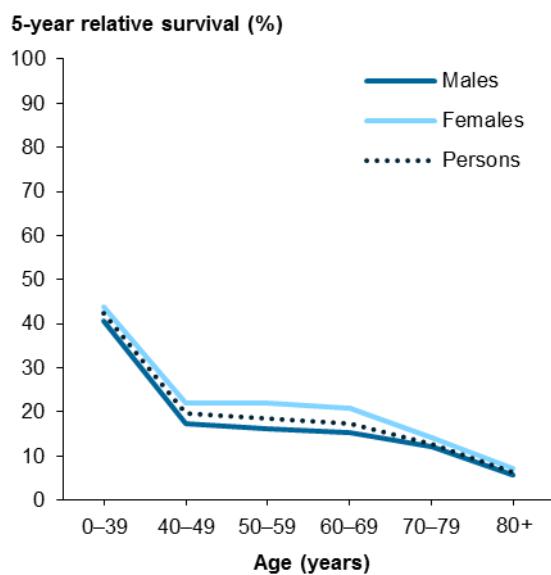
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	14.1	13.7–14.5
Already survived 1 year after diagnosis	33.6	31.4–35.8
Already survived 5 years after diagnosis	72.3	70.4–74.2
Already survived 10 years after diagnosis	81.4	79.0–83.7

Note: Additional data are presented in online Table S15.4.

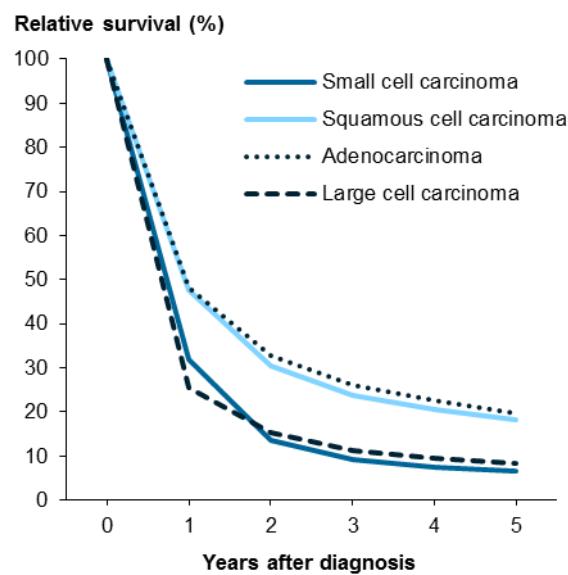
Source: AIHW Australian Cancer Database (2007).



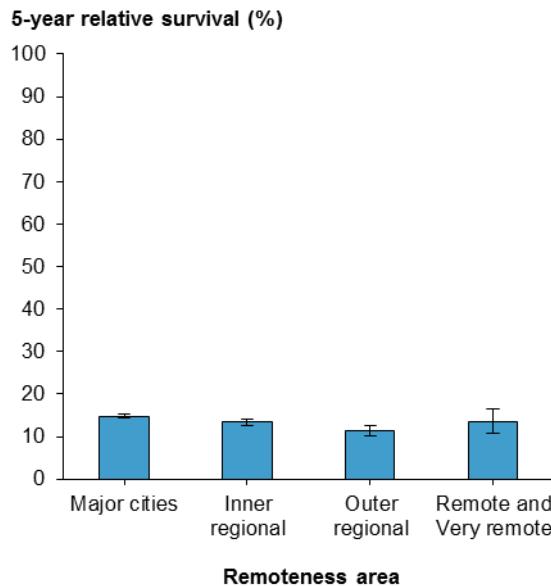
A. Sex and age



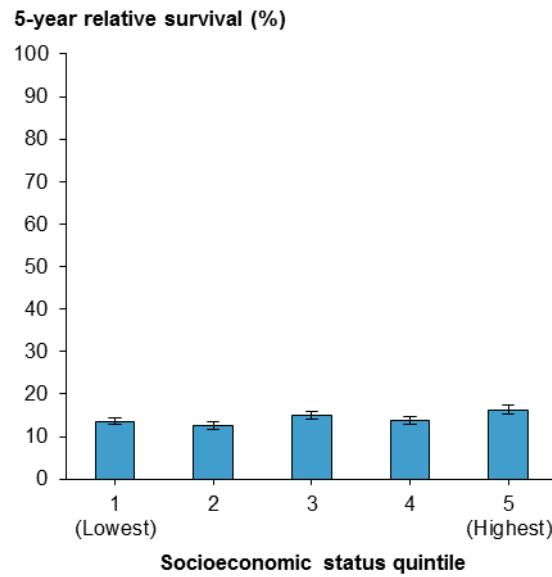
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S15.5, S15.6 and S15.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.42: Relative survival from lung cancer by sex and age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Melanoma of the skin (C43)

Snapshot: in 2006–2010, individuals with melanoma of the skin had a 91% chance of surviving for at least 5 years compared with the general population. This was among the highest survival rates of all the cancers presented in this report.

Melanoma of the skin is a major cancer in Australia: it was the fourth most commonly diagnosed cancer and the eighth most common cause of cancer death in 2007. Melanoma is very treatable when found in its early stages (Cancer Council Victoria 2009; ACS 2012b). In addition, data from New South Wales indicate that the majority of melanomas diagnosed were localised disease (Tracey et al. 2006; Tracey, Barracough et al. 2007).

Incidence, mortality and survival trends

Incidence of melanoma of the skin grew considerably between 1982 and 2007, almost doubling to 47 new cases per 100,000. Mortality only increased a little during this period, from 4.7 to 5.7 deaths per 100,000.

Consistent with its high incidence and low mortality, survival from melanoma was high, although survival trends were not consistent over time. Until the 2000s, survival increased significantly between every time period: 5-year survival grew from 86% in the period 1982–1987 to 91% in 1994–1999 but changed very little thereafter.

Survival in the period 2006–2010

Sex: Females tended to have higher survival than males: 5-year survival was 94% for females compared with 89% for males.

Age: Survival was high for all age groups under 70 and decreased gradually with age. Five-year survival was 95% for those aged under 40 and 80% for those aged 80 and over.

Tumour thickness: Despite high survival from melanoma overall, survival varied considerably by tumour thickness. Five-year survival for large tumours (thicker than 4 mm) was 55% compared with almost 100% survival for small tumours (1 mm or less).

Population group: There were no significant differences in survival from melanoma by remoteness or by socioeconomic status.

Conditional survival

The probability of surviving for at least 5 years was 91% at diagnosis compared with 92% by 1 year after diagnosis. By 14 years after diagnosis, conditional survival had reached 100% – that is, 5-year survival for those with melanoma was the same as that for the general population.

Prevalence at the end of 2007

Melanoma of the skin was the second most prevalent cancer in Australia as a result of its high incidence and good survival. At the end of 2007, there were more than 136,000 people in Australia who were diagnosed with melanoma in the previous 26 years, including almost 45,800 diagnosed in the previous 5 years. This represented a 26-year prevalence of 640 people per 100,000 population or 0.6% of the total Australian population.

Table 4.43: Summary of new cases, deaths and prevalence for melanoma of the skin, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	103,734	40,402	25,740	70,654	669.1
Females	84,040	22,893	20,013	65,362	612.1
Persons	187,774	63,295	45,753	136,016	640.4

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.44: Summary of relative survival from melanoma of the skin, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	96.4	96.0–96.8	88.5	87.9–89.1	85.2	84.4–85.9
Females	98.3	97.9–98.6	93.6	93.0–94.2	91.4	90.7–92.2
Persons	97.2	96.9–97.5	90.7	90.3–91.1	87.9	87.3–88.4
<i>Previous time periods</i>						
1982–1987	95.4	95.1–95.7	85.8	84.9–86.6	n.a.	n.a.
1988–1993	97.1	96.8–97.3	89.4	89.0–89.9	85.7	85.0–86.4
1994–1999	97.4	97.2–97.6	91.0	90.6–91.4	87.6	87.1–88.2
2000–2005	97.6	97.5–97.8	91.5	91.2–91.9	88.3	87.8–88.8

Note: Additional data are presented in online tables S16.1 and S16.2.

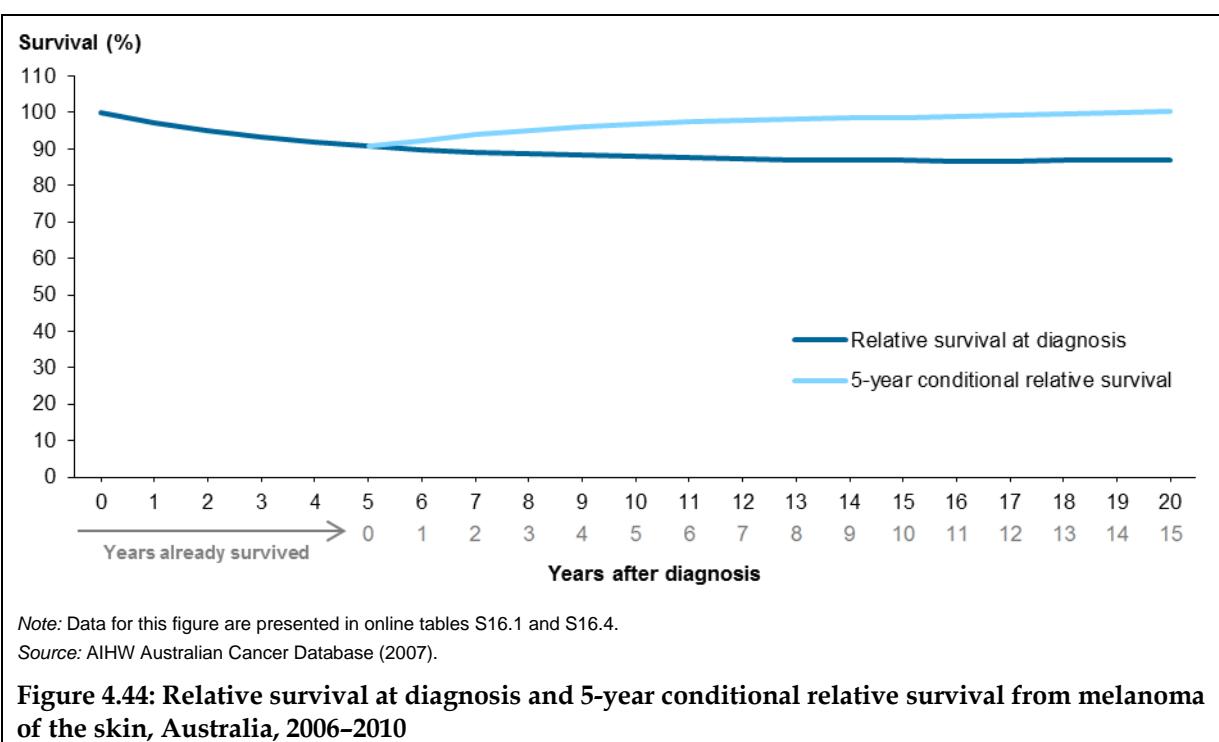
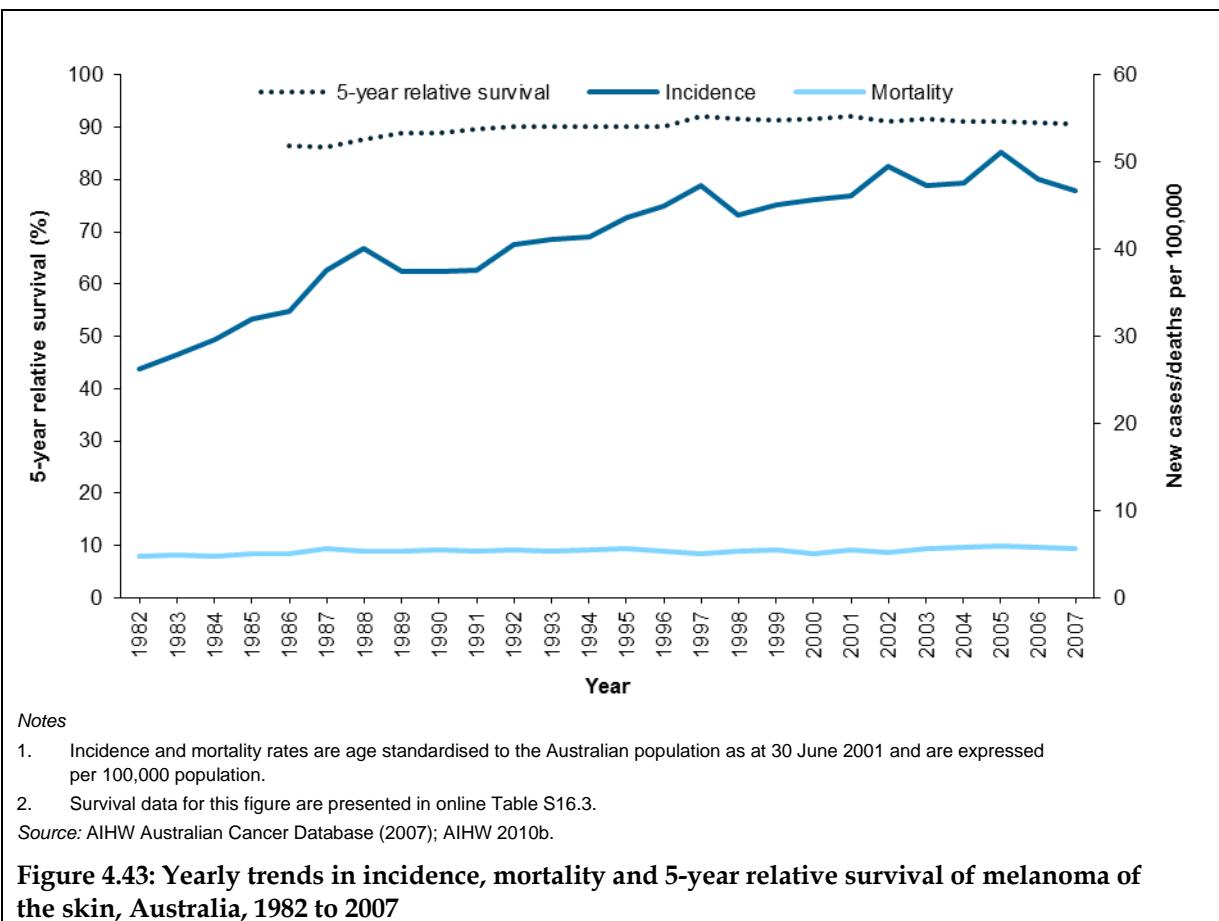
Source: AIHW Australian Cancer Database (2007).

Table 4.45: Summary of conditional relative survival from melanoma of the skin, Australia, 2006–2010

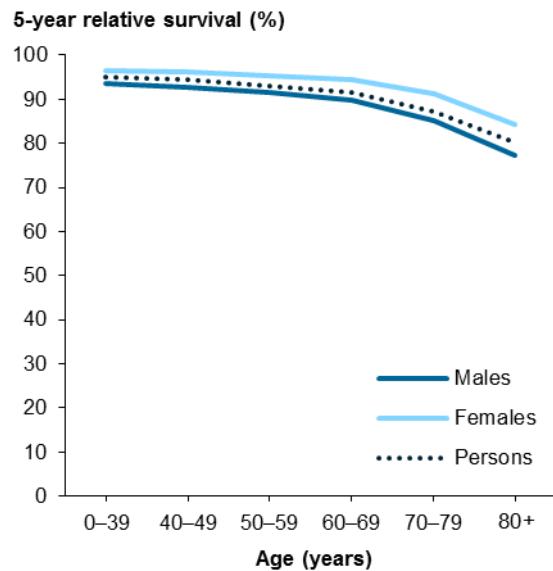
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	90.7	90.3–91.1
Already survived 1 year after diagnosis	92.4	92.0–92.8
Already survived 5 years after diagnosis	96.9	96.6–97.2
Already survived 10 years after diagnosis	98.7	98.4–99.1

Note: Additional data are presented in online Table S16.4.

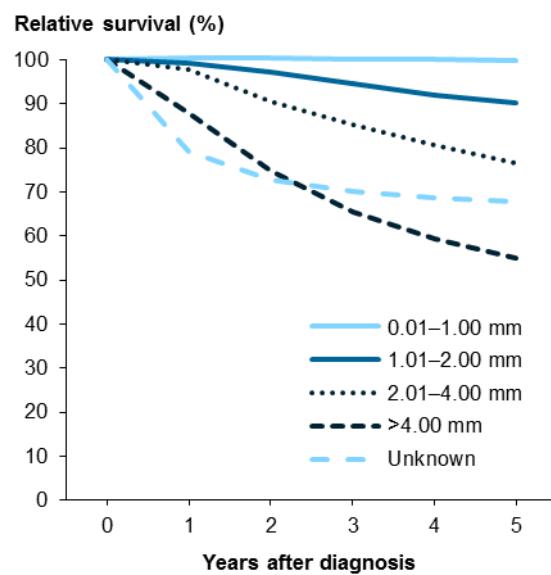
Source: AIHW Australian Cancer Database (2007).



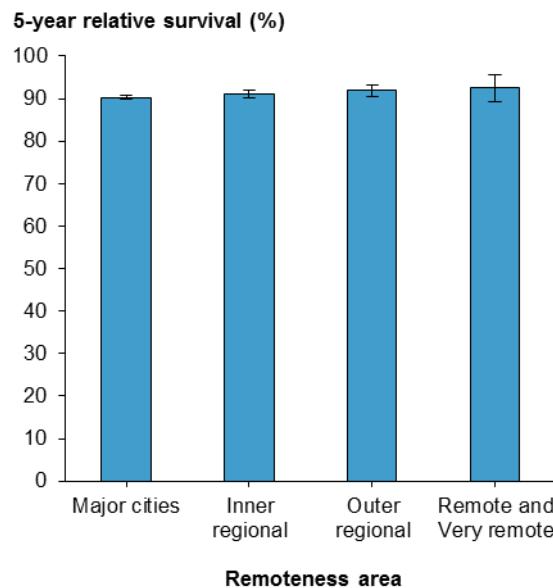
A. Sex and age



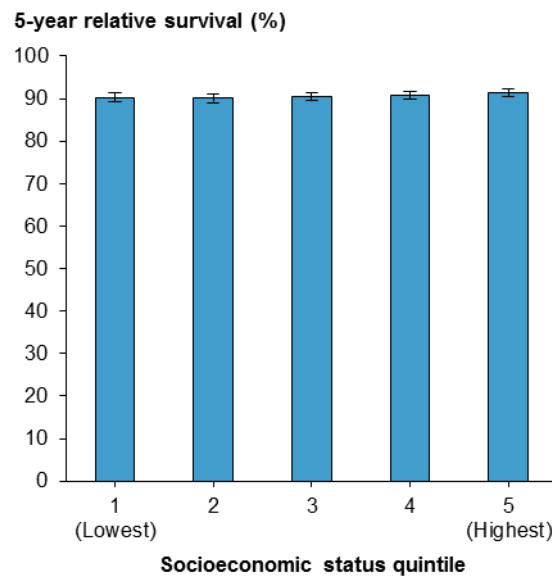
B. Tumour thickness



C. Remoteness



D. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S16.5, S16.6 and S16.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.45: Five-year relative survival from melanoma of the skin by sex and age (A), tumour thickness (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Mesothelioma (C45)

Snapshot: in 2006–2010, individuals with mesothelioma had a 6.2% chance of surviving for at least 5 years compared with the general population. This was among the lowest survival rates of all the cancers presented in this report.

Mesothelioma is a cancer of the protective lining of the body cavities and internal organs, such as the lungs, heart and bowel. It is rare, accounting for 0.6% of all cancer cases in 2007. Males were almost 6 times more likely to be diagnosed with it than females. It is almost always caused by asbestos exposure, which has been regulated in the Australian workplace and general environment since the 1970s (Safe Work Australia 2011). Australia has one of the world's highest reported rates of mesothelioma and the prevention and treatment of this disease remains a public health concern (Australian Mesothelioma Registry 2012).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of mesothelioma was low but on the rise, doubling from 1.2 to 3.0 new cases per 100,000. Mortality data are only available from 1997, with death rates at about 2.4 deaths per 100,000.

Survival from mesothelioma was low, reflecting the high mortality-to-incidence ratio. It did not change significantly over time and remained at about 5%–6% between the periods 1982–1987 and 2006–2010.

Survival in the period 2006–2010

Sex: Five-year survival was 5.3% for males, significantly lower than for females (10%).

Age: Survival decreased with age: 5-year survival was 25% for people aged under 50 compared with 4.3% for people aged 70 and over.

Population group: Survival from mesothelioma did not vary significantly by remoteness.

There was a survival advantage associated with higher socioeconomic status. Five-year survival was 10% in the highest socioeconomic status quintile – more than double than in the two lowest quintiles (4.1% and 4.9%, respectively).

Conditional survival

Due to small numbers, conditional survival estimates for mesothelioma are unstable and should be interpreted with caution. At diagnosis, the probability of surviving for at least 5 years was 6.2%. By the time those with mesothelioma had survived 5 years after their diagnosis, their survival prospects for 5 more years had increased more than seven-fold to 45%.

Prevalence at the end of 2007

Mesothelioma had the lowest prevalence of all the cancers in this report, due to its low incidence and poor survival. At the end of 2007, there were less than 1,000 people who were diagnosed with mesothelioma in the previous 26 years, representing a prevalence of 4.5 people per 100,000 population.

Table 4.46: Summary of new cases, deaths and prevalence for mesothelioma, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	8,592	8,398	631	735	7.0
Females	1,555	1,464	162	223	2.1
Persons	10,147	9,862	793	958	4.5

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.47: Summary of relative survival from mesothelioma, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	43.6	40.9–46.4	5.3	4.3–6.4	2.4	1.7–3.3
Females	47.6	41.4–53.6	10.2	7.4–13.4	4.1	2.5–6.5
Persons	44.3	41.8–46.8	6.2	5.2–7.2	2.8	2.1–3.6
<i>Previous time periods</i>						
1982–1987	38.0	35.1–41.0	5.5	3.4–8.5	n.a.	n.a.
1988–1993	37.4	35.1–39.6	5.9	4.7–7.2	n.p.	n.p.
1994–1999	36.9	35.1–38.8	5.0	4.1–6.1	3.4	2.6–4.3
2000–2005	42.8	41.1–44.5	5.1	4.3–6.0	3.1	2.4–4.0

Notes

1. Survival data are not presented if there were less than 20 individuals alive at the start of the follow-up year.

2. Additional data are presented in online tables S17.1 and S17.2.

Source: AIHW Australian Cancer Database (2007).

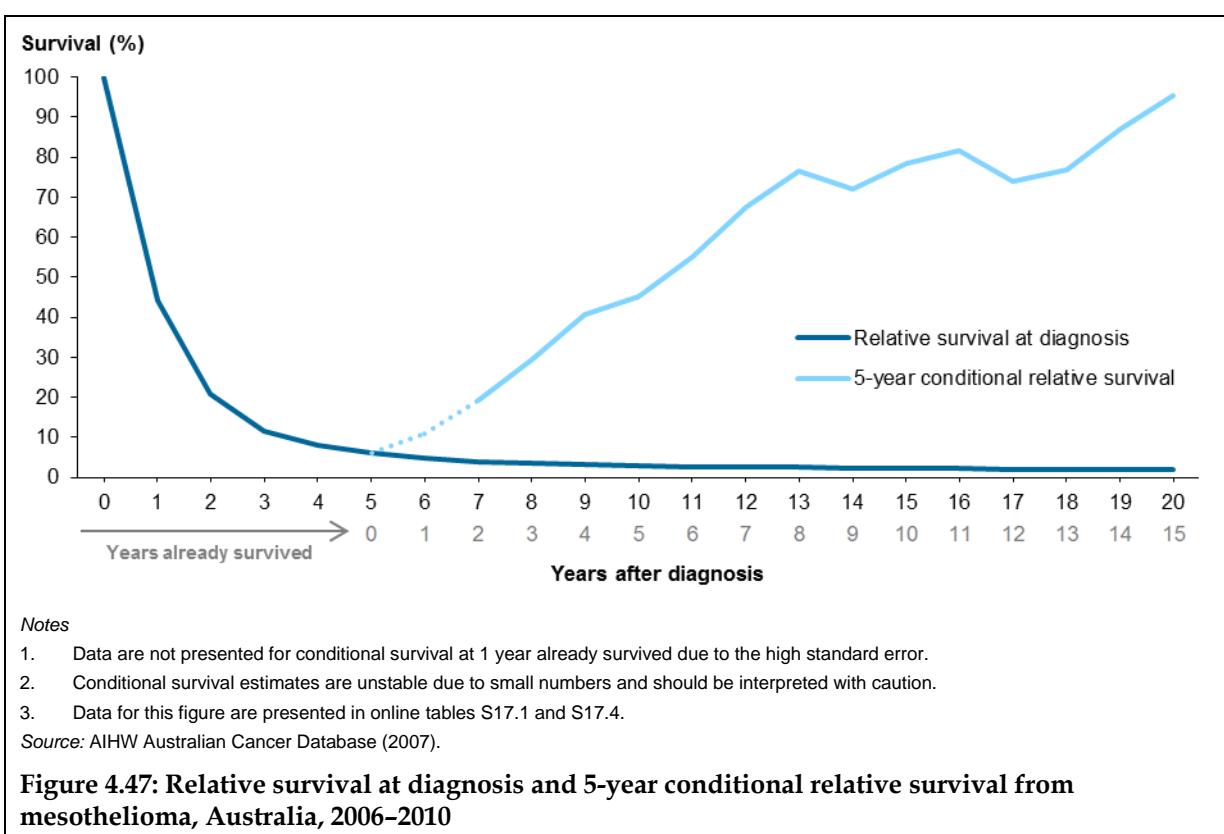
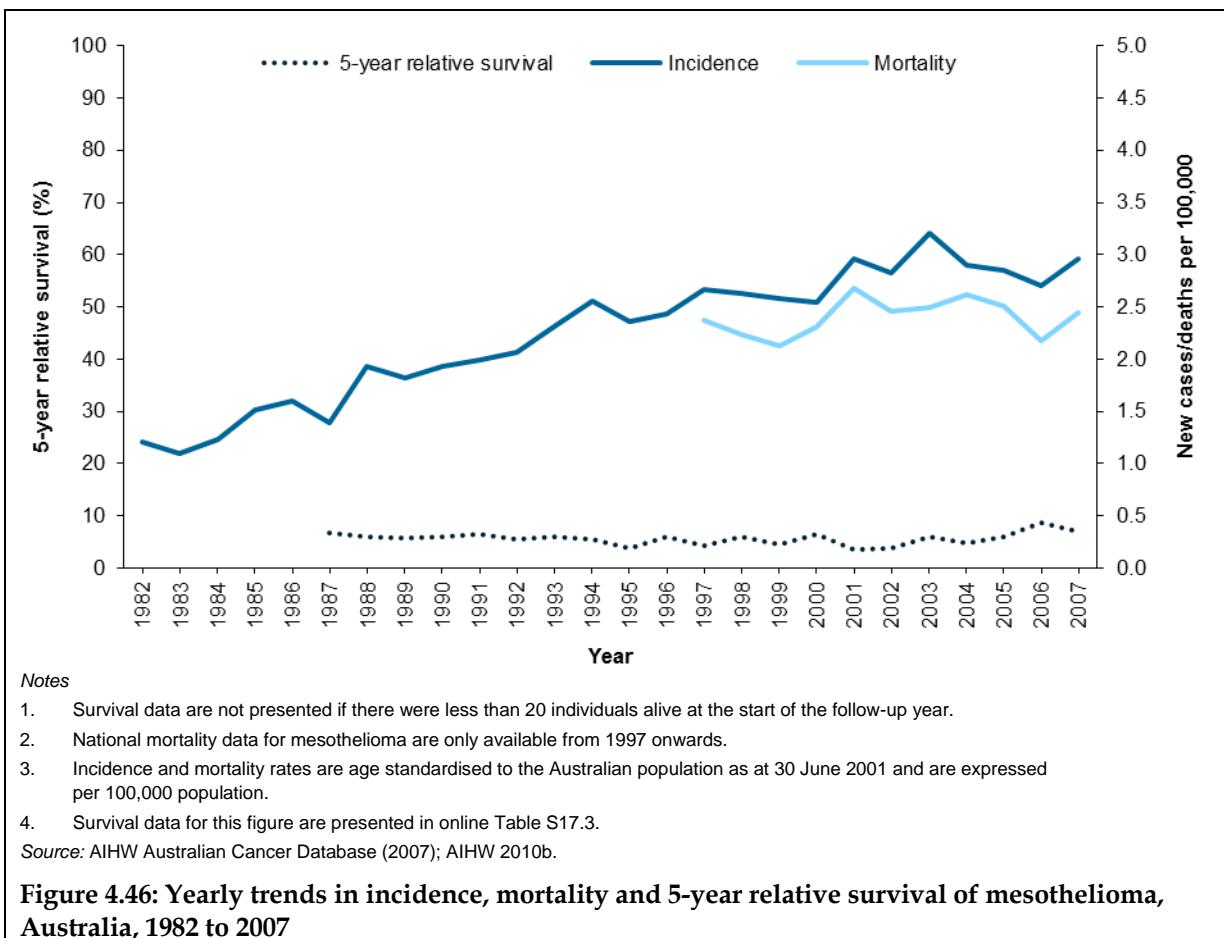
Table 4.48: Summary of conditional relative survival from mesothelioma, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	6.2	5.2–7.2
Already survived 1 year after diagnosis	n.p. ^(a)	n.p. ^(a)
Already survived 5 years after diagnosis	45.2	26.8–63.5
Already survived 10 years after diagnosis	78.6	61.3–95.8

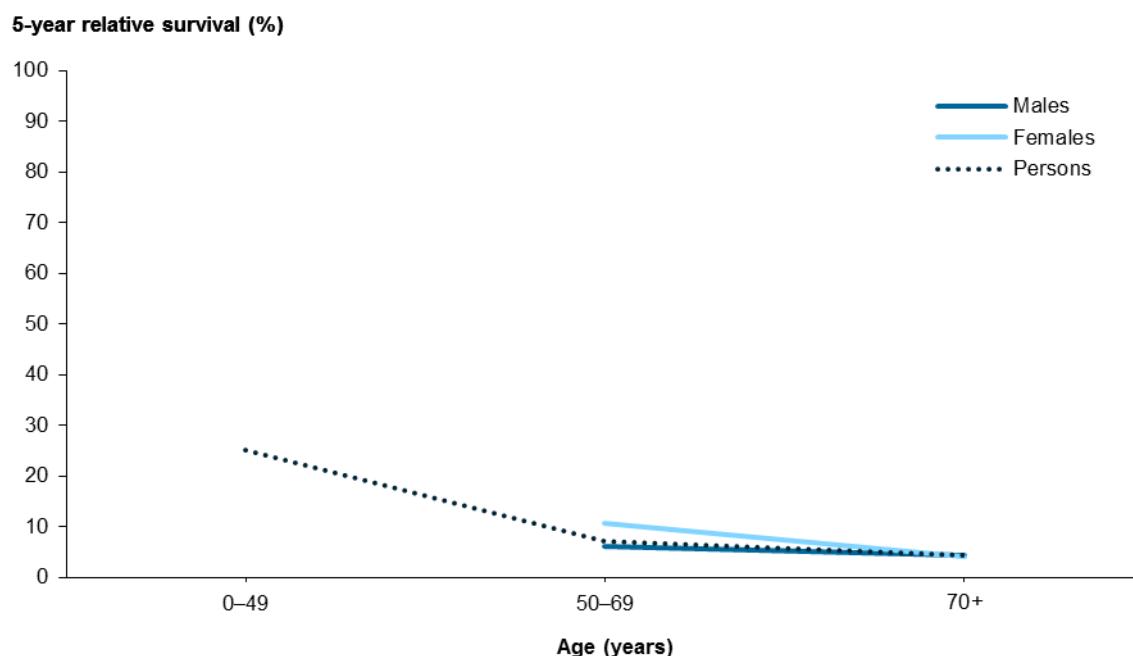
(a) Survival estimate and confidence interval are not presented due to the high standard error.

Note: Additional data are presented in online Table S17.4.

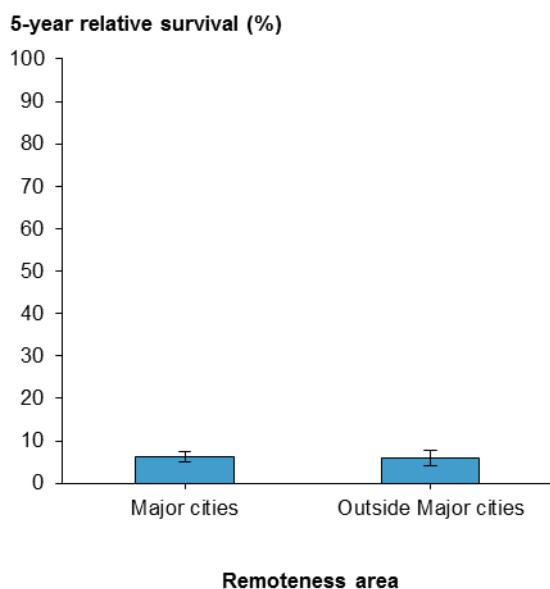
Source: AIHW Australian Cancer Database (2007).



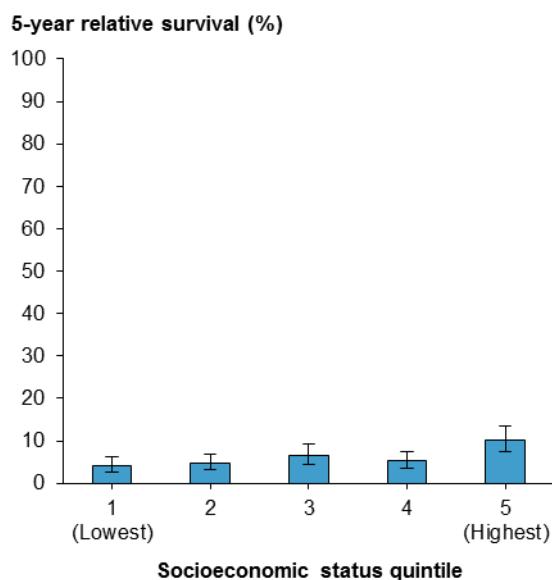
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Survival data are not presented if there were less than 20 individuals alive at the start of the follow-up year.
2. Error bars represent 95% confidence intervals.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S17.5 and S17.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.48: Five-year relative survival from mesothelioma by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Myeloma (C90)

Snapshot: in 2006–2010, individuals with myeloma had a 43% chance of surviving for at least 5 years compared with the general population.

Myeloma is a rare cancer affecting the plasma cells in the bone marrow (Leukaemia Foundation 2008c). It accounted for 1.2% of all cancer cases and was ranked seventeenth for incidence and eighteenth for mortality in Australia in 2007. Myeloma was more common in males than females and was rare in people aged under 50. Over the last decade, there have been many developments in the treatment of myeloma, with the introduction of new therapeutic agents linked to better disease outcomes (Joshua 2005; Brenner et al. 2008; Myeloma Foundation of Australia 2012).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of myeloma grew slightly, with the rate of new cases increasing from 4.7 to 5.6 per 100,000. Mortality from myeloma fluctuated between 2.9 and 3.8 deaths per 100,000, although the 2007 rate remained similar to the 1982 rate at 3.1 deaths per 100,000.

Survival from myeloma increased significantly between the periods 1982–1987 and 2006–2010. Five-year survival rose from 26% to 43% during this time, with greater increases seen in the second half of this time span.

Survival in the period 2006–2010

Sex: Survival was similar for males and females.

Age: Five-year survival was similar for age groups under 60, but fell steeply with age thereafter. Five-year survival was 51% for people in their 60s compared with 19% for those aged 80 and over.

Population group: Survival did not vary significantly by remoteness.

There was a slight survival advantage associated with higher socioeconomic status. Five-year survival was significantly higher in the highest socioeconomic status quintile (46%) compared with the lowest quintile (39%).

Conditional survival

The probability of surviving for at least 5 years was 43% at diagnosis, compared with 48% by 1 year after diagnosis and 56% by 5 years after diagnosis.

Prevalence at the end of 2007

At the end of 2007, there were about 5,400 Australians alive who were diagnosed with myeloma in the previous 26 years, including about 3,500 diagnosed in the previous 5 years. This represented a 26-year prevalence of 26 people per 100,000 population.

Table 4.49: Summary of new cases, deaths and prevalence for myeloma, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	12,575	10,632	1,993	3,030	28.7
Females	10,215	8,636	1,554	2,415	22.6
Persons	22,790	19,268	3,547	5,445	25.6

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.50: Summary of relative survival from myeloma, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	78.9	76.8–81.0	43.9	41.7–46.1	24.0	22.0–26.0
Females	77.5	75.0–79.8	42.8	40.4–45.2	24.4	22.2–26.6
Persons	78.3	76.7–79.8	43.4	41.8–45.0	24.2	22.7–25.7
<i>Previous time periods</i>						
1982–1987	67.4	65.6–69.1	26.3	23.8–28.9	n.a.	n.a.
1988–1993	69.8	68.3–71.3	28.4	26.9–30.1	12.2	10.6–13.9
1994–1999	72.6	71.3–73.9	31.6	30.1–33.1	15.0	13.7–16.4
2000–2005	74.5	73.4–75.6	36.3	35.0–37.6	18.3	17.1–19.7

Note: Additional data are presented in online tables S18.1 and S18.2.

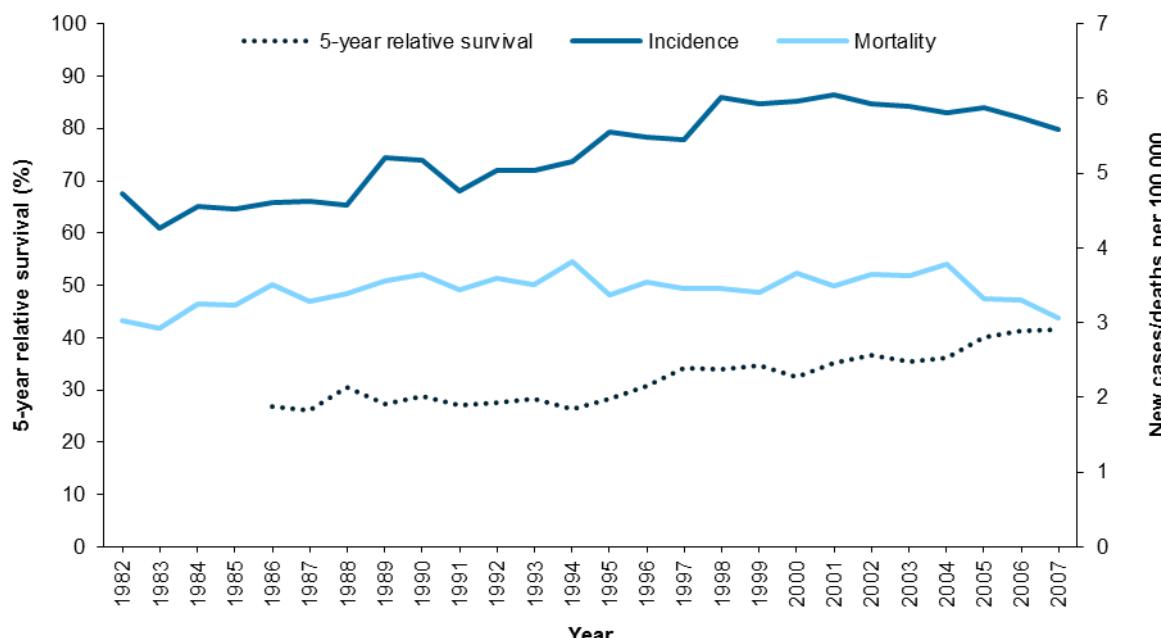
Source: AIHW Australian Cancer Database (2007).

Table 4.51: Summary of conditional relative survival from myeloma, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	43.4	41.8–45.0
Already survived 1 year after diagnosis	47.6	44.5–50.8
Already survived 5 years after diagnosis	55.8	51.7–59.8
Already survived 10 years after diagnosis	75.2	69.8–80.6

Note: Additional data are presented in online Table S18.4.

Source: AIHW Australian Cancer Database (2007).

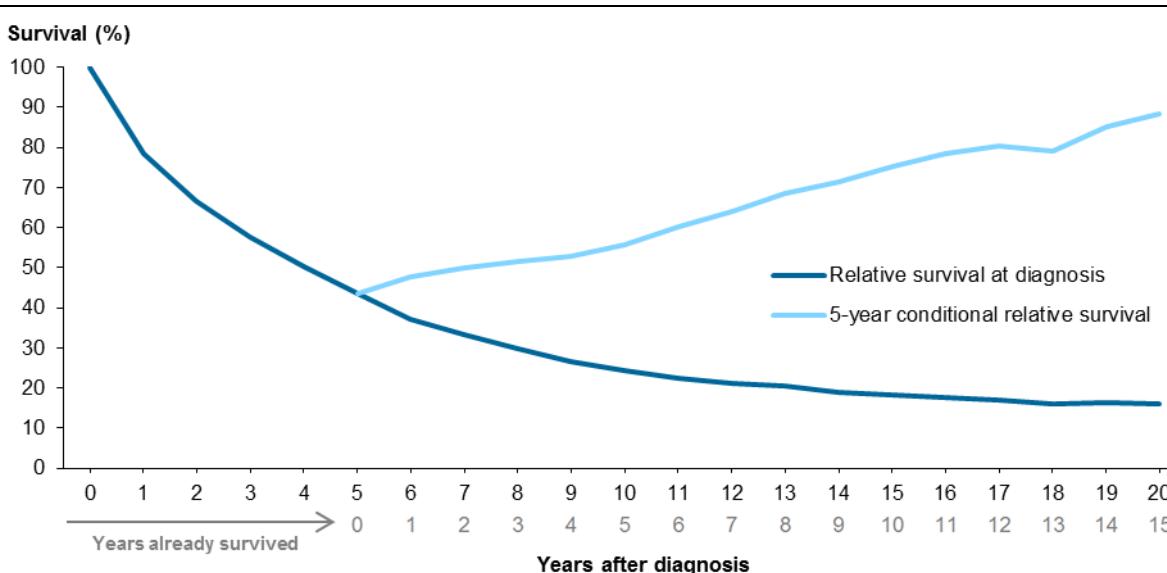


Notes

1. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
2. Survival data for this figure are presented in online Table S18.3.

Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 4.49: Yearly trends in incidence, mortality and 5-year relative survival of myeloma, Australia, 1982 to 2007

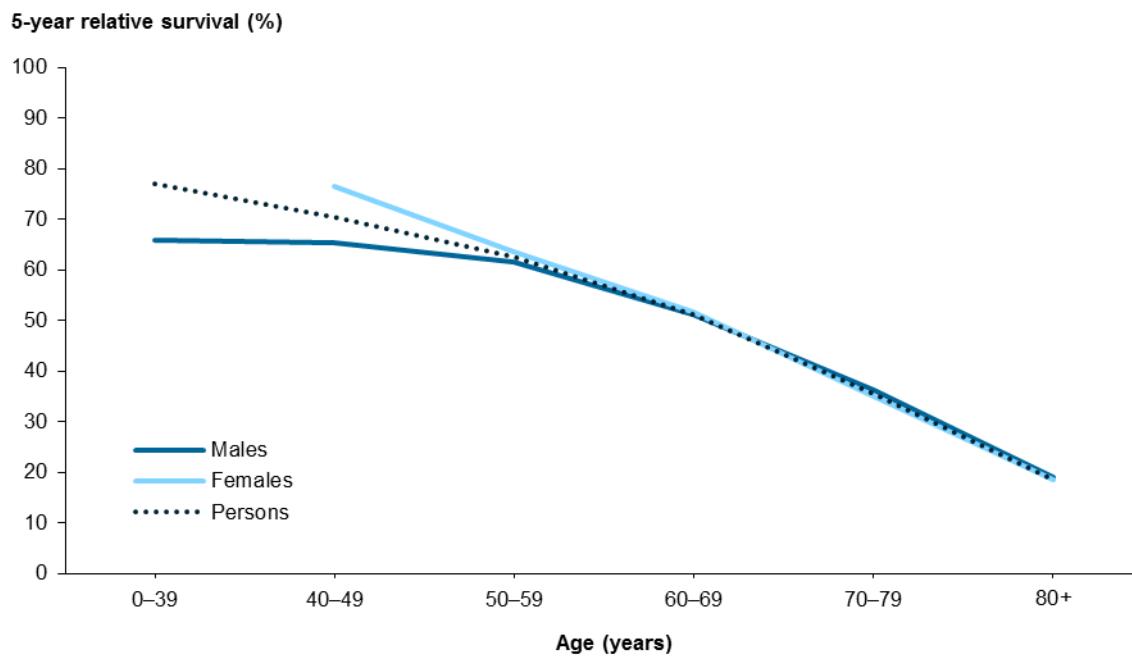


Note: Data for this figure are presented in online tables S18.1 and S18.4.

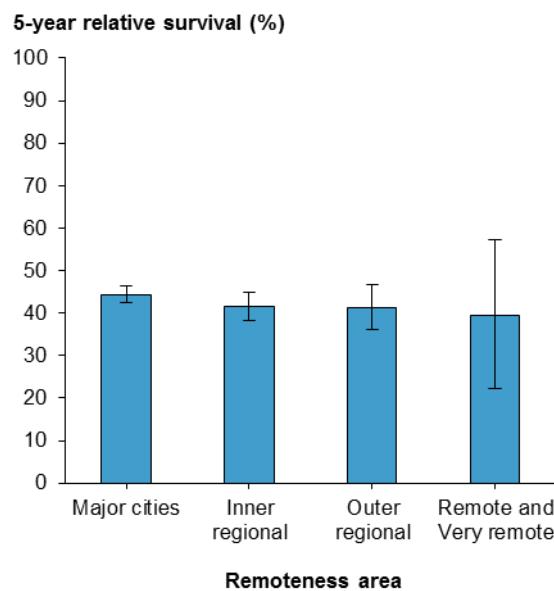
Source: AIHW Australian Cancer Database (2007).

Figure 4.50: Relative survival at diagnosis and 5-year conditional relative survival from myeloma, Australia, 2006–2010

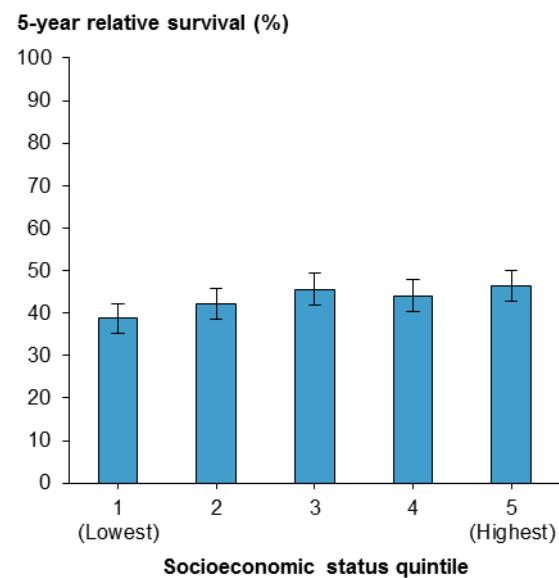
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S18.5 and S18.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.51: Five-year relative survival from myeloma by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Non-Hodgkin lymphoma (C82–C85)

Snapshot: in 2006–2010, individuals with non-Hodgkin lymphoma had a 71% chance of surviving for at least 5 years compared with the general population.

Non-Hodgkin lymphoma was the most common cancer affecting the blood and lymphatic system in Australia in 2007. Overall, it was the sixth most commonly diagnosed cancer and the seventh most common cause of cancer death. There have been a number of developments in the treatment of non-Hodgkin lymphoma, including advances in radiotherapy and the introduction of monoclonal antibody therapies (Johnson 2008).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of non-Hodgkin lymphoma increased from 13 to 18 new cases per 100,000. Mortality decreased during the latter half of this period, from a peak of 8.9 deaths per 100,000 in 1997 to 5.8 deaths in 2007.

There were considerable survival gains for non-Hodgkin lymphoma. Five-year survival increased significantly in every time period between 1982–1987 and 2006–2010, from 47% to 71%. Increases in survival from non-Hodgkin lymphoma have been attributed to more effective treatment, particularly the introduction of antibody therapies (Yu et al. 2010). Other reasons include the decline in incidence and improvements in treatment of HIV-comorbid non-Hodgkin lymphoma (Pulte et al. 2008).

Survival in the period 2006–2010

Sex: Survival was similar for males and females overall. For those aged in their 50s and 60s, however, females had a slight survival advantage over males.

Age: Survival was similar for age groups under 50 but decreased with age thereafter. Five-year survival was 88% for those aged 0–39 compared with 42% for those aged 80 and over.

Histology: Survival varied across different types of non-Hodgkin lymphoma: 5-year survival was 92% for marginal zone lymphoma compared with 48% for peripheral T-cell lymphoma.

Population group: There were no significant differences in survival by remoteness.

There was a gradient of decreasing survival associated with greater socioeconomic disadvantage. Five-year survival was 74% in the highest socioeconomic status quintile compared with 68% in the lowest quintile.

Conditional survival

The probability of surviving for at least 5 years was 71% at diagnosis, compared with 82% by 1 year after diagnosis and 88% by 5 years after diagnosis.

Prevalence at the end of 2007

Non-Hodgkin lymphoma was the fifth most prevalent cancer. At the end of 2007, there were about 30,600 people in Australia who were diagnosed with non-Hodgkin lymphoma in the previous 26 years, a prevalence of 144 people per 100,000 population.

Table 4.52: Summary of new cases, deaths and prevalence for non-Hodgkin lymphoma, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	39,441	25,382	7,717	16,547	156.7
Females	32,912	20,737	6,312	14,099	132.0
Persons	72,353	46,119	14,029	30,646	144.3

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.53: Summary of relative survival from non-Hodgkin lymphoma, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	83.7	82.6–84.7	70.0	68.8–71.3	60.7	59.2–62.1
Females	82.8	81.5–83.9	71.3	69.9–72.6	63.2	61.6–64.7
Persons	83.3	82.4–84.0	70.6	69.6–71.5	61.8	60.7–62.9
<i>Previous time periods</i>						
1982–1987	71.0	70.0–72.0	46.6	45.0–48.1	n.a.	n.a.
1988–1993	71.9	71.1–72.7	50.0	49.1–51.0	37.9	36.6–39.2
1994–1999	74.0	73.4–74.7	53.6	52.7–54.4	42.6	41.6–43.6
2000–2005	79.0	78.5–79.6	62.3	61.5–63.1	51.5	50.6–52.4

Note: Additional data are presented in online tables S19.1 and S19.2.

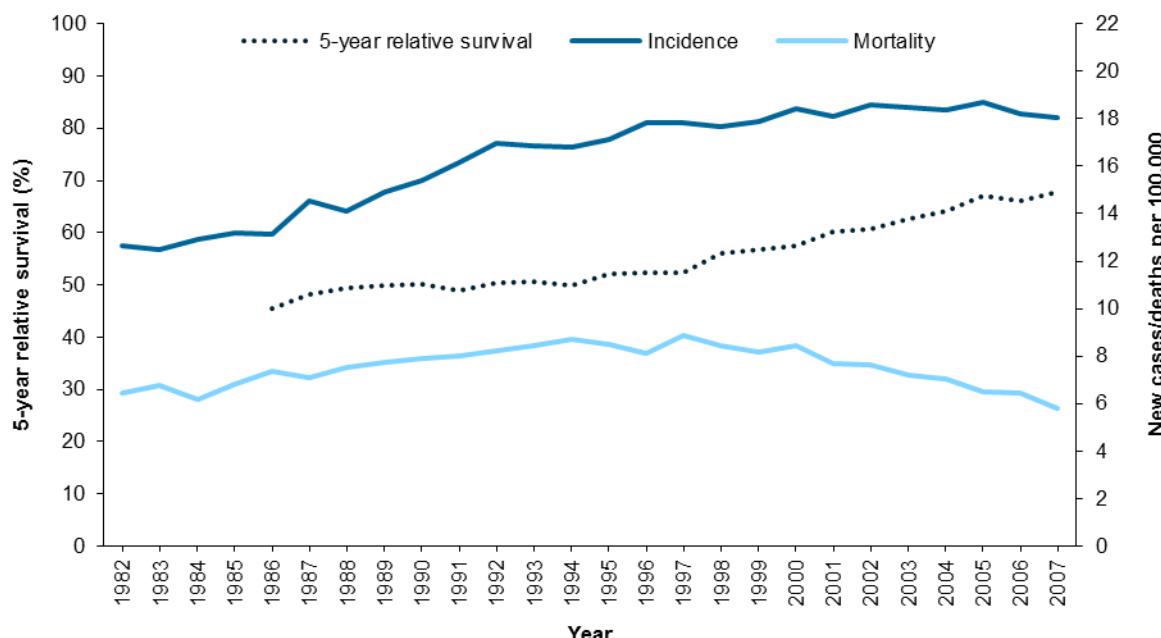
Source: AIHW Australian Cancer Database (2007).

Table 4.54: Summary of conditional relative survival from non-Hodgkin lymphoma, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	70.6	69.6–71.5
Already survived 1 year after diagnosis	82.1	81.2–83.0
Already survived 5 years after diagnosis	87.5	86.6–88.4
Already survived 10 years after diagnosis	88.5	87.3–89.7

Note: Additional data are presented in online Table S19.4.

Source: AIHW Australian Cancer Database (2007).

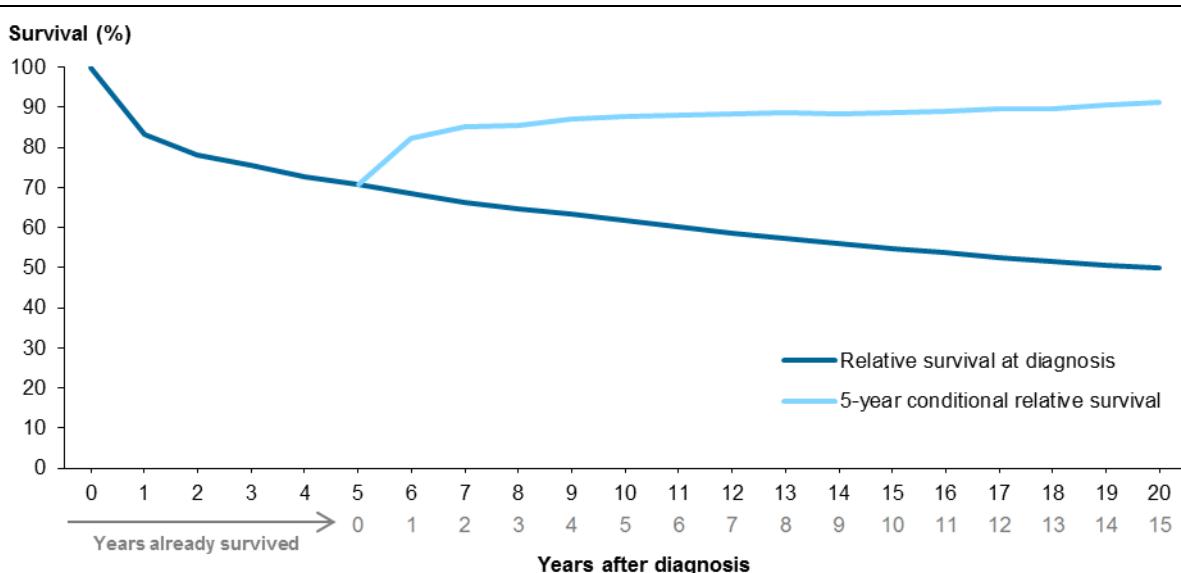


Notes

1. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
2. Survival data for this figure are presented in online Table S19.3.

Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 4.52: Yearly trends in incidence, mortality and 5-year relative survival of non-Hodgkin lymphoma, 1982 to 2007

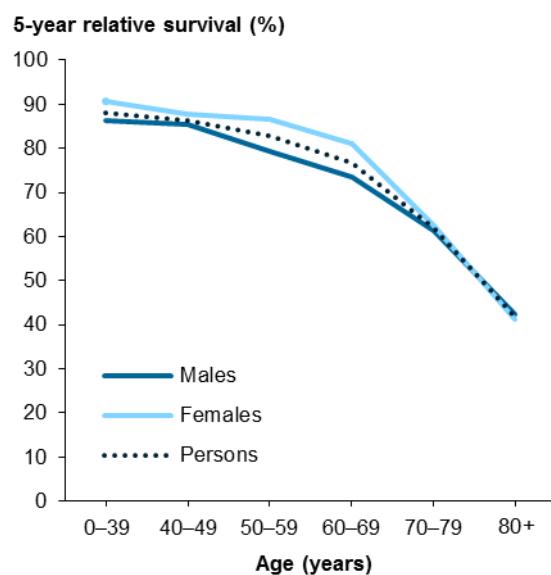


Note: Data for this figure are presented in online tables S19.1 and S19.4.

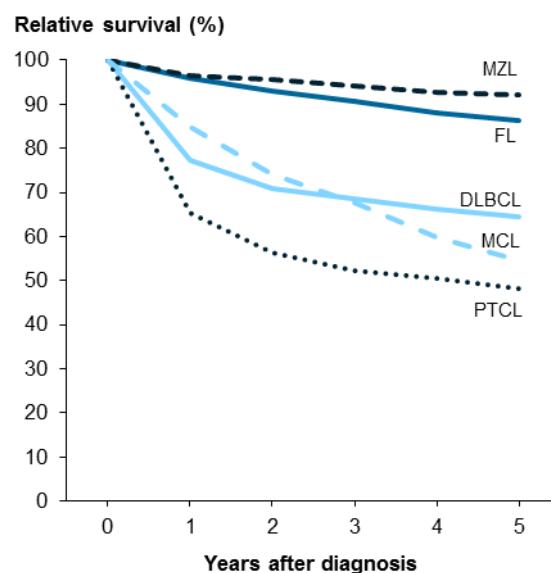
Source: AIHW Australian Cancer Database (2007).

Figure 4.53: Relative survival at diagnosis and 5-year conditional relative survival from non-Hodgkin lymphoma, Australia, 2006–2010

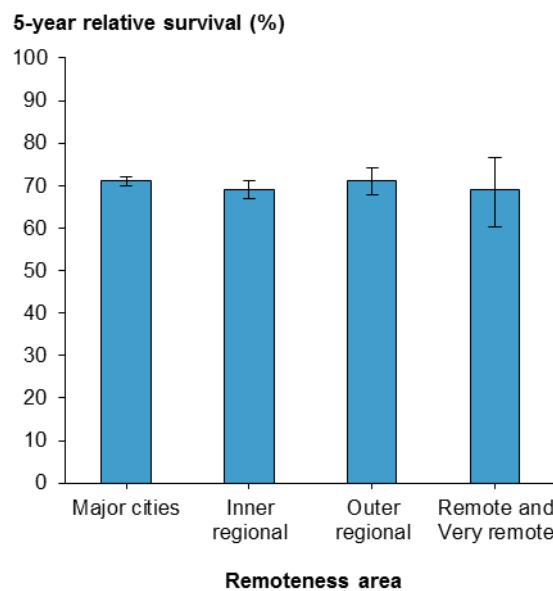
A. Sex and age



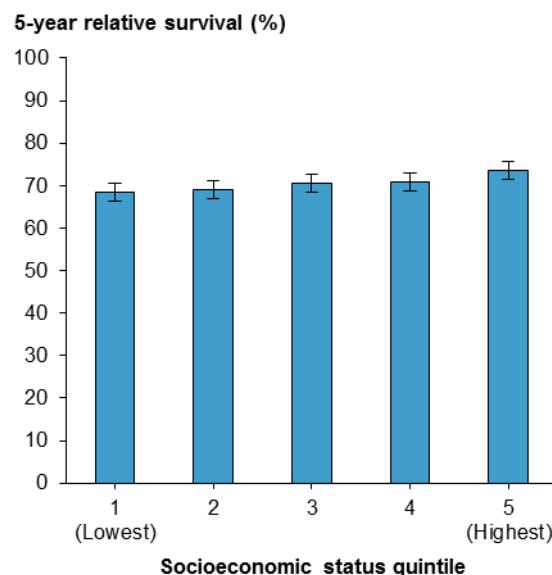
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. DLBCL=Diffuse large B-cell lymphoma, FL=Follicular lymphoma, PTCL=Peripheral T-cell lymphoma, MZL=Marginal zone lymphoma, MCL=Mantle cell lymphoma.
2. Error bars represent 95% confidence intervals.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S19.5, S19.6 and S19.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.54: Relative survival from non-Hodgkin lymphoma by sex and age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Oesophageal cancer (C15)

Snapshot: in 2006–2010, individuals with oesophageal cancer had a 16% chance of surviving for at least 5 years compared with the general population.

Oesophageal cancer was one of the less common cancers in Australia in 2007, ranked sixteenth for incidence and twelfth for mortality. Males were 3 times more likely than females to be diagnosed with the disease and to die from it. The prognosis for oesophageal cancer is often poor and a large proportion of patients are not treated with a curative intent due to advanced stage and poor physical condition (Lagergren & Lagergren 2010).

Incidence, mortality and survival trends

There were similar trends in incidence and mortality from oesophageal cancer between 1982 and 2007. Both increased slightly: from 4.4 to 5.6 new cases per 100,000 for incidence and from 4.4 to 4.9 deaths per 100,000 for mortality.

Survival from oesophageal cancer was low and reflected the closeness of its incidence and mortality rates. Five-year survival increased gradually between the periods 1982–1987 and 2000–2005, from 9.8% to 17%, but did not change significantly after that.

Survival in the period 2006–2010

Sex: Survival was similar for males and females overall. However females had a survival advantage over males for those aged 50–69.

Age: Five-year survival was similar for age groups under 70 (about 21%–23%). However, survival dropped to 12% for those aged 70 and over.

Histology: There are two main types of oesophageal cancer: squamous cell carcinoma (which begins in the flat, squamous cells lining the oesophagus) and adenocarcinoma (which begins in the glandular tissue of the oesophagus). Both had very similar 5-year survival (16%).

Population group: Survival did not differ significantly by remoteness.

There was no clear association between survival and socioeconomic status. Five-year survival was the highest in the highest socioeconomic status quintile (20%) and lowest in the third quintile (14%).

Conditional survival

Survival increased rapidly with the number of years already survived. At diagnosis, the probability of surviving at least 5 years was 16%. By 1 year after diagnosis, the probability of surviving for at least another 5 years had more than doubled to 35%, which more than doubled again to 78% by 5 years.

Prevalence at the end of 2007

Prevalence of oesophageal cancer was low, given its low incidence and low survival. At the end of 2007, there were about 3,100 Australians alive who were diagnosed with oesophageal cancer in the previous 26 years, a prevalence of 14 people per 100,000 population.

Table 4.55: Summary of new cases, deaths and prevalence for oesophageal cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	15,233	14,124	1,265	1,970	18.7
Females	8,384	7,709	586	1,096	10.3
Persons	23,617	21,833	1,851	3,066	14.4

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.56: Summary of relative survival from oesophageal cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	43.6	41.4–45.7	15.5	14.2–17.0	12.1	10.8–13.5
Females	43.7	40.4–47.0	17.0	14.9–19.3	13.1	11.1–15.2
Persons	43.6	41.8–45.4	16.0	14.8–17.2	12.4	11.3–13.5
<i>Previous time periods</i>						
1982–1987	30.1	28.6–31.6	9.8	8.4–11.4	n.a.	n.a.
1988–1993	36.0	34.6–37.3	12.4	11.3–13.5	8.8	7.6–10.2
1994–1999	40.5	39.2–41.8	14.9	13.9–16.0	11.8	10.7–12.9
2000–2005	42.3	41.1–43.5	17.0	16.1–18.0	13.2	12.1–14.2

Note: Additional data are presented in online tables S20.1 and S20.2.

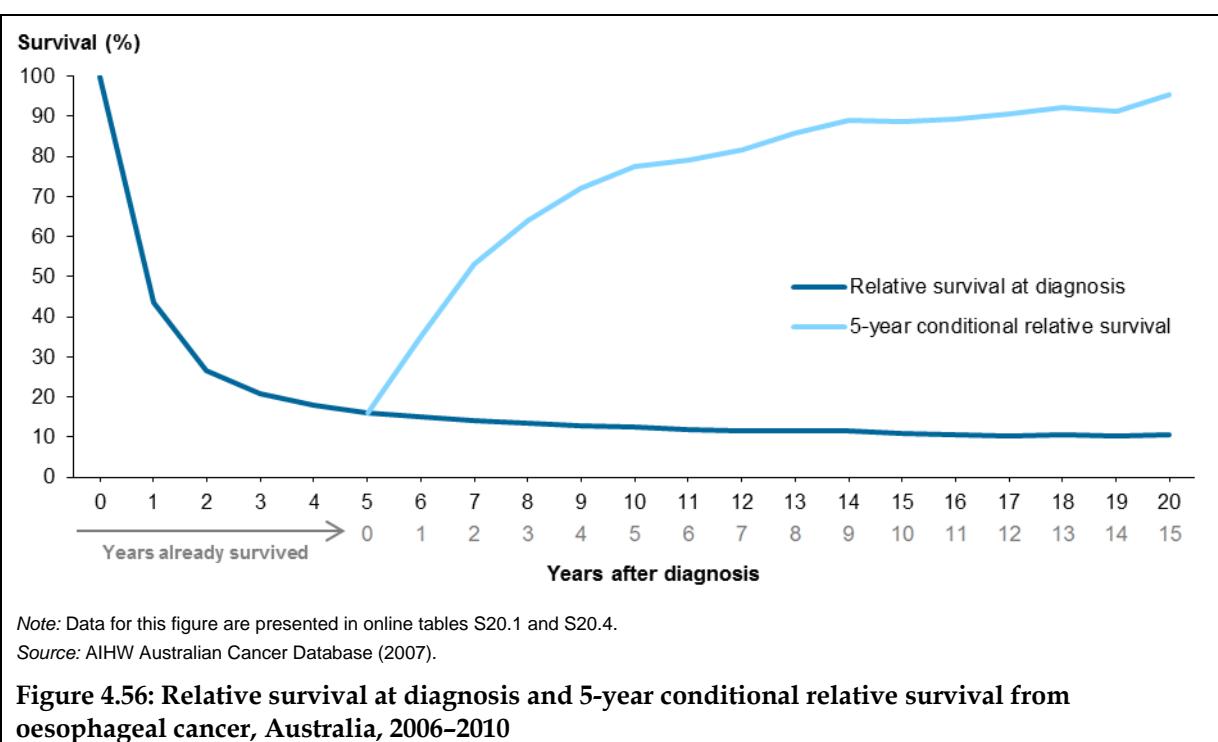
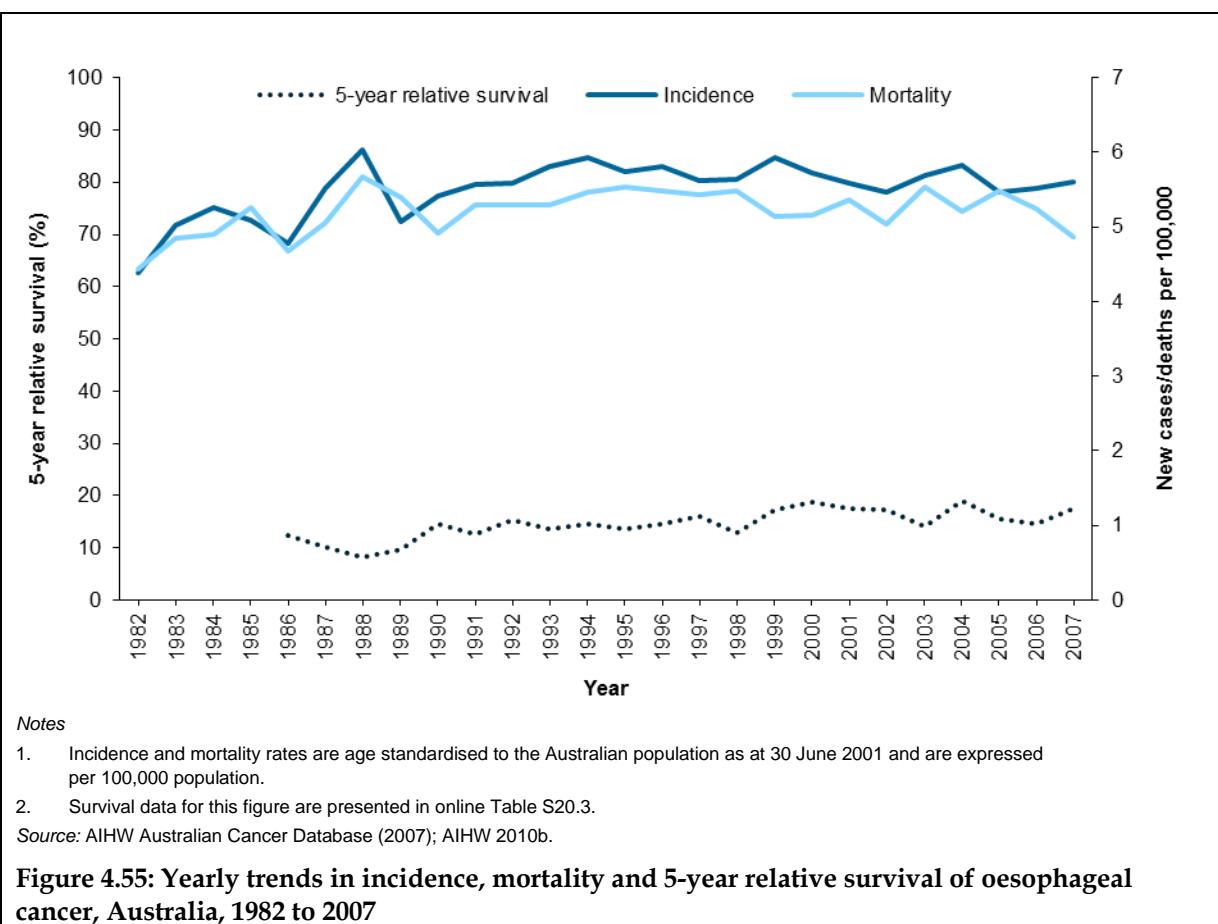
Source: AIHW Australian Cancer Database (2007).

Table 4.57: Summary of conditional relative survival from oesophageal cancer, Australia, 2006–2010

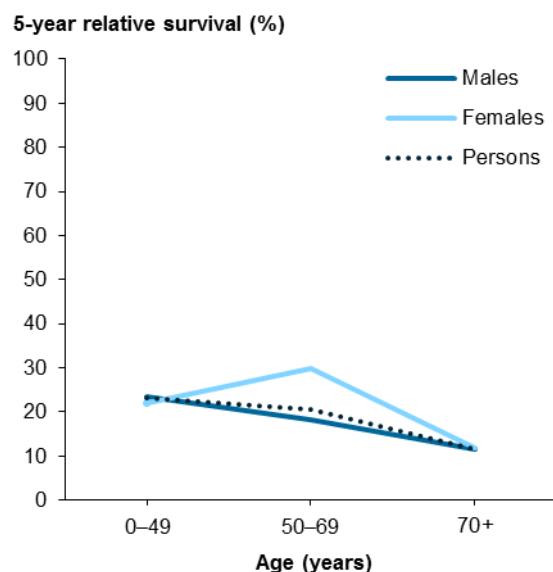
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	16.0	14.8–17.2
Already survived 1 year after diagnosis	34.9	29.3–40.4
Already survived 5 years after diagnosis	77.5	73.3–81.7
Already survived 10 years after diagnosis	88.7	83.5–93.9

Note: Additional data are presented in online Table S20.4.

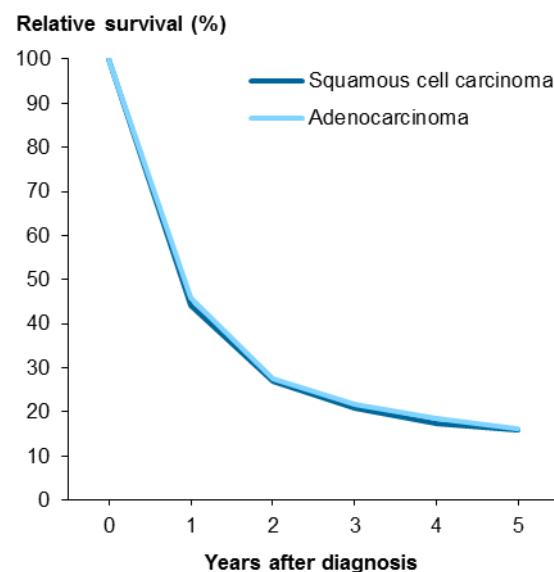
Source: AIHW Australian Cancer Database (2007).



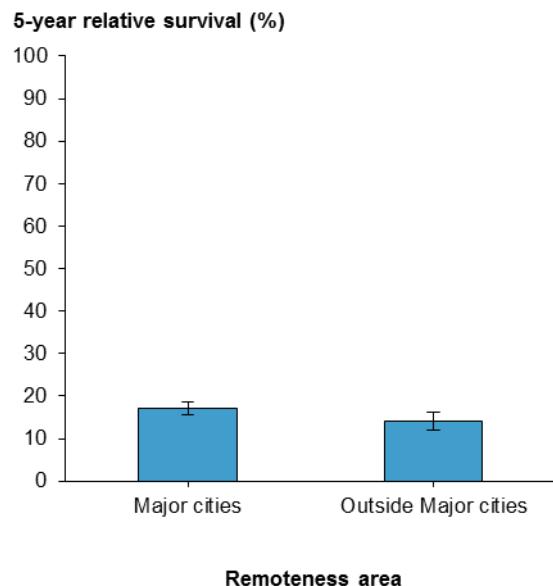
A. Sex and age



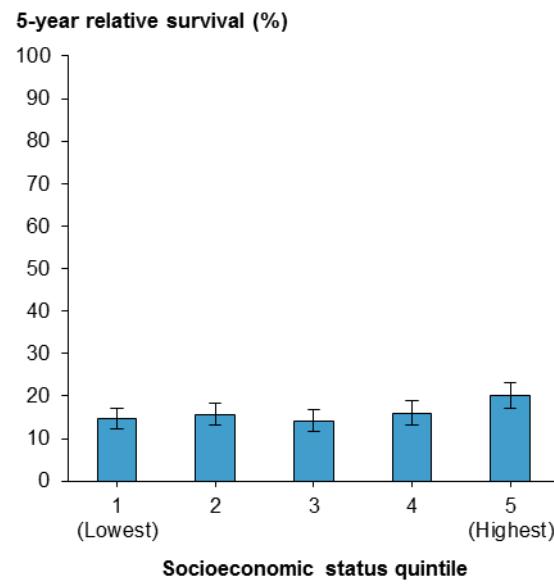
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S20.5, S20.6 and S20.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.57: Relative survival from oesophageal cancer by sex and age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Ovarian cancer (C56)

Snapshot: in 2006–2010, women with ovarian cancer had a 43% chance of surviving for at least 5 years compared with the general population.

Ovarian cancer was the ninth most commonly diagnosed cancer and the sixth most common cause of cancer death among Australian women in 2007. It is mainly a disease of postmenopausal women: the average age at diagnosis was 63 years and the risk of ovarian cancer increased with age. It is often diagnosed at a stage where the cancer has spread beyond the ovary, which is associated with a poorer prognosis (Tracey et al. 2006; AIHW & NBOCC 2010).

Incidence, mortality and survival trends

Both incidence and mortality of ovarian cancer decreased between 1982 and 2007. Incidence of ovarian cancer fell from 12.4 to 10.8 new cases per 100,000 and mortality fell from 8.8 to 7.0 deaths per 100,000. Coinciding with falling mortality, survival from ovarian cancer also increased over time. Five-year survival increased gradually but significantly from 32% in the period 1982–1987 to 43% in 2006–2010.

Survival in the period 2006–2010

Age: Survival dropped steeply with age. Five-year survival was highest for women diagnosed under age 40 (82%) but decreased significantly with each older age group. It was 17% for women aged 80 and over.

Histology: Ovarian cancer consists of a heterogeneous set of invasive tumours arising from different cell types in the ovary. As such, there were marked differences in survival by histological subtype. Five-year survival was highest for endometrioid carcinoma (79%), followed by clear cell carcinoma (64%), mucinous carcinoma (62%), and serous carcinoma (40%). It was lowest for adenocarcinoma, not otherwise specified (16%).

Population group: Five-year survival was 45% in *Major cities*, significantly higher than in *Outer regional areas* (36%).

There was a gradient of decreasing survival with greater socioeconomic disadvantage. One-year survival was 81% in the highest socioeconomic status quintile compared with 73% in the lowest. The same pattern emerged for 5-year survival, although these differences were not statistically significant.

Conditional survival

The probability of surviving from ovarian cancer for at least 5 years was 43% at diagnosis, compared with 53% by 1 year after diagnosis and 79% by 5 years after diagnosis.

Prevalence at the end of 2007

At the end of 2007, there were about 8,600 Australian women alive who were diagnosed with ovarian cancer in the previous 26 years, including about 3,500 diagnosed in the previous 5 years. This represented a 26-year prevalence of 80 women per 100,000 female population.

Table 4.58: Summary of new cases, deaths and prevalence for ovarian cancer, Australia, 1982–2010

No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
			No. as at end of 2007	Rate per 100,000 population
26,923	20,033	3,504	8,564	80.2

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.59: Summary of relative survival from ovarian cancer, Australia, 1982–1987 to 2006–2010

Time period	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
1982–1987	63.4	62.0–64.8	32.4	30.6–34.2	n.a.	n.a.
1988–1993	67.5	66.3–68.7	37.2	35.8–38.5	31.8	30.3–33.3
1994–1999	71.7	70.5–72.8	39.0	37.7–40.3	32.7	31.4–34.0
2000–2005	73.7	72.6–74.7	40.2	39.0–41.5	32.7	31.5–34.0
2006–2010	76.5	74.9–78.0	43.3	41.8–44.9	34.0	32.5–35.5

Note: Additional data are presented in online tables S21.1 and S21.2.

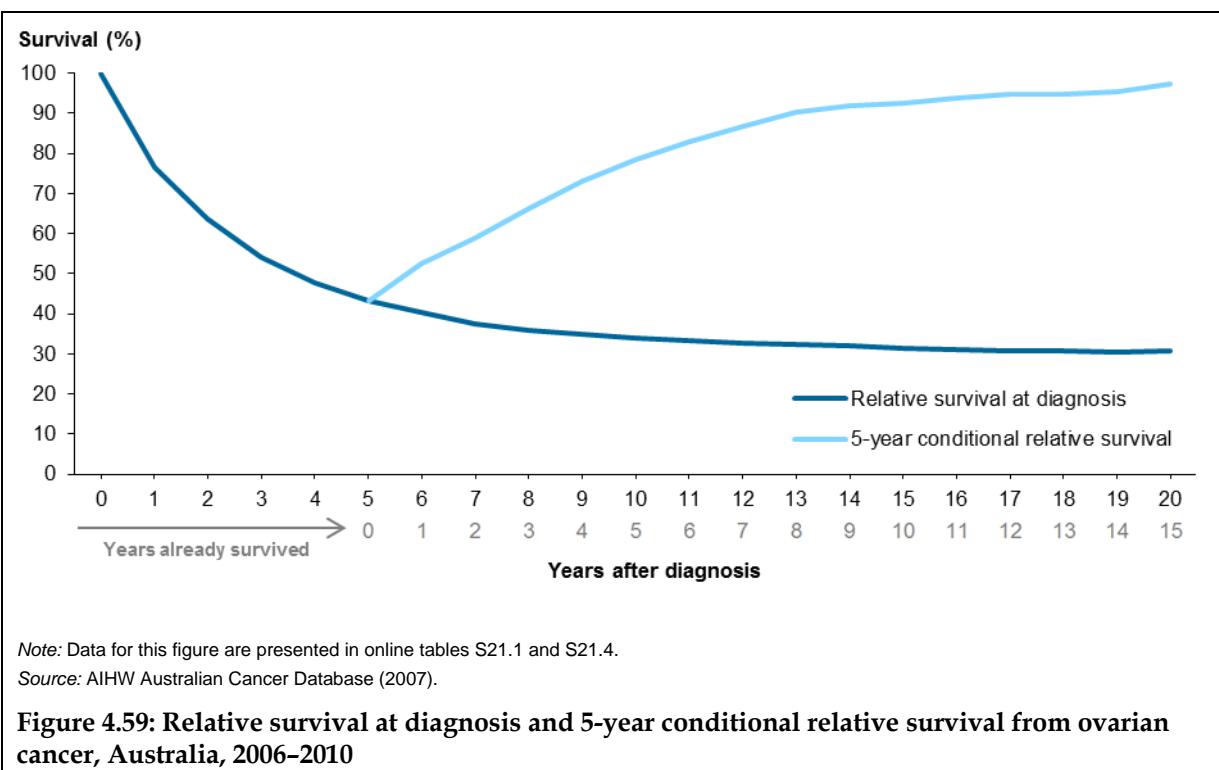
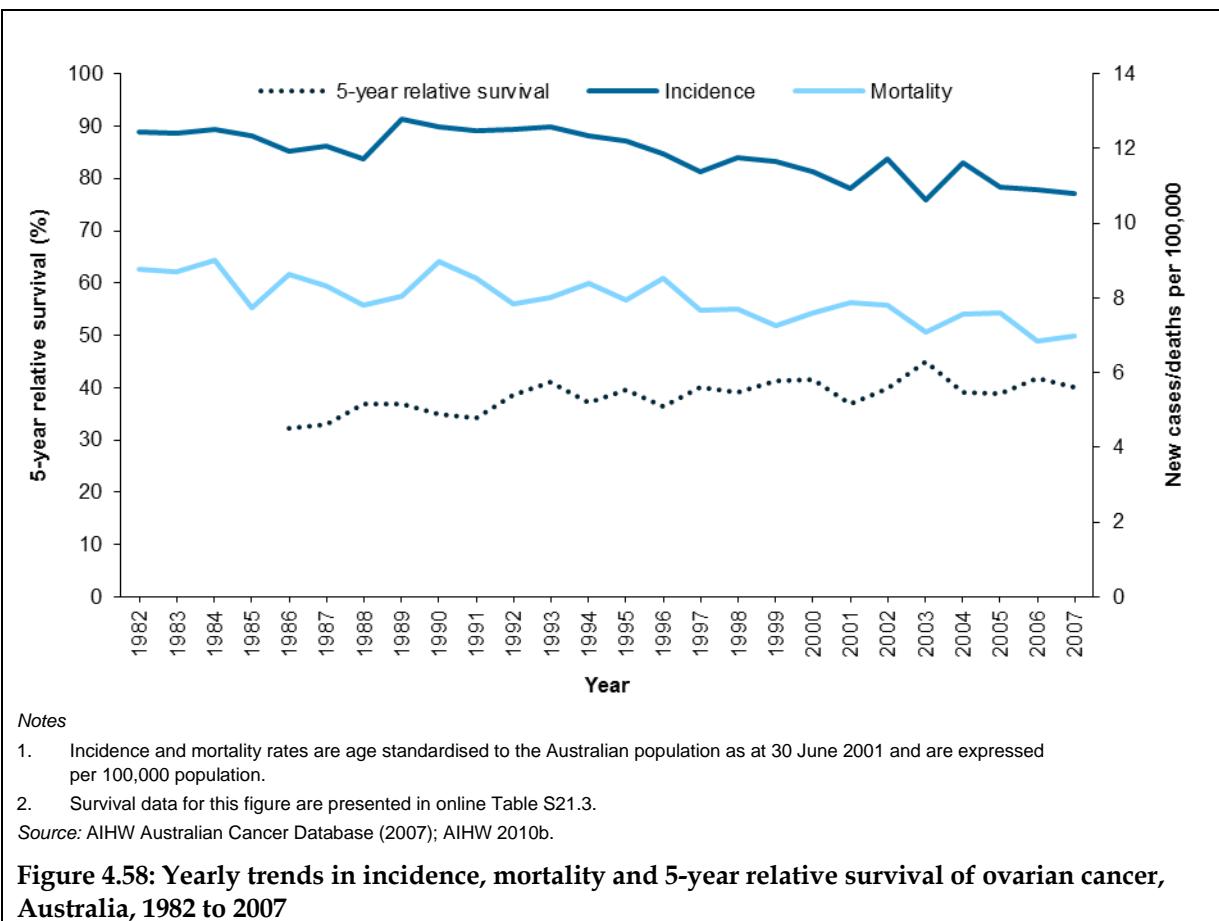
Source: AIHW Australian Cancer Database (2007).

Table 4.60: Summary of conditional relative survival from ovarian cancer, Australia, 2006–2010

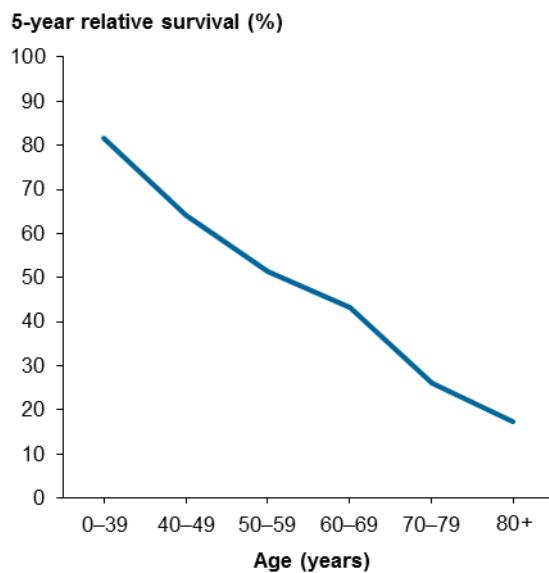
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	43.3	41.8–44.9
Already survived 1 year after diagnosis	52.5	49.8–55.3
Already survived 5 years after diagnosis	78.5	76.4–80.7
Already survived 10 years after diagnosis	92.6	90.9–94.4

Note: Additional data are presented in online Table S21.4.

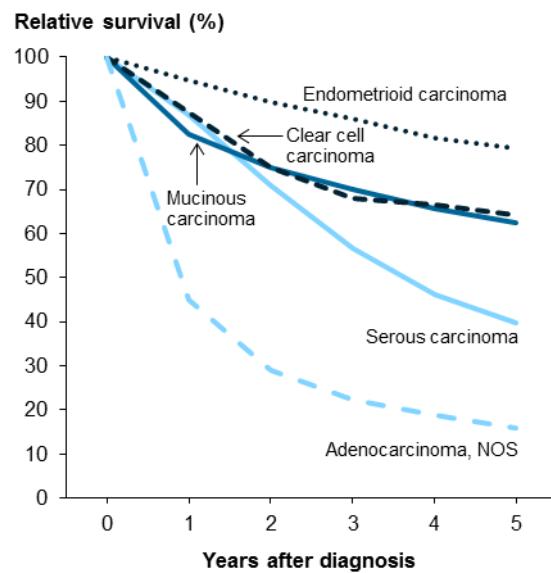
Source: AIHW Australian Cancer Database (2007).



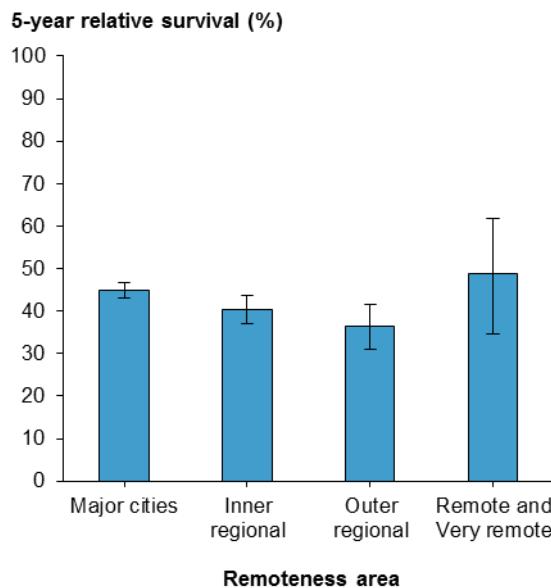
A. Age



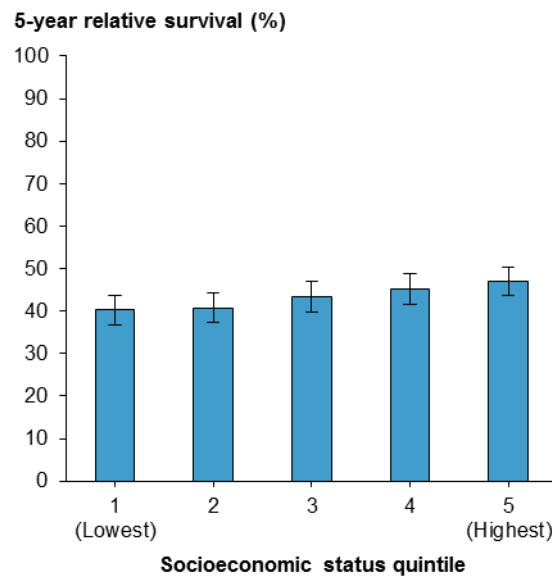
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S21.5, S21.6 and S21.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.60: Relative survival from ovarian cancer by age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Pancreatic cancer (C25)

Snapshot: in 2006–2010, individuals with pancreatic cancer had a 5.2% chance of surviving for at least 5 years compared with the general population. This was the lowest survival rate of all the cancers presented in this report.

Pancreatic cancer was the ninth most commonly diagnosed cancer and the sixth most common cause of cancer death. It affected more males than females, with males 1.5 times more likely to develop the disease. Pancreatic cancer is associated with a poor prognosis: it often presents at an advanced stage, with most cases metastatic at diagnosis (Mitry et al. 2008). Pancreatic tumours tend to be aggressive and are difficult to treat, even for localised disease (Creighton et al. 2010).

Incidence, mortality and survival trends

The rate of new cases and deaths from pancreatic cancer were closely matched for much of the period between 1982 and 2007. Incidence grew slightly faster than mortality, with 11 new cases and 9.9 deaths per 100,000 by the end of 2007.

Consistent with its high mortality, survival from pancreatic cancer was very low. Five-year survival grew slightly but significantly between the periods 1982–1987 and 2006–2010, increasing from 3.0% to 5.2%.

Survival in the period 2006–2010

Sex: Survival was similar for males and females.

Age: Five-year survival was highest for those diagnosed under the age of 40 (37%), and decreased with age. Survival was less than 2.0% for those aged 80 and over.

Population group: Five-year survival was significantly lower outside *Major cities* (4.1%) compared with *Major cities* (5.8%).

There was a gradient of decreasing survival with greater socioeconomic disadvantage. One-year survival was 25% in the highest socioeconomic status quintile compared with 20% in the lowest. The same pattern emerged for 5-year survival, although the differences were not statistically significant.

Conditional survival

Due to small numbers, conditional survival estimates for pancreatic cancer are unstable and should be interpreted with caution. Survival prospects improved considerably with the number of years already survived. The probability of surviving for at least 5 years was 5.2% at diagnosis compared with 23% by 1 year after diagnosis – more than 4 times higher.

Prevalence at the end of 2007

Prevalence of pancreatic cancer was low, partly because of its poor survival. At the end of 2007, there were about 2,600 Australians alive who were diagnosed with pancreatic cancer in the previous 26 years, most (1,900) of whom were diagnosed in the previous 5 years. This represented a 26-year prevalence of 12 people per 100,000 population.

Table 4.61: Summary of new cases, deaths and prevalence for pancreatic cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	20,990	20,376	981	1,370	13.0
Females	19,557	18,947	882	1,263	11.8
Persons	40,547	39,323	1,863	2,633	12.4

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.62: Summary of relative survival from pancreatic cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	22.8	21.4–24.3	4.9	4.2–5.5	3.7	3.2–4.4
Females	20.5	19.0–22.0	5.6	4.9–6.4	4.2	3.6–5.0
Persons	21.7	20.7–22.8	5.2	4.8–5.8	4.0	3.5–4.5
<i>Previous time periods</i>						
1982–1987	13.2	12.5–14.0	3.0	2.5–3.6	n.a.	n.a.
1988–1993	14.2	13.5–14.9	3.4	3.0–3.8	2.9	2.5–3.3
1994–1999	16.2	15.5–16.9	4.3	3.9–4.7	3.5	3.1–3.9
2000–2005	20.3	19.6–21.0	5.1	4.7–5.5	4.1	3.7–4.5

Note: Additional data are presented in online tables S22.1 and S22.2.

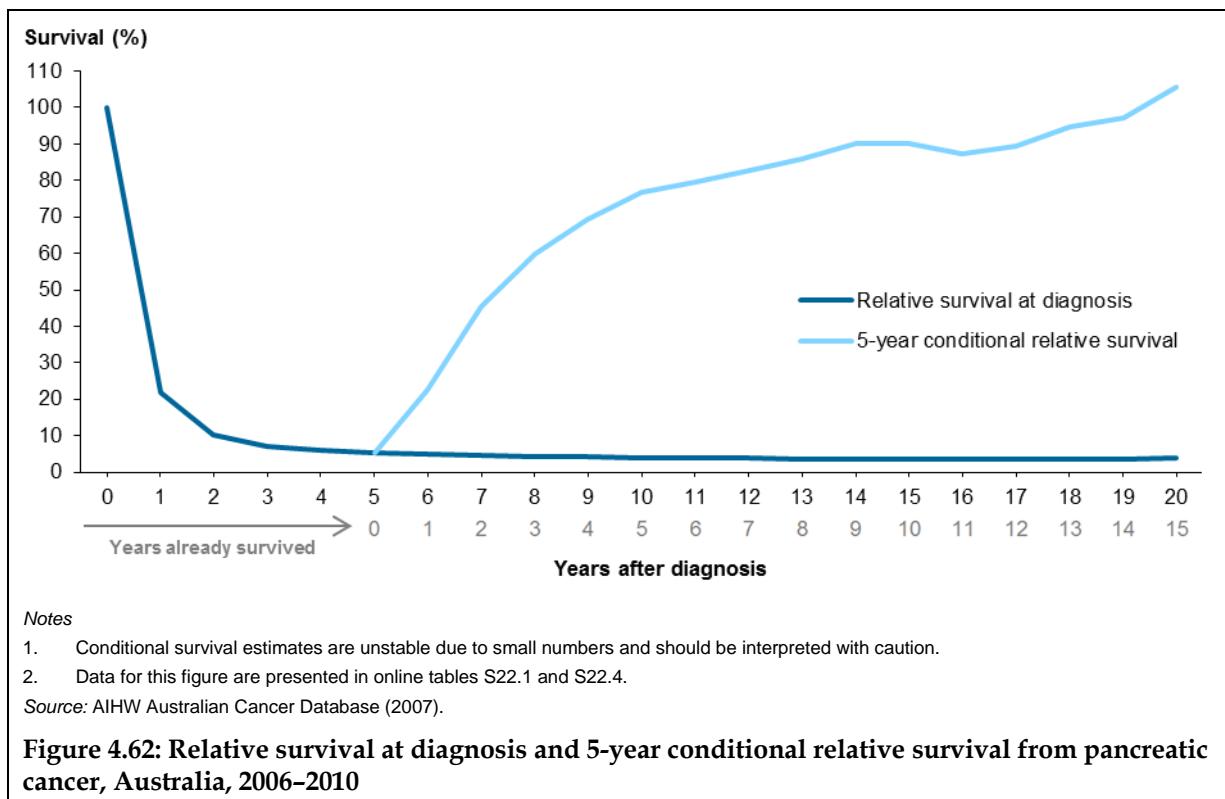
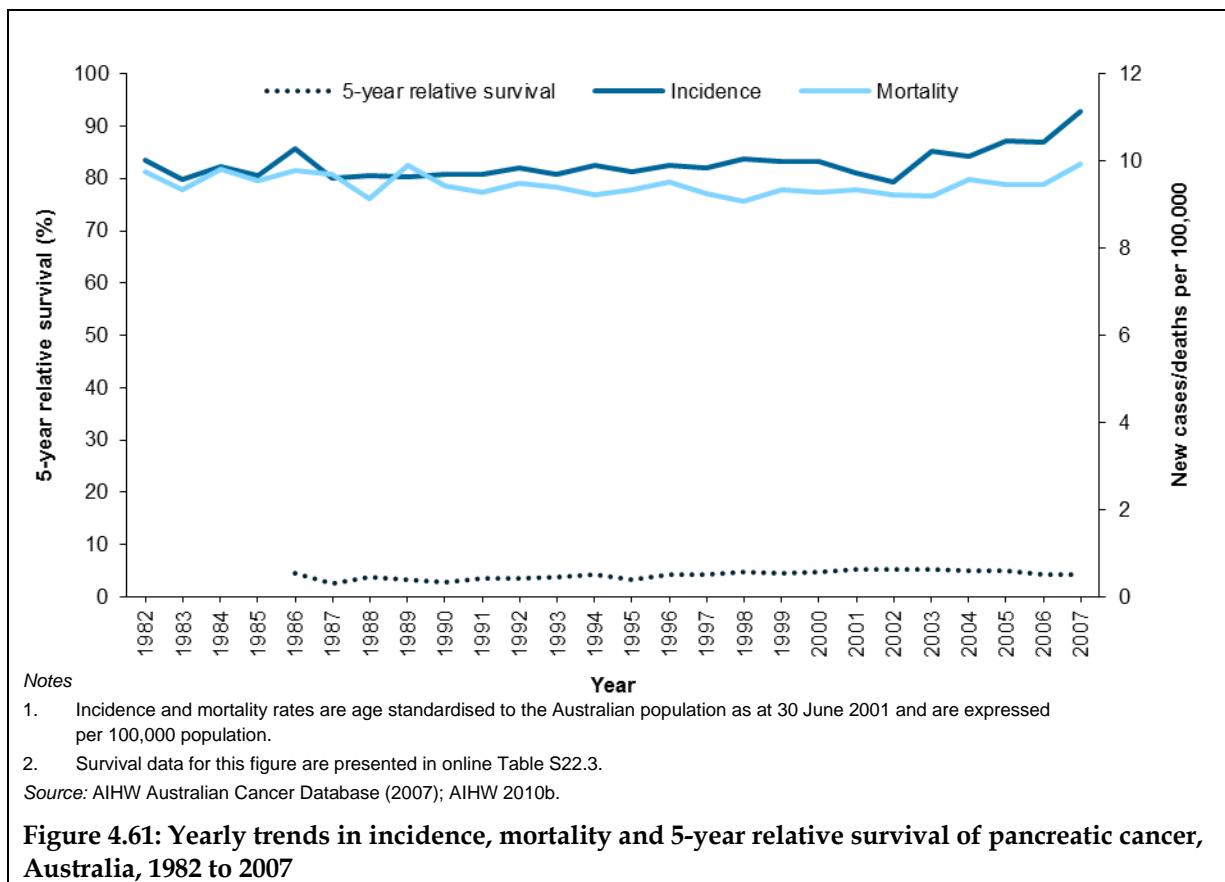
Source: AIHW Australian Cancer Database (2007).

Table 4.63: Summary of conditional relative survival from pancreatic cancer, Australia, 2006–2010

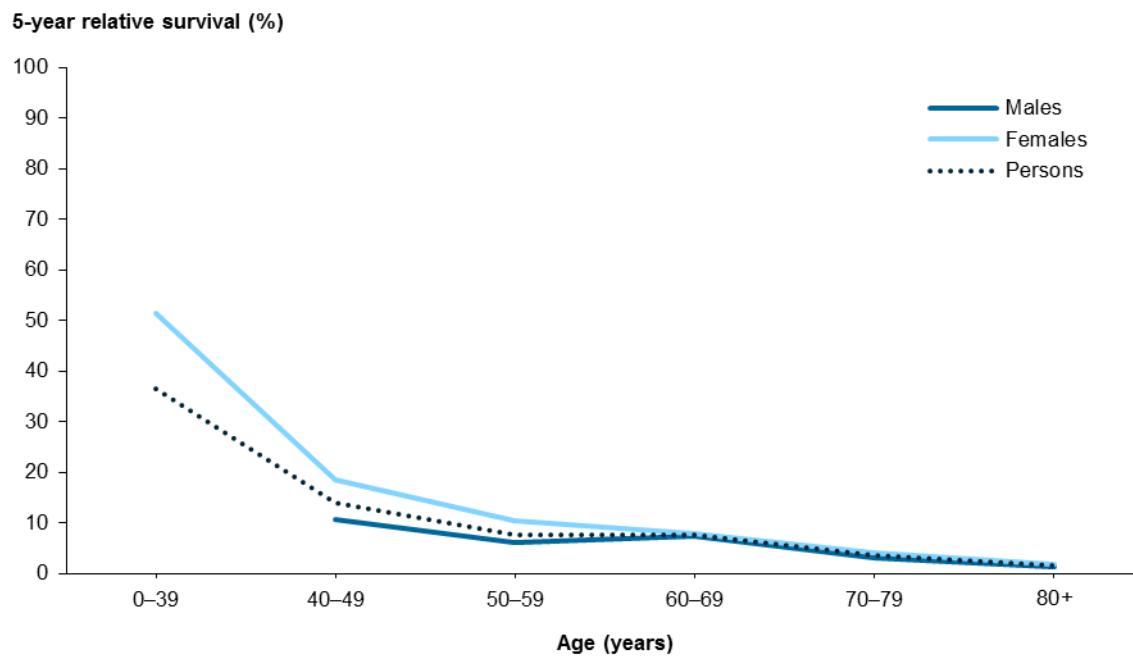
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	5.2	4.8–5.8
Already survived 1 year after diagnosis	22.6	15.2–29.9
Already survived 5 years after diagnosis	76.9	71.3–82.6
Already survived 10 years after diagnosis	90.0	83.6–96.4

Note: Additional data are presented in online Table S22.4.

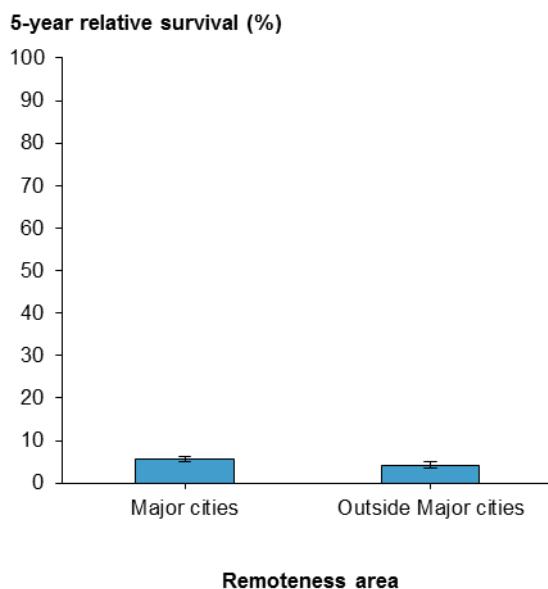
Source: AIHW Australian Cancer Database (2007).



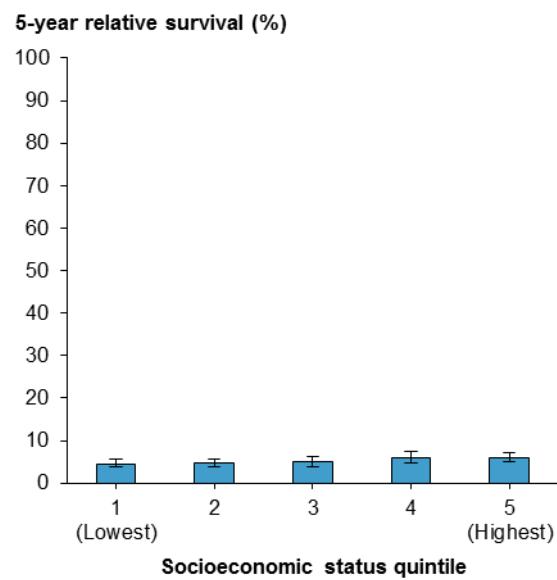
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Survival data are not presented if there were less than 20 individuals alive at the start of the follow-up year.
2. Error bars represent 95% confidence intervals.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S22.5 and S22.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.63: Five-year relative survival from pancreatic cancer by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Prostate cancer (C61)

Snapshot: in 2006–2010, men with prostate cancer had a 92% chance of surviving for at least 5 years compared with the general population. Among males, this was the third highest survival rate of all the cancers presented in this report.

Prostate cancer was the most commonly diagnosed cancer in Australia, accounting for almost a third of all cancer cases in males in 2007. It is primarily a disease of older men, and is rare before the age of 40. Prostate cancer was responsible for around 20,000 new cases of cancer and 3,000 deaths annually and remains a major public health concern. Incidence of prostate cancer is strongly influenced by the uptake of prostate-specific antigen (PSA) testing, which complicates the interpretation of survival outcomes and trends.

Incidence, mortality and survival trends

Incidence of prostate cancer in Australia has undergone a number of major changes since 1982. With the introduction of PSA testing, sharp increases in incidence of prostate cancer appeared in the early 1990s with a peak of 184 cases per 100,000 males in 1994. This peak is largely due to improved detection rather than elevated risk and reflects the large pool of undiagnosed cases that were identified using the PSA test that likely would have remained undiagnosed until symptoms later emerged, or never diagnosed because of mortality from another condition (AIHW 2007). Although the rate of new cases dropped in the late 1990s, it escalated again in later years, reaching 183 per 100,000 in 2007.

By contrast, mortality from prostate cancer changed only a little during this period, reaching a peak of 44 deaths per 100,000 in 1993, before falling to 31 per 100,000 in 2007.

Survival increased considerably, from 58% in the period 1982–1987 to 92% in 2006–2010. While the treatment of early, aggressive tumours may have led to some survival gains (Kvåle et al. 2007), much of this increasing trend may be a result of the lead-time and inclusion of non-fatal cancers associated with PSA testing (Dickman & Adami 2006).

Survival in the period 2006–2010

Age: Five-year survival was highest for men aged in their 50s and 60s (97%). It was slightly lower for younger men (86% – 95%) and lowest for men aged 80 and over (72%).

Population group: Survival from prostate cancer was slightly higher in *Major cities*, although differences by remoteness were not significant.

Survival varied significantly by socioeconomic status. Five-year survival in the highest socioeconomic status quintile (94%) exceeded that in each of the four lower socioeconomic status quintiles. International studies have documented socioeconomic differences in the uptake of PSA testing (Brenner & Arndt 2005) as well as in the use of radical surgery and radiotherapy (Lyratzopoulos et al. 2010).

Conditional survival

The gains in conditional survival from the number of years already survived were small for prostate cancer. At diagnosis, the probability of surviving for at least 5 years was 92%. By 1

year after diagnosis, survival prospects for at least another 5 years increased only marginally to 93%, with conditional survival changing very little thereafter.

Prevalence at the end of 2007

Prostate cancer was the third most prevalent cancer, largely owing to its high incidence and high survival. At the end of 2007, there were nearly 130,000 men in Australia who were diagnosed with prostate cancer in the previous 26 years. This equated to 1.2% of the total male population – including 12% of all men aged 80 and over – who had a history of prostate cancer in the previous 26 years.

Table 4.64: Summary of new cases, deaths and prevalence for prostate cancer, Australia, 1982–2010

No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
			No. as at end of 2007	Rate per 100,000 population
246,922	137,315	72,582	129,978	1,230.9

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.65: Summary of relative survival from prostate cancer, Australia, 1982–1987 to 2006–2010

Time period	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
1982–1987	87.4	86.8–88.0	58.2	56.8–59.6	n.a.	n.a.
1988–1993	91.5	91.2–91.9	62.7	61.9–63.5	43.7	42.4–45.1
1994–1999	95.3	95.0–95.5	80.8	80.3–81.3	62.6	61.6–63.7
2000–2005	96.1	95.9–96.3	85.3	84.9–85.7	75.1	74.5–75.7
2006–2010	97.8	97.6–98.0	92.0	91.6–92.3	84.5	83.9–85.1

Note: Additional data are presented in online tables S23.1 and S23.2.

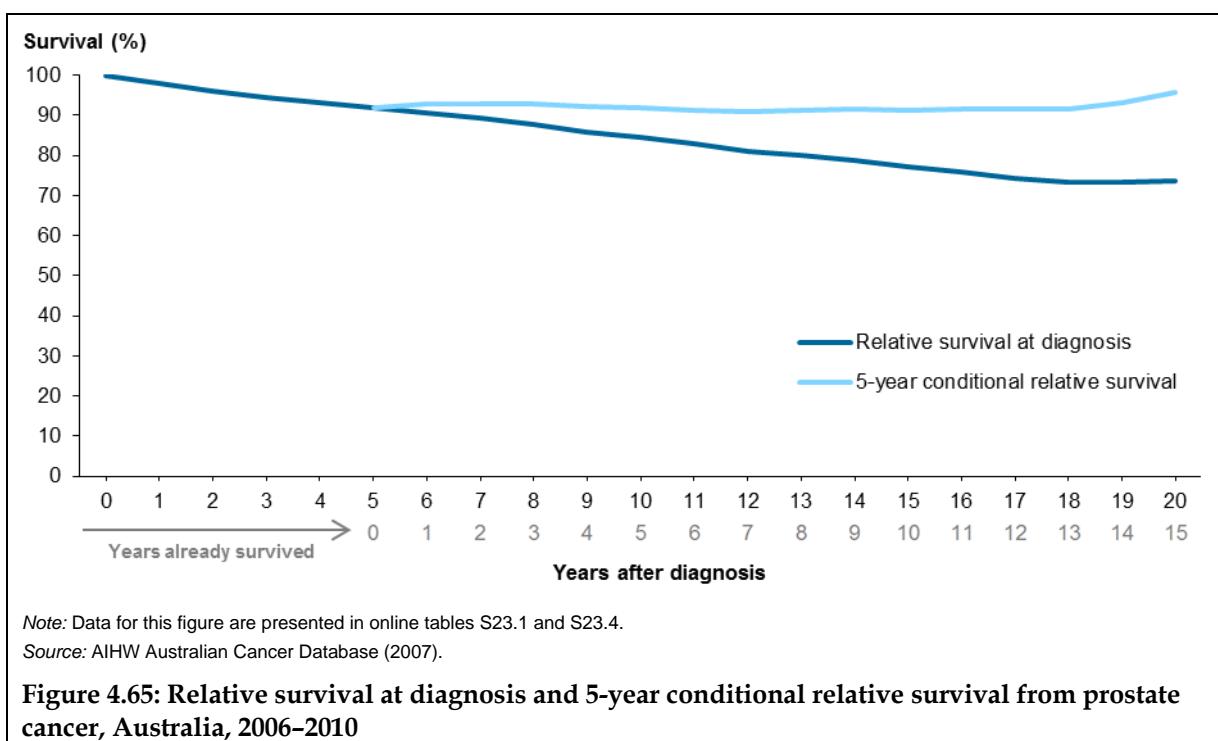
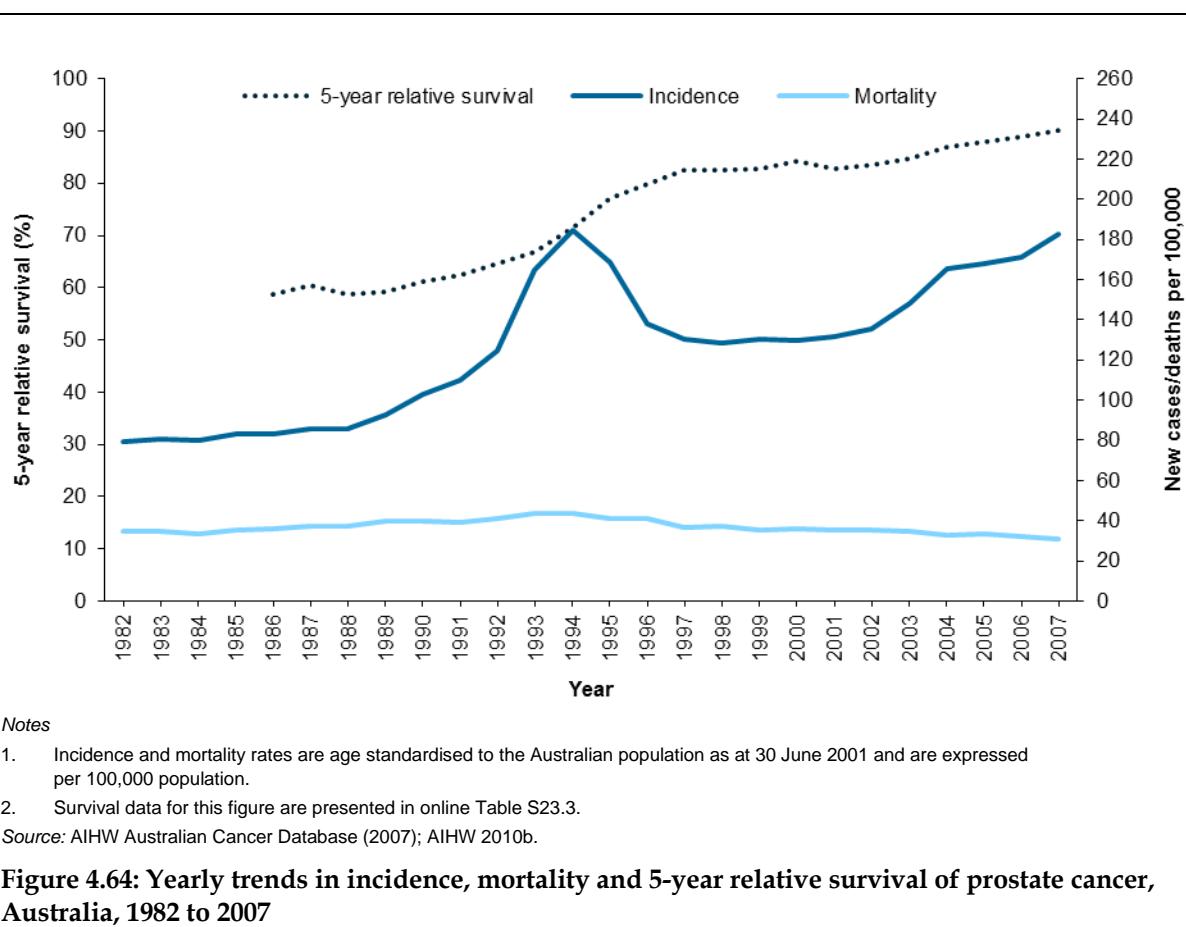
Source: AIHW Australian Cancer Database (2007).

Table 4.66: Summary of conditional relative survival from prostate cancer, Australia, 2006–2010

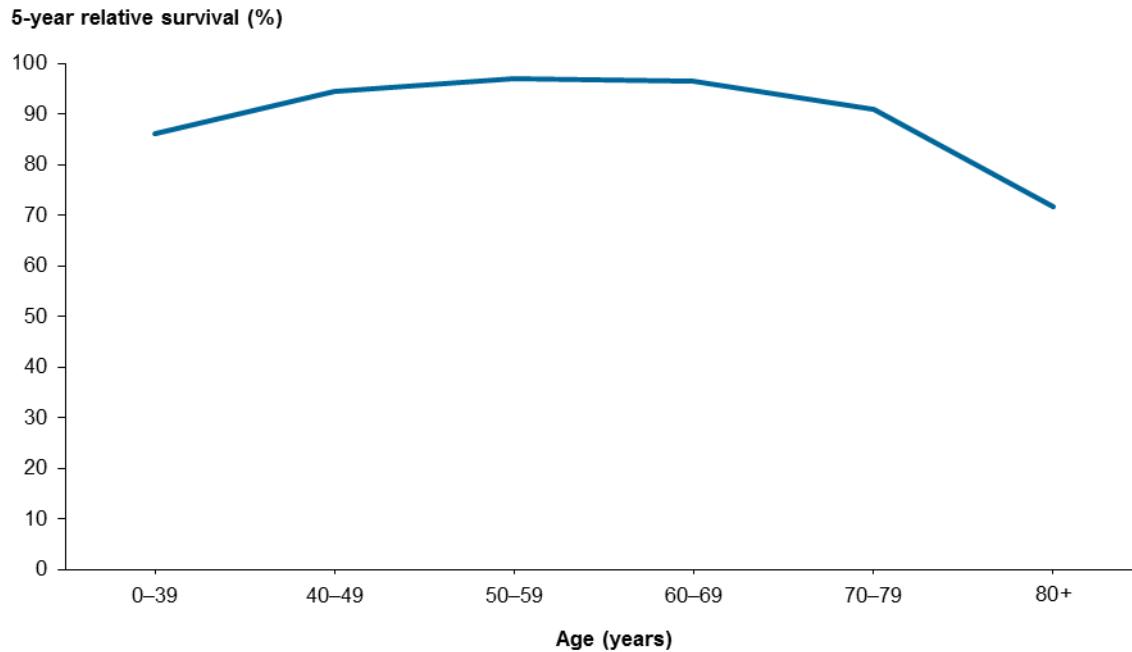
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	92.0	91.6–92.3
Already survived 1 year after diagnosis	92.7	92.4–93.1
Already survived 5 years after diagnosis	91.8	91.4–92.3
Already survived 10 years after diagnosis	91.1	90.4–91.9

Note: Additional data are presented in online Table S23.4.

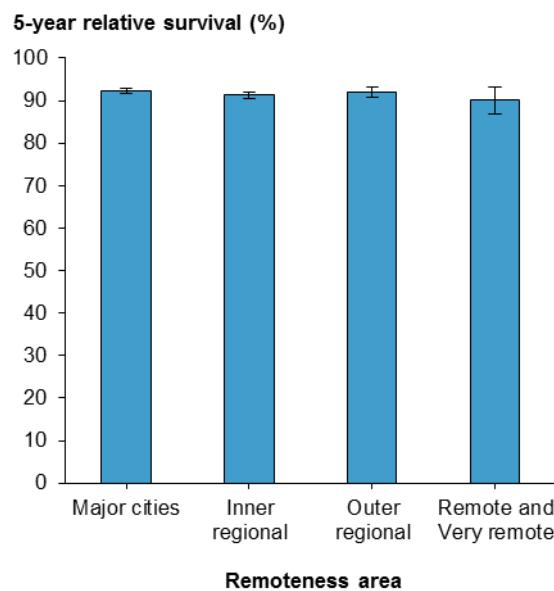
Source: AIHW Australian Cancer Database (2007).



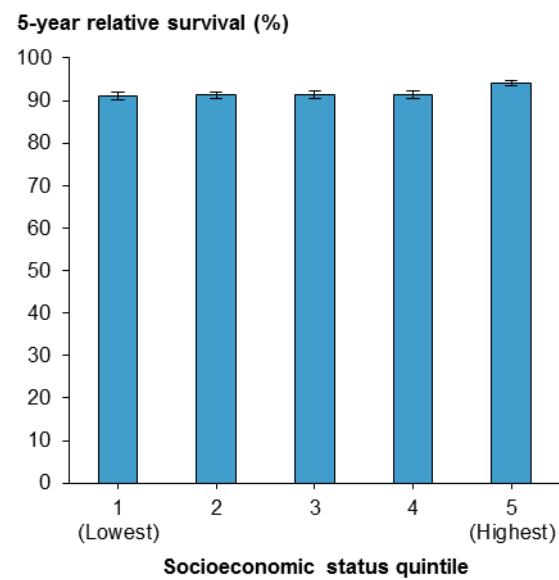
A. Age



B. Remoteness



C. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S23.5 and S23.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.66: Five-year relative survival from prostate cancer by age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Stomach cancer (C16)

Snapshot: in 2006–2010, individuals with stomach cancer had a 27% chance of surviving for at least 5 years compared with the general population.

Stomach cancer was ranked twelfth for incidence and ninth for mortality in Australia in 2007. It affected more males than females, with males twice as likely to be diagnosed with the disease and to die from it. Stomach cancers tend to be diagnosed at a more advanced stage than other cancers (NCI 2011a), with more than a third of stomach cancers in New South Wales presenting with a regional extent of disease at diagnosis (Tracey et al. 2006).

Incidence, mortality and survival trends

Between 1982 and 2007, both incidence and mortality from stomach cancer decreased considerably. Incidence fell by half from 16 new cases to 8.4 per 100,000 while mortality fell even further from 12 deaths to 5.0 per 100,000.

Coinciding with declining mortality, survival from stomach cancer was on the rise. Five-year survival increased significantly in almost every time period between 1982–1987 and 2006–2010, from 17% to 27%.

Survival in the period 2006–2010

Sex: Survival was similar for males and females.

Age: Under the age of 70, 5-year survival did not differ significantly by age group and was about 31%–35%. However, survival fell to 27% for those in their 70s, and to 15% for those aged 80 and over.

Population group: Five-year survival was significantly higher in *Major cities* (29%) compared with *Inner regional areas* (22%).

There was a gradient of decreasing survival with greater socioeconomic disadvantage. One-year survival was 56% in the highest socioeconomic status quintile compared with 48% in the lowest. The same pattern emerged for 5-year survival, although these differences were no longer statistically significant.

Conditional survival

Survival increased rapidly with the number of years already survived. At diagnosis, the probability of surviving for at least 5 years was 27%. By 1 year after diagnosis, survival prospects had almost doubled to 51%. By 15 years after diagnosis, 5-year conditional survival had reached 100% – that is, people with stomach cancer had the same survival prospects as those in the general population.

Prevalence at the end of 2007

At the end of 2007, there were about 7,800 Australians alive who were diagnosed with stomach cancer in the previous 26 years, including around 3,600 diagnosed in the previous 5 years. This represented a 26-year prevalence of 37 people per 100,000 population.

Table 4.67: Summary of new cases, deaths and prevalence for stomach cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	30,731	27,246	2,335	4,903	46.4
Females	16,588	14,401	1,257	2,889	27.1
Persons	47,319	41,647	3,592	7,792	36.7

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.68: Summary of relative survival from stomach cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	51.2	49.4–53.0	26.9	25.4–28.4	23.4	21.9–25.0
Females	50.1	47.6–52.6	26.4	24.4–28.4	23.8	21.9–25.9
Persons	50.8	49.4–52.3	26.7	25.5–27.9	23.6	22.4–24.8
<i>Previous time periods</i>						
1982–1987	37.2	36.3–38.2	17.2	16.1–18.2	n.a.	n.a.
1988–1993	41.8	40.8–42.7	19.7	18.8–20.5	17.4	16.4–18.4
1994–1999	45.3	44.3–46.2	21.6	20.8–22.5	19.3	18.4–20.2
2000–2005	49.6	48.6–50.5	24.6	23.7–25.5	21.6	20.6–22.5

Note: Additional data are presented in online tables S24.1 and S24.2.

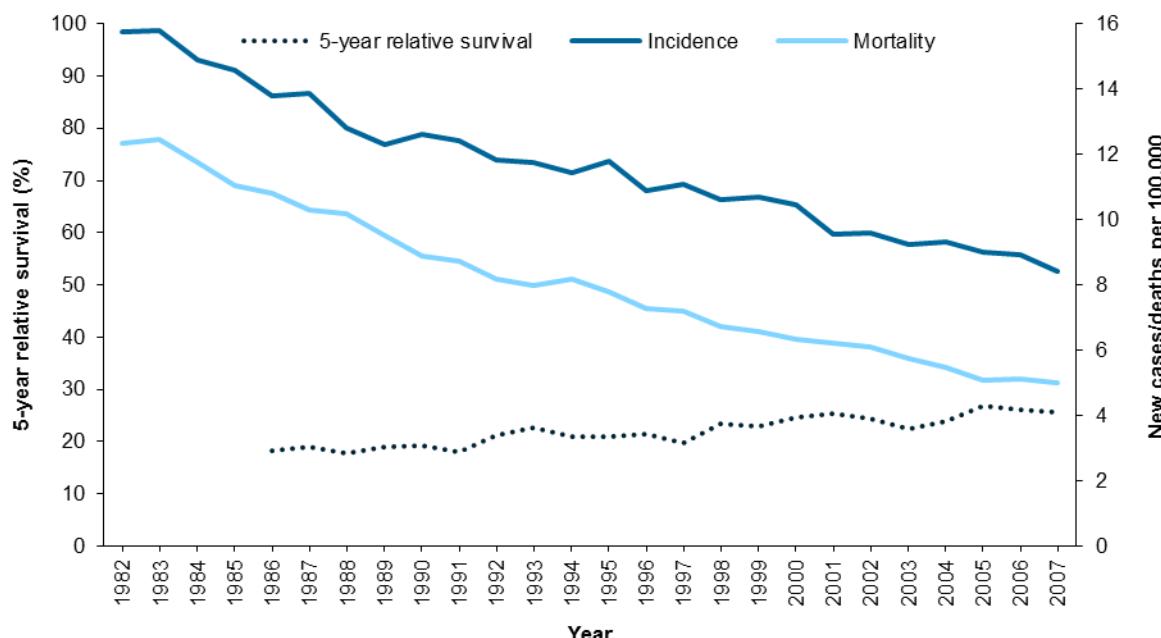
Source: AIHW Australian Cancer Database (2007).

Table 4.69: Summary of conditional relative survival from stomach cancer, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	26.7	25.5–27.9
Already survived 1 year after diagnosis	51.2	48.1–54.3
Already survived 5 years after diagnosis	88.4	86.2–90.6
Already survived 10 years after diagnosis	95.3	92.8–97.9

Note: Additional data are presented in online Table S24.4.

Source: AIHW Australian Cancer Database (2007).

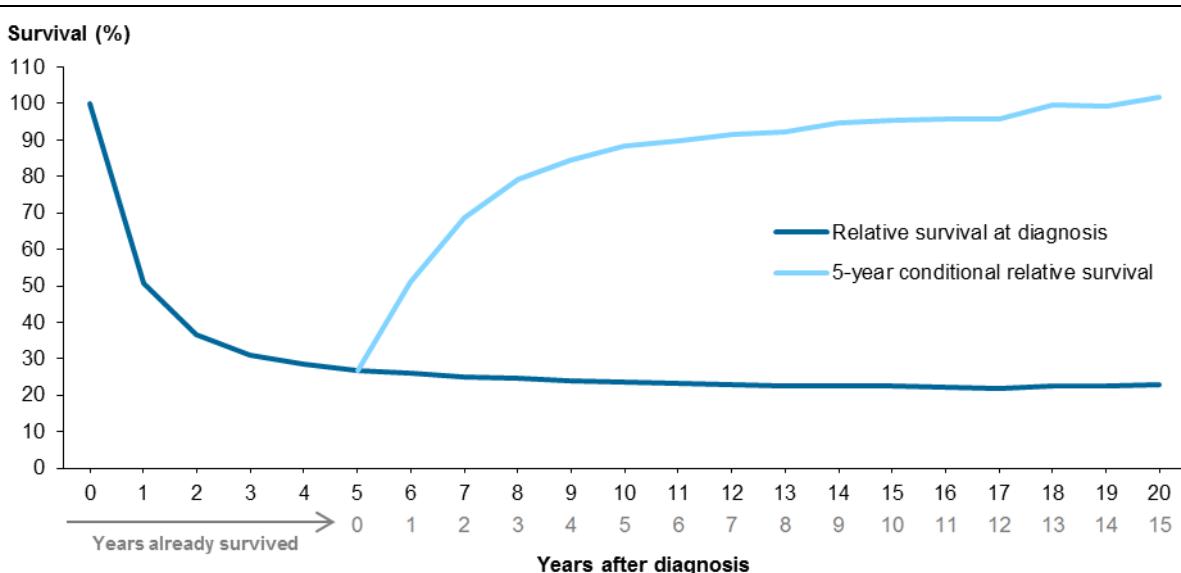


Notes

1. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
2. Survival data for this figure are presented in online Table S24.3.

Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 4.67: Yearly trends in incidence, mortality and 5-year relative survival of stomach cancer, Australia, 1982 to 2007

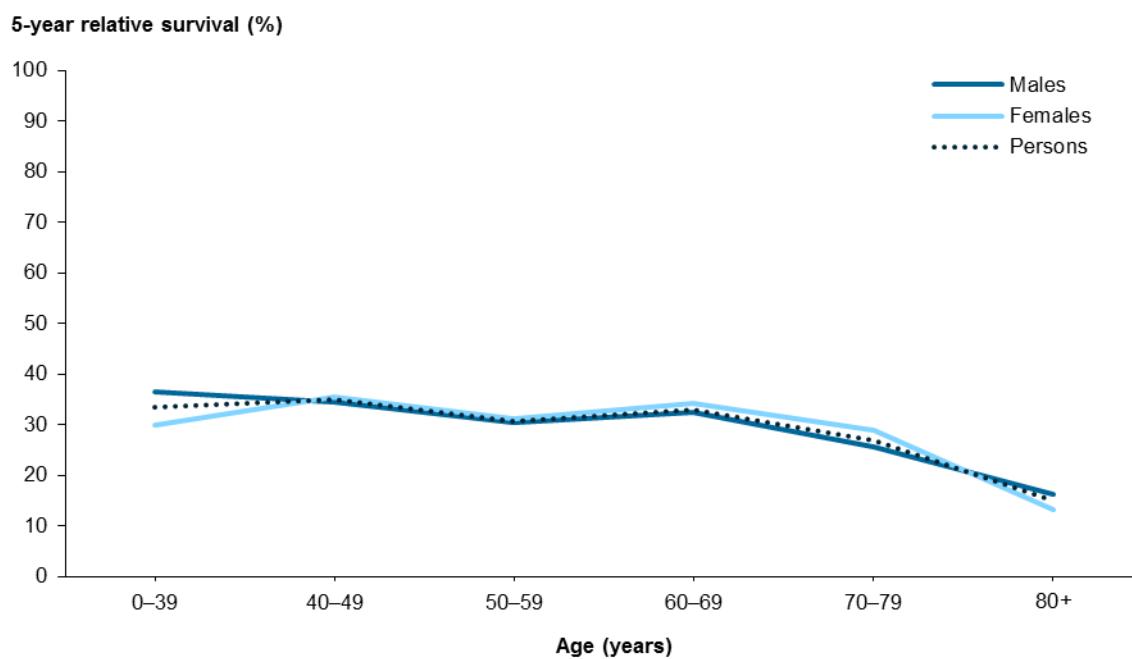


Note: Data for this figure are presented in online tables S24.1 and S24.4.

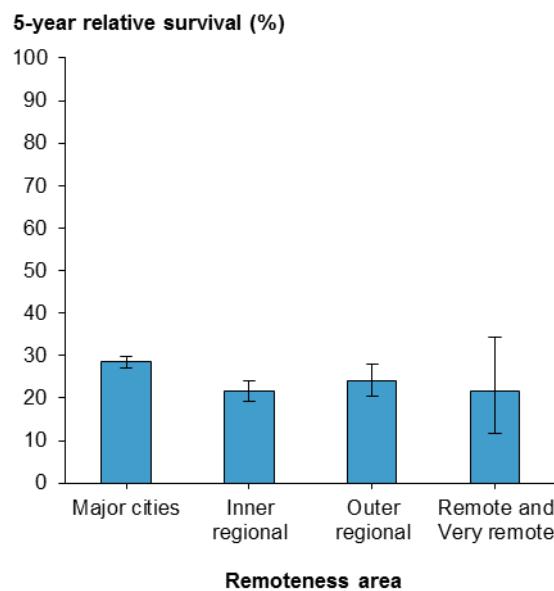
Source: AIHW Australian Cancer Database (2007).

Figure 4.68: Relative survival at diagnosis and 5-year conditional relative survival from stomach cancer, Australia, 2006–2010

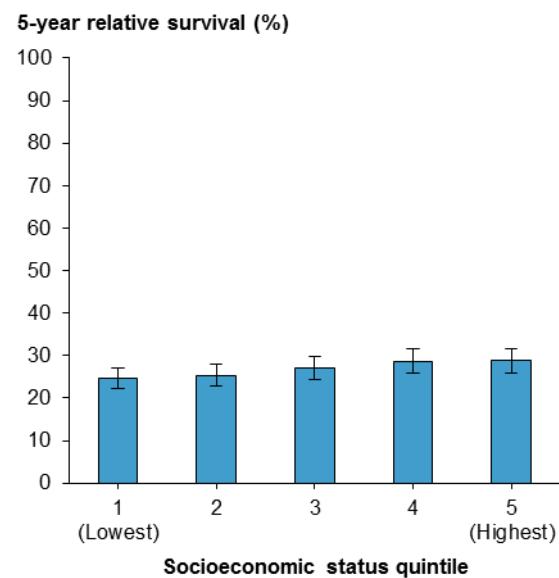
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S24.5 and S24.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.69: Five-year relative survival from stomach cancer by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Testicular cancer (C62)

Snapshot: in 2006–2010, men with testicular cancer had a 98% chance of surviving for at least 5 years compared with the general population. This was the highest 5-year survival rate of all the cancers presented in this report.

Testicular cancer is uncommon, accounting for 1.1% of all cancer cases in males in 2007. However, it was one of the major cancers diagnosed in young Australian males, with a peak incidence in men aged in their 30s. Testicular cancer is one of the most treatable solid tumours, even when the disease is metastatic (Huddart 2008; Cancer Council NSW 2010).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of testicular cancer grew from 4.2 to 6.8 new cases per 100,000. Mortality remained very low throughout this period, dropping slightly from 0.5 to 0.3 deaths per 100,000.

Survival from testicular cancer also increased over time. Five-year survival improved gradually but significantly from 91% to 98% between the periods 1982–1987 and 2006–2010. Internationally, improvements in testicular cancer survival have been attributed to the use of platinum-based chemotherapy (Biggs & Schwartz 2007; Nur et al. 2008), earlier diagnosis, standardisation of treatment and improved supportive care (Huddart 2008).

Survival in the period 2006–2010

Age: Survival was high and similar across all age groups. While 5-year survival appeared slightly lower in males aged 70 and over, this was not significantly different due to the scarcity of cases in this age group.

Histology: There are two main types of testicular cancer which have different patterns of growth and are treated differently. Seminoma tends to be slow-growing and more sensitive to radiation, while other germ cell tumour includes yolk sac tumour, choriocarcinoma and mixed germ cell tumour (NCI 2011b). Five-year survival was 99% for seminoma, significantly higher than for other germ cell tumour (96%).

Population group: Survival from testicular cancer did not differ significantly by remoteness or by socioeconomic status.

Conditional survival

Survival was already quite high at diagnosis and there were only marginal gains in conditional survival as a result of years already survived. At diagnosis, the probability of surviving at least 5 years was 98%. By 1 year after diagnosis, these survival prospects had increased to 99%. By 10 years after diagnosis, conditional survival had reached 100% – in other words, survival for those with testicular cancer was no different from that in the general population.

Prevalence at the end of 2007

Prevalence of testicular cancer reflected a balance between its low incidence and high survival, as well as its younger age at diagnosis. At the end of 2007, there were about 11,800 men in Australia who were diagnosed with testicular cancer in the previous 26 years, representing a prevalence of 112 men per 100,000 male population.

Table 4.70: Summary of new cases, deaths and prevalence for testicular cancer, Australia, 1982–2010

No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
			No. as at end of 2007	Rate per 100,000 population
13,032	1,403	3,220	11,844	112.2

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.71: Summary of relative survival from testicular cancer, Australia, 1982–1987 to 2006–2010

Time period	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
1982–1987	95.5	94.4–96.4	90.7	88.9–92.3	n.a.	n.a.
1988–1993	97.9	97.2–98.4	95.1	94.0–96.1	94.3	92.9–95.6
1994–1999	98.0	97.4–98.5	95.6	94.7–96.4	95.0	93.9–96.0
2000–2005	98.6	98.2–99.0	96.8	96.0–97.4	96.5	95.6–97.3
2006–2010	98.9	98.2–99.3	97.6	96.7–98.3	97.0	96.0–97.9

Note: Additional data are presented in online tables S25.1 and S25.2.

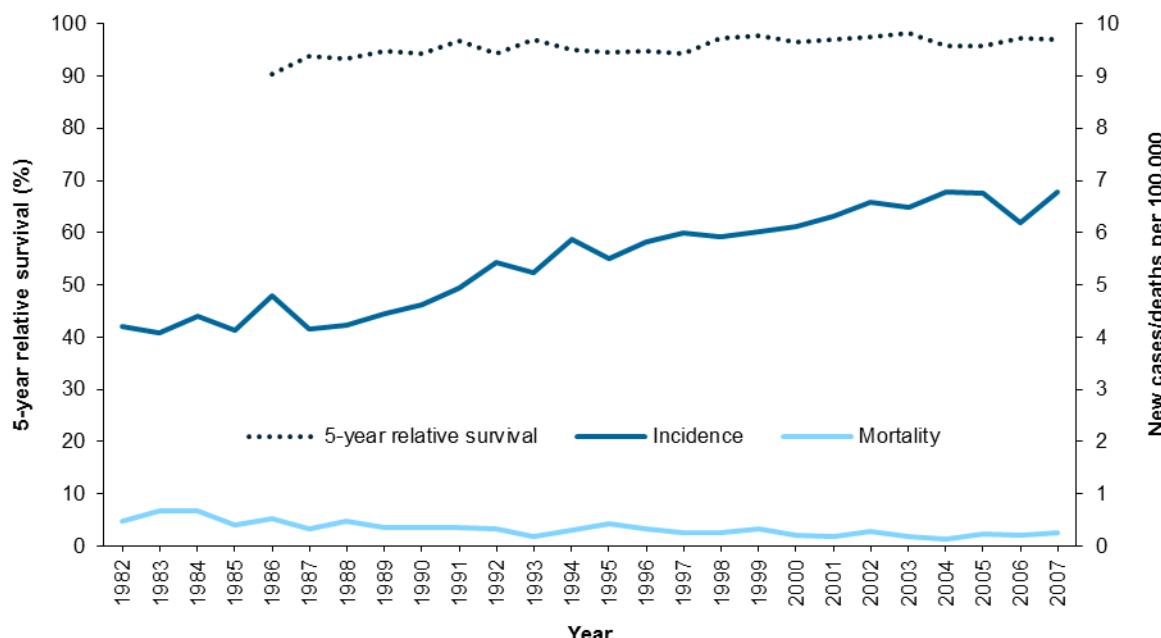
Source: AIHW Australian Cancer Database (2007).

Table 4.72: Summary of conditional relative survival from testicular cancer, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	97.6	96.7–98.3
Already survived 1 year after diagnosis	98.5	98.0–99.0
Already survived 5 years after diagnosis	99.4	98.9–99.8
Already survived 10 years after diagnosis	100.0	99.5–100.5

Note: Additional data are presented in online Table S25.4.

Source: AIHW Australian Cancer Database (2007).

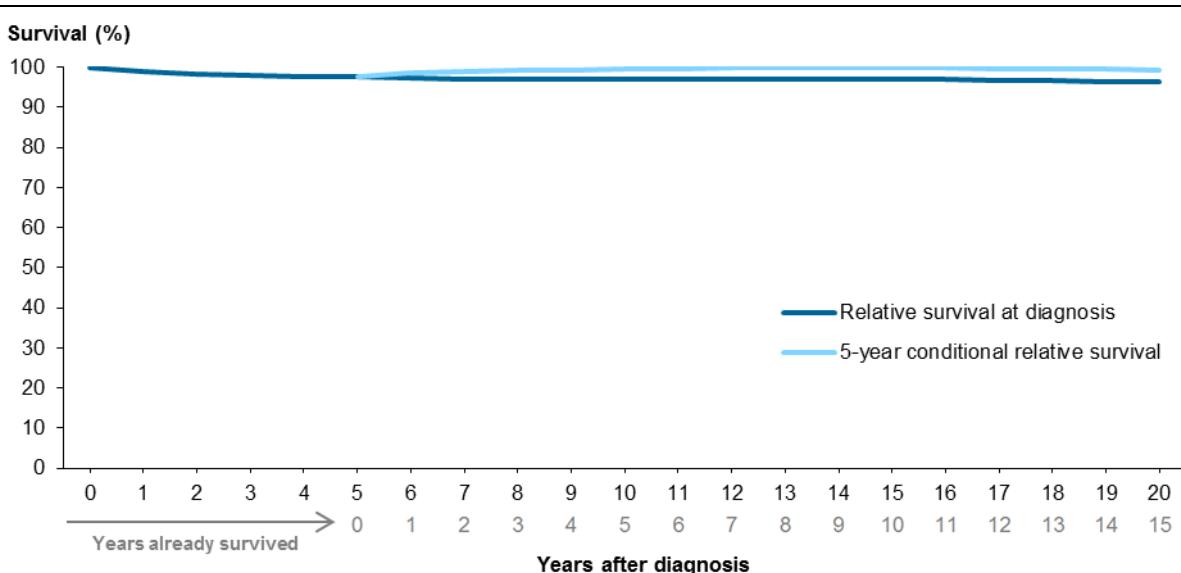


Notes

1. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
2. Survival data for this figure are presented in online Table S25.3.

Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 4.70: Yearly trends in incidence, mortality and 5-year relative survival of testicular cancer, Australia, 1982 to 2007

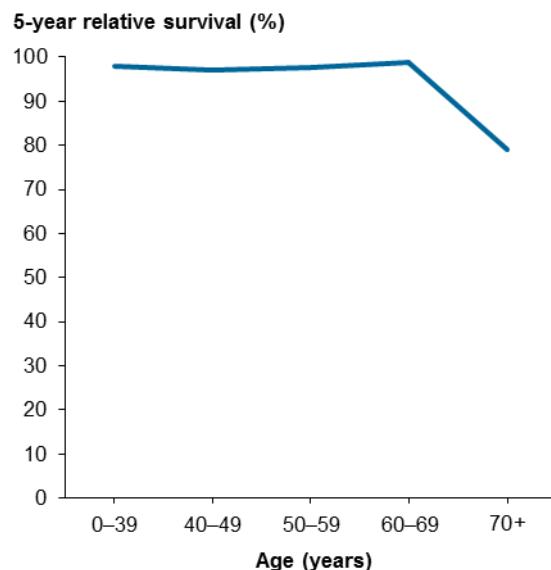


Note: Data for this figure are presented in online tables S25.1 and S25.4.

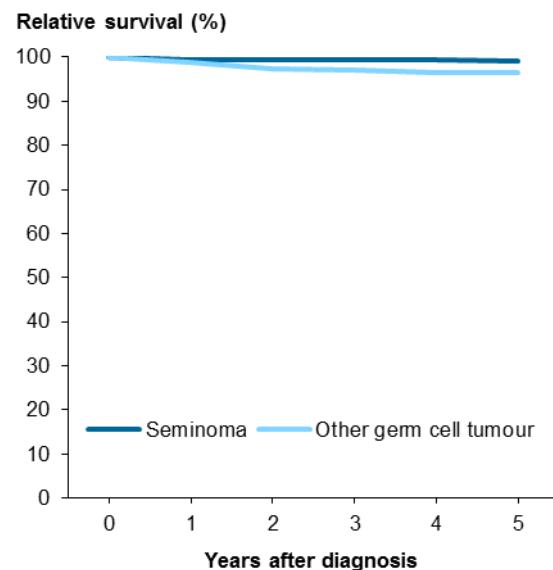
Source: AIHW Australian Cancer Database (2007).

Figure 4.71: Relative survival at diagnosis and 5-year conditional relative survival from testicular cancer, Australia, 2006–2010

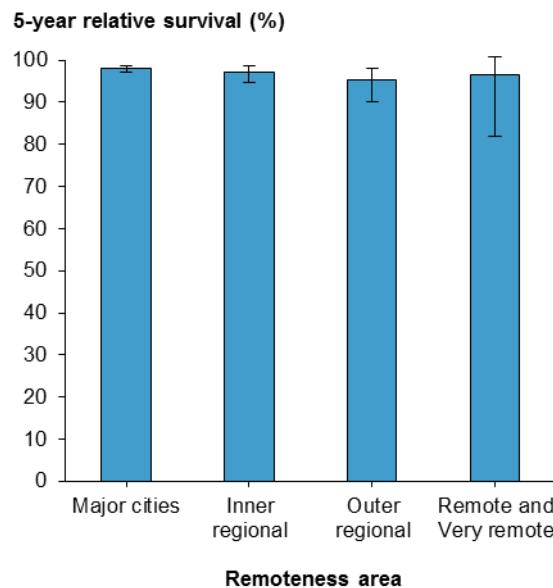
A. Age



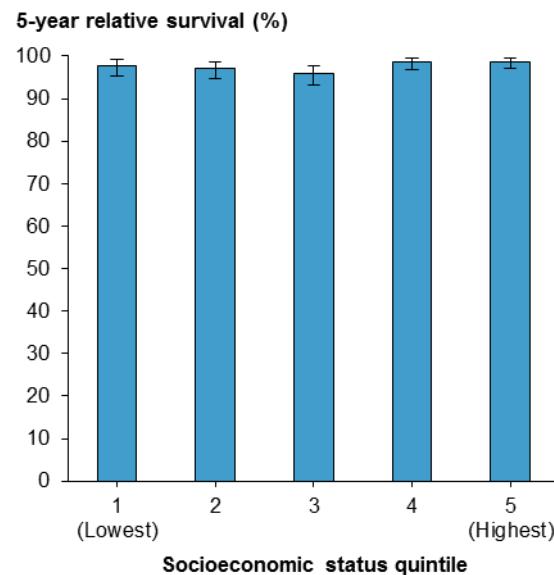
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

- In graph A, the drop in 5-year survival for those aged 70 and over is not statistically significant.
- Error bars represent 95% confidence intervals.
- Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
- Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
- Data for this figure are presented in online tables S25.5, S25.6 and S25.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.72: Relative survival from testicular cancer by age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Thyroid cancer (C73)

Snapshot: in 2006–2010, individuals with thyroid cancer had a 96% chance of surviving for at least 5 years compared with the general population. Of the cancers in this report, thyroid cancer had the highest survival among females and the fourth highest among males.

Thyroid cancer accounted for 1.6% of all cancer cases in Australia in 2007 and was the thirteenth most common cancer. Unlike many other cancers, it affected more females than males, with females almost 3 times as likely to develop it. It was a rare cause of cancer death and the prognosis for those with thyroid cancer is generally good (NCI 2011c). However, survival outcomes have been found to vary substantially by the type of cancer involved and the degree of spread at diagnosis (Kosary 2007; Stavrou et al. 2008).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of thyroid cancer increased markedly, almost tripling from 2.8 to 8.3 new cases per 100,000. Rising incidence of thyroid cancer has been attributed to increased medical surveillance and improved diagnostics (IARC 2008; Enewold et al. 2009)—specifically ultrasound and increased sampling of specimens by pathologists (Grodski et al. 2008). In contrast to incidence, mortality changed very little, remaining at about 0.4 to 0.6 deaths per 100,000 over the same time.

Five-year survival from thyroid cancer increased from 84% in the period 1982–1987 to 96% in 2006–2010. International studies have suggested a possible lead-time bias resulting from improved and more widespread detection of thyroid cancer (Lundgren et al. 2003), although the extent to which this is the case in Australia is unknown.

Survival in the period 2006–2010

Sex: Females tended to have higher survival than males. Five-year survival was 97% for females compared with 91% for males.

Age: Survival decreased with age: 5-year survival was almost 100% for those aged under 40 compared with 73% for those aged 80 and over.

Histology: Follicular and papillary carcinomas are the two most common forms of thyroid cancer. Both tend to be slow growing (Stavrou et al. 2008) and shared similar survival outcomes: 5-year survival was 97% for follicular carcinoma and 99% for papillary carcinoma. Medullary carcinoma is often more aggressive with a tendency for metastasis (Kosary 2007); it had significantly lower survival at 89%.

Population group: For both 1 and 5 years, survival was highest in *Major cities*, although differences by remoteness were not statistically significant. Likewise, survival did not differ significantly by socioeconomic status.

Conditional survival

The probability of surviving for at least 5 years was 96% at diagnosis, compared with 98% by 1 year after diagnosis and 99% by 5 years after diagnosis.

Prevalence at the end of 2007

At the end of 2007, there were about 18,900 Australians alive who were diagnosed with thyroid cancer in the previous 26 years, including 7,500 diagnosed in the previous 5 years. This represented a 26-year prevalence of 89 people per 100,000 population.

Table 4.73: Summary of new cases, deaths and prevalence for thyroid cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	5,705	1,708	1,769	4,257	40.3
Females	16,738	2,430	5,693	14,593	136.7
Persons	22,443	4,138	7,462	18,850	88.8

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.74: Summary of relative survival from thyroid cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	95.6	94.0–96.8	91.3	89.3–93.2	87.6	85.0–90.0
Females	98.1	97.4–98.5	97.3	96.5–98.0	96.9	95.9–97.8
Persons	97.5	96.9–98.0	95.8	95.1–96.5	94.6	93.7–95.6
<i>Previous time periods</i>						
1982–1987	89.6	88.2–90.9	83.5	81.2–85.6	n.a.	n.a.
1988–1993	93.2	92.2–94.1	88.9	87.5–90.2	85.6	83.5–87.5
1994–1999	95.4	94.7–96.0	93.0	92.0–93.9	90.6	89.2–91.9
2000–2005	96.4	95.9–96.8	93.7	93.0–94.4	92.0	91.0–93.0

Note: Additional data are presented in online tables S26.1 and S26.2.

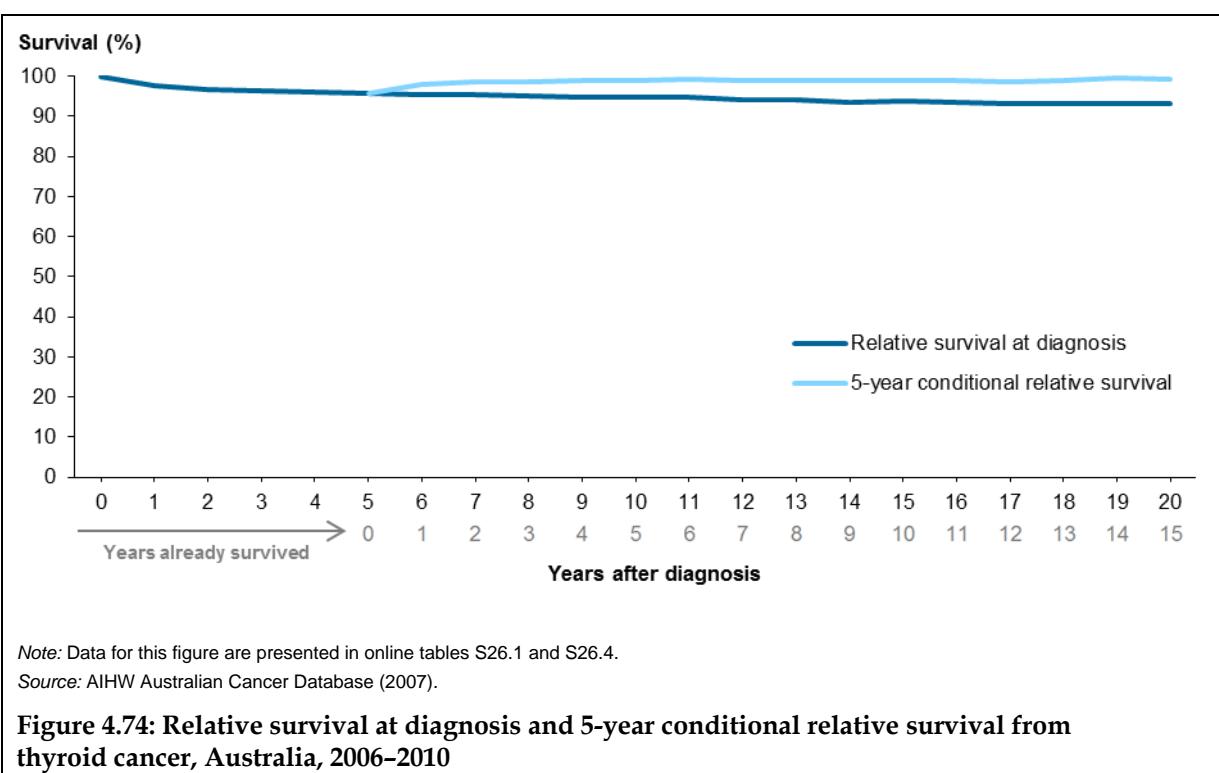
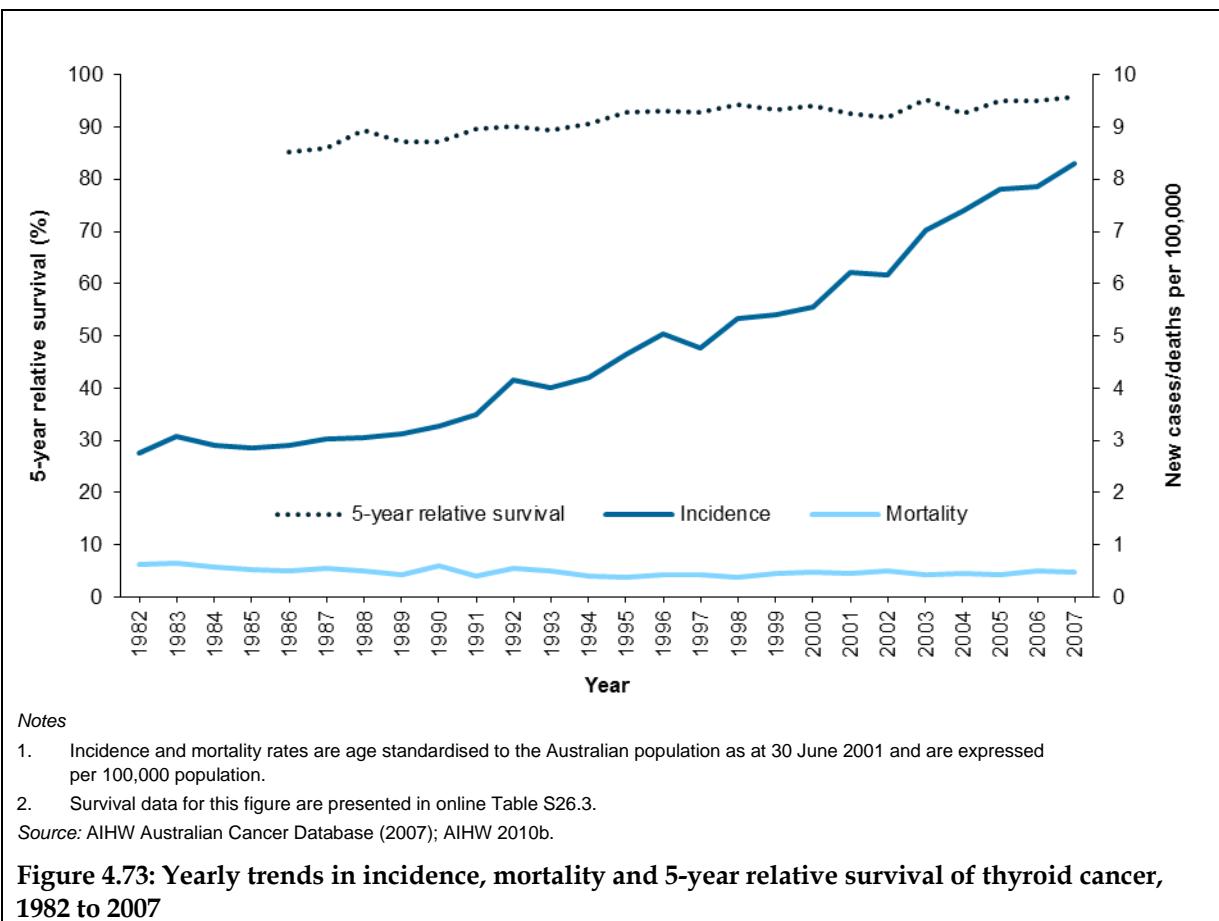
Source: AIHW Australian Cancer Database (2007).

Table 4.75: Summary of conditional relative survival from thyroid cancer, Australia, 2006–2010

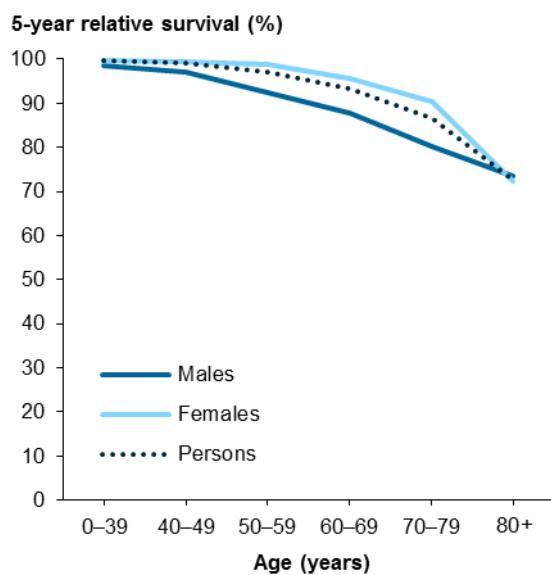
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	95.8	95.1–96.5
Already survived 1 year after diagnosis	97.8	97.3–98.4
Already survived 5 years after diagnosis	98.7	98.2–99.3
Already survived 10 years after diagnosis	99.0	98.3–99.7

Note: Additional data are presented in online Table S26.4.

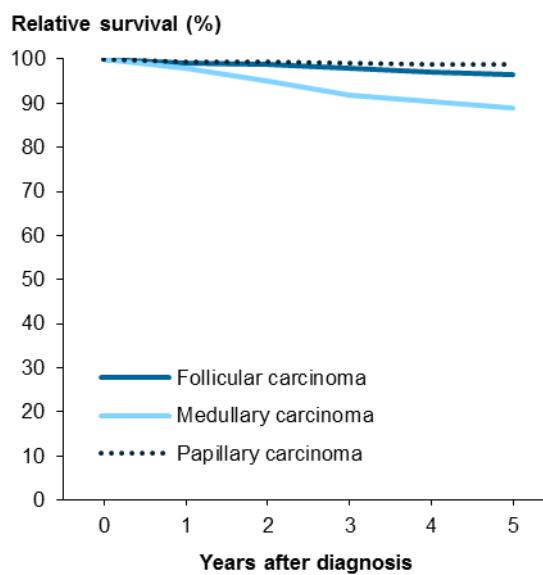
Source: AIHW Australian Cancer Database (2007).



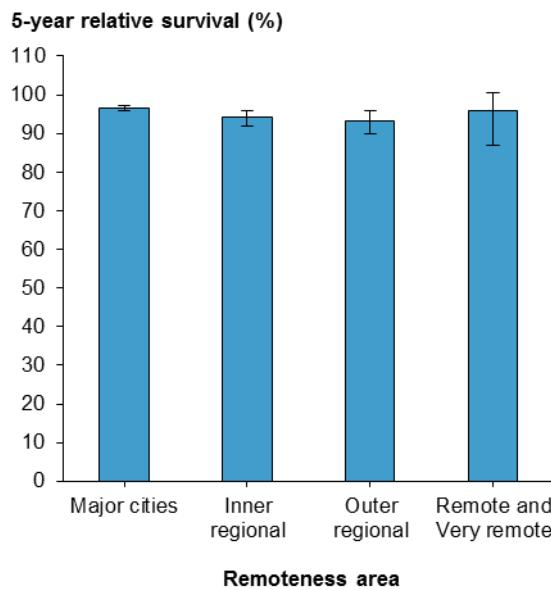
A. Sex and age



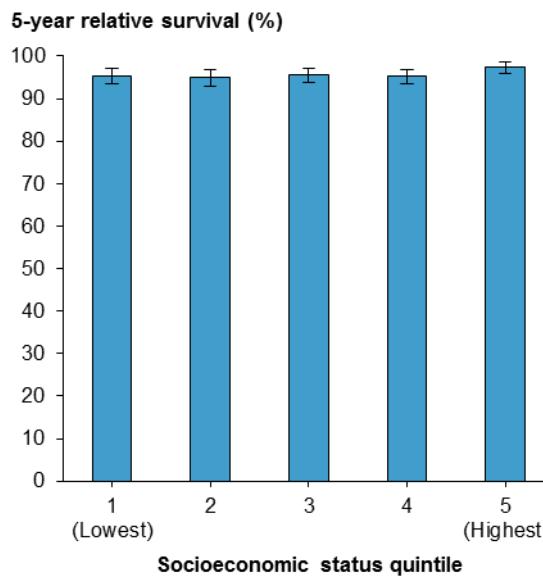
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Note the difference in the scale of the y-axis between figures.
3. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
4. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
5. Data for this figure are presented in online tables S26.5, S26.6 and S26.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.75: Relative survival from thyroid cancer by sex and age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Tongue cancer (C01–C02)

Snapshot: in 2006–2010, individuals with tongue cancer had a 62% chance of surviving for at least 5 years compared with the general population.

Tongue cancer is one of the major cancers of the oral cavity, although it was a rare cancer overall, accounting for only 0.6% of all cancer cases. It was twice as common in males as in females and the risk increased with age. There have been a number of developments in the treatment of oral cancer, including surgical resection, reconstruction, radiation therapy and chemotherapy (Lam et al. 2006). Previous studies have also indicated that tumour location is a strong predictor of tongue cancer survival, with tumours toward the base of the tongue associated with greater spread and poorer survival (Lam et al. 2006).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence and mortality of tongue cancer changed very little. Incidence increased slightly from 2.3 to 2.7 new cases per 100,000 while mortality dropped slightly from 1.0 to 0.8 deaths per 100,000.

Survival from tongue cancer showed little change until the 2000s. However, 5-year survival increased significantly from 55% to 62% between the periods 2000–2005 and 2006–2010.

Survival in the period 2006–2010

Sex: Survival was not significantly different between males and females.

Age: Survival declined gradually with age: 5-year survival was significantly lower in those aged 70 and over (50%) compared with all younger age groups.

Population group: Despite small numbers, survival varied by remoteness. Five-year survival was significantly lower in *Remote and Very remote areas* (38%) compared with *Major cities* (63%) and *Inner regional* areas (64%).

Similarly, survival varied by socioeconomic status, although the relationship was less clear. Five-year survival was highest in the two highest socioeconomic status quintiles (68%–70%) and lowest in the second lowest quintile (55%).

Conditional survival

The probability of surviving for at least 5 years was 62% at diagnosis, compared with 71% by 1 year after diagnosis and 82% by 5 years after diagnosis.

Prevalence at the end of 2007

At the end of 2007, there were about 3,800 people in Australia who were diagnosed with tongue cancer in the previous 26 years, including 1,800 diagnosed in the previous 5 years. Two-thirds of these were males, with a 26-year prevalence of 23 per 100,000 for males and 13 per 100,000 for females.

Table 4.76: Summary of new cases, deaths and prevalence for tongue cancer, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	6,943	4,954	1,204	2,471	23.4
Females	3,326	2,225	596	1,340	12.5
Persons	10,269	7,179	1,800	3,811	17.9

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.77: Summary of relative survival from tongue cancer, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
<i>2006–2010</i>						
Males	83.0	80.4–85.4	61.3	58.2–64.3	48.9	45.6–52.2
Females	81.1	77.0–84.6	61.9	57.5–66.2	52.8	48.0–57.5
Persons	82.4	80.2–84.4	61.5	59.0–64.0	50.3	47.5–52.9
<i>Previous time periods</i>						
1982–1987	74.6	72.3–76.8	48.2	44.6–51.8	n.a.	n.a.
1988–1993	76.2	74.2–78.1	47.8	45.3–50.3	37.6	34.4–40.8
1994–1999	78.2	76.5–79.9	51.4	49.1–53.7	40.3	37.7–42.8
2000–2005	79.6	78.0–81.1	54.5	52.4–56.6	44.2	41.9–46.6

Note: Additional data are presented in online tables S27.1 and S27.2.

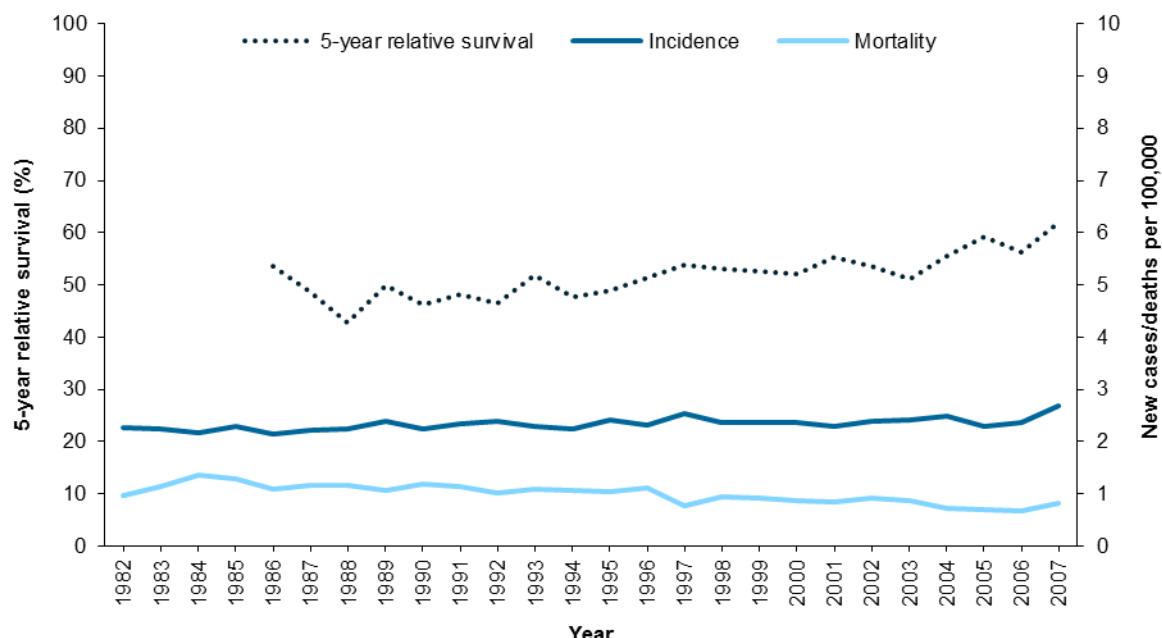
Source: AIHW Australian Cancer Database (2007).

Table 4.78: Summary of conditional relative survival from tongue cancer, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	61.5	59.0–64.0
Already survived 1 year after diagnosis	71.2	68.3–74.2
Already survived 5 years after diagnosis	81.8	78.8–84.7
Already survived 10 years after diagnosis	84.5	80.7–88.3

Note: Additional data are presented in online Table S27.4.

Source: AIHW Australian Cancer Database (2007).

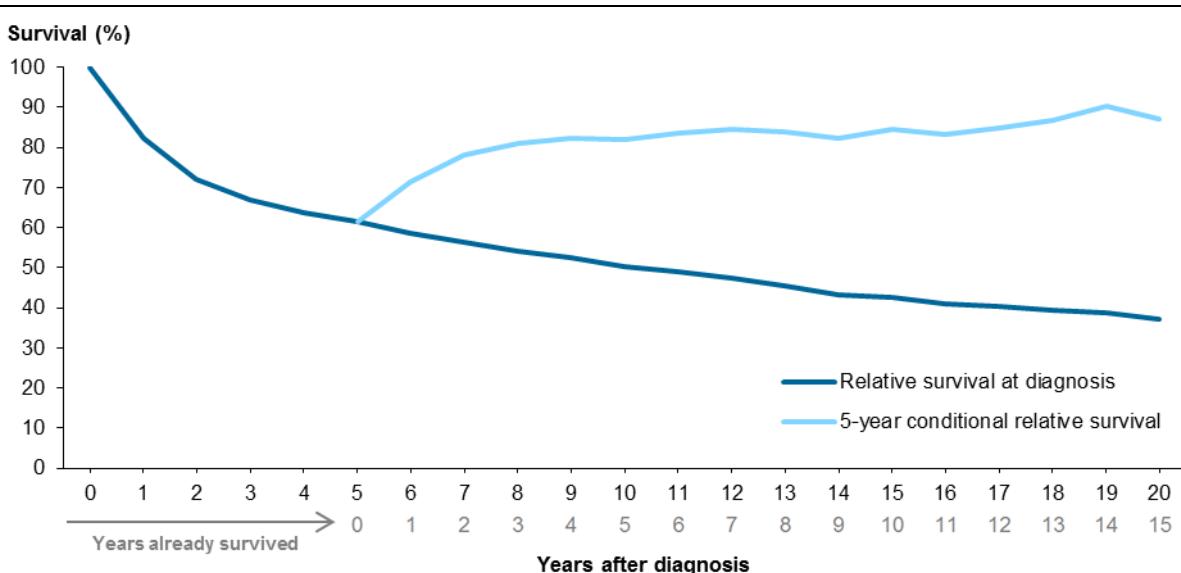


Notes

1. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
2. Survival data for this figure are presented in online Table S27.3.

Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 4.76: Yearly trends in incidence, mortality and 5-year relative survival of tongue cancer, Australia, 1982 to 2007

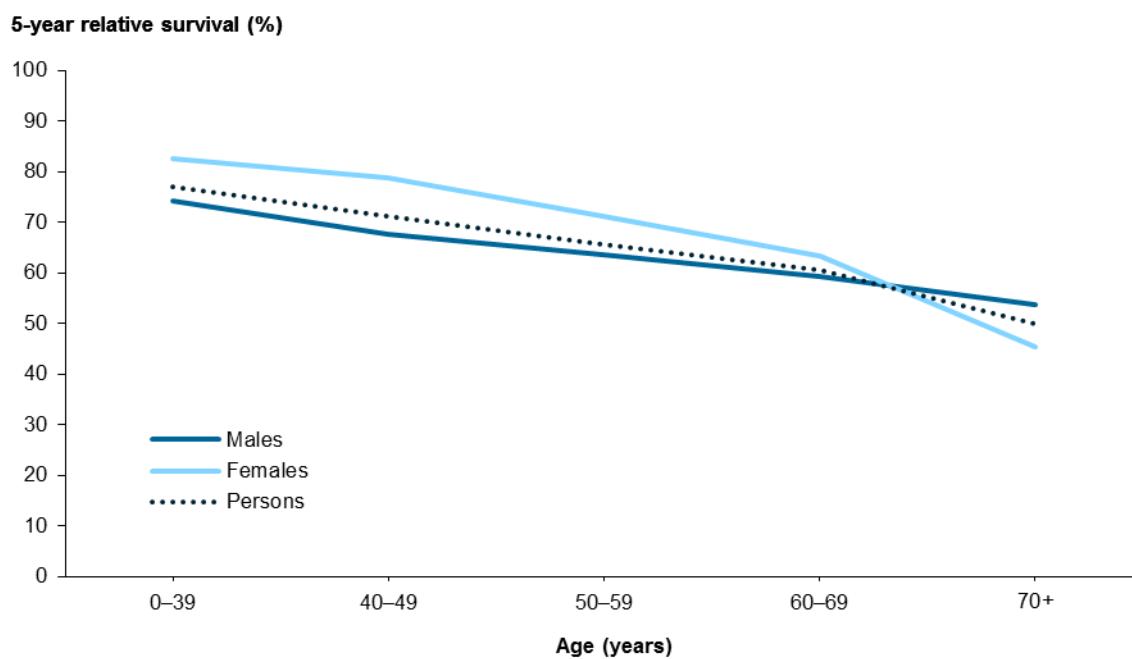


Note: Data for this figure are presented in online tables S27.1 and S27.4.

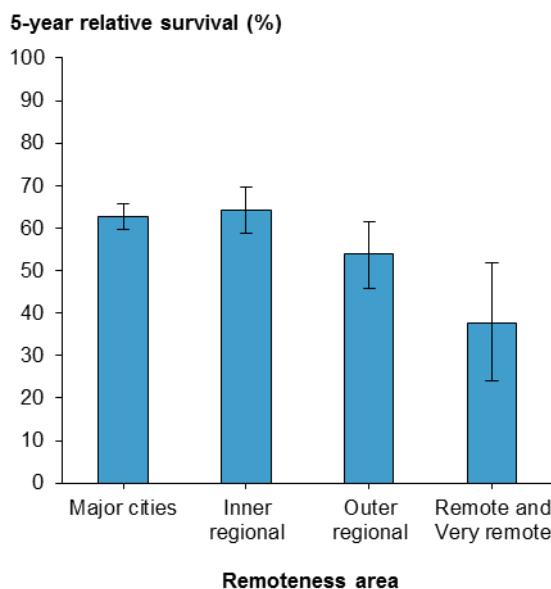
Source: AIHW Australian Cancer Database (2007).

Figure 4.77: Relative survival at diagnosis and 5-year conditional relative survival from tongue cancer, Australia, 2006–2010

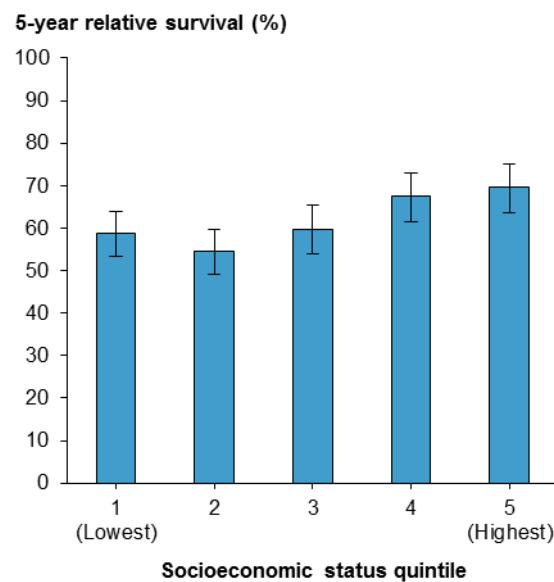
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S27.5 and S27.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.78: Five-year relative survival from tongue cancer by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Cancer of unknown primary site (C80)

Snapshot: in 2006–2010, individuals with cancer of unknown primary site had a 16% chance of surviving for at least 5 years compared with the general population.

Cancer of unknown primary site is diagnosed where cancer is found in the body but the original site where the cancer began cannot be determined. In Australia, it was the seventh most common cancer diagnosed and the fifth most common cause of cancer death, representing almost 6% of all cancer deaths in 2007. While it has been traditionally regarded as metastatic cancer, it is being increasingly recognised as clinically and biologically distinct, characterised by rapid progression and atypical spread (Tracey et al. 2008).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of cancer of unknown primary site decreased, from a peak of almost 20 new cases per 100,000 in 1991 to 13 new cases in 2007. Mortality increased throughout the 1980s before dropping to 10 deaths per 100,000 in 2007 – the same rate as in 1982.

Survival from cancer of unknown primary site remained virtually unchanged until the 2000s, after which there were considerable improvements. Between the periods 1994–1999 and 2006–2010, 5-year survival more than doubled from 6.2% to 16%.

Survival in the period 2006–2010

Sex: Unlike many other cancers, males tended to have a survival advantage over females. Five-year survival was 18% for males compared with 13% for females.

Age: Five-year survival was highest for age groups under 50 and fell steadily with age thereafter. It was 50% for those aged under 40 and 39% for those in their 40s, compared with 4.6% for those aged 80 and over.

Population group: Survival did not differ significantly by remoteness. However, there was a gradient of decreasing survival with greater socioeconomic disadvantage. Five-year survival was significantly higher in the highest socioeconomic status quintile (20%) compared with the three lowest quintiles (13%–15%).

Conditional survival

Conditional survival showed considerable gains with the number of years already survived. The probability of surviving for at least 5 more years was 16% at diagnosis compared with 61% by 1 year after diagnosis. By 13 years after diagnosis, 5-year conditional survival had exceeded 100% – that is, survival prospects were the same as those in the general population.

Prevalence at the end of 2007

At the end of 2007, there were about 6,200 Australians alive who were diagnosed with cancer of unknown primary site in the previous 26 years, including 3,300 diagnosed in the previous 5 years. This represented a 26-year prevalence of 29 people per 100,000 population.

Table 4.79: Summary of new cases, deaths and prevalence for cancer of unknown primary site, Australia, 1982–2010

Sex	No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
				No. as at end of 2007	Rate per 100,000 population
Males	34,616	32,028	1,835	3,506	33.2
Females	31,124	29,144	1,424	2,712	25.4
Persons	65,740	61,172	3,259	6,218	29.3

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.80: Summary of relative survival from cancer of unknown primary site, Australia, 1982–1987 to 2006–2010

Time period/Sex	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
2006–2010						
Males	27.8	26.2–29.4	18.1	16.8–19.4	14.8	13.6–16.1
Females	21.5	20.1–23.0	13.1	12.1–14.3	10.9	9.9–12.0
Persons	24.8	23.7–25.8	15.7	14.8–16.5	12.9	12.1–13.8
<i>Previous time periods</i>						
1982–1987	12.0	11.5–12.5	5.6	5.1–6.1	n.a.	n.a.
1988–1993	13.2	12.7–13.7	6.4	6.1–6.8	5.7	5.3–6.2
1994–1999	12.9	12.4–13.3	6.2	5.8–6.5	5.6	5.2–5.9
2000–2005	17.5	17.0–18.1	9.0	8.6–9.5	7.6	7.1–8.0

Note: Additional data are presented in online tables S28.1 and S28.2.

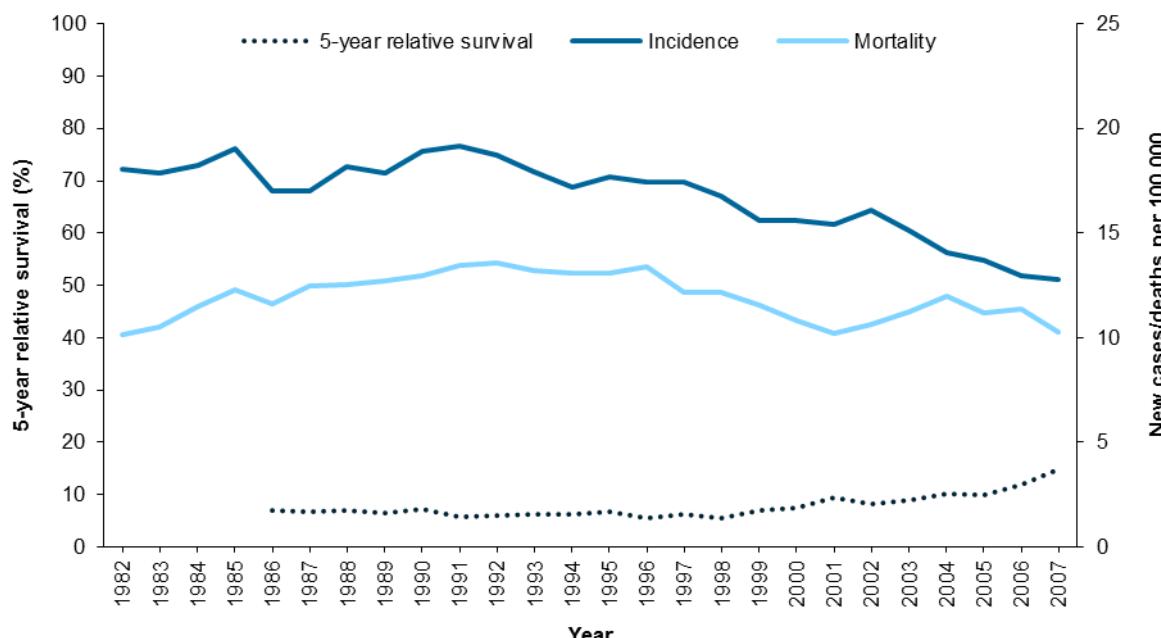
Source: AIHW Australian Cancer Database (2007).

Table 4.81: Summary of conditional relative survival from cancer of unknown primary site, Australia, 2006–2010

Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	15.7	14.8–16.5
Already survived 1 year after diagnosis	60.9	58.0–63.8
Already survived 5 years after diagnosis	82.2	79.4–84.9
Already survived 10 years after diagnosis	96.1	93.2–99.1

Note: Additional data are presented in online Table S28.4.

Source: AIHW Australian Cancer Database (2007).

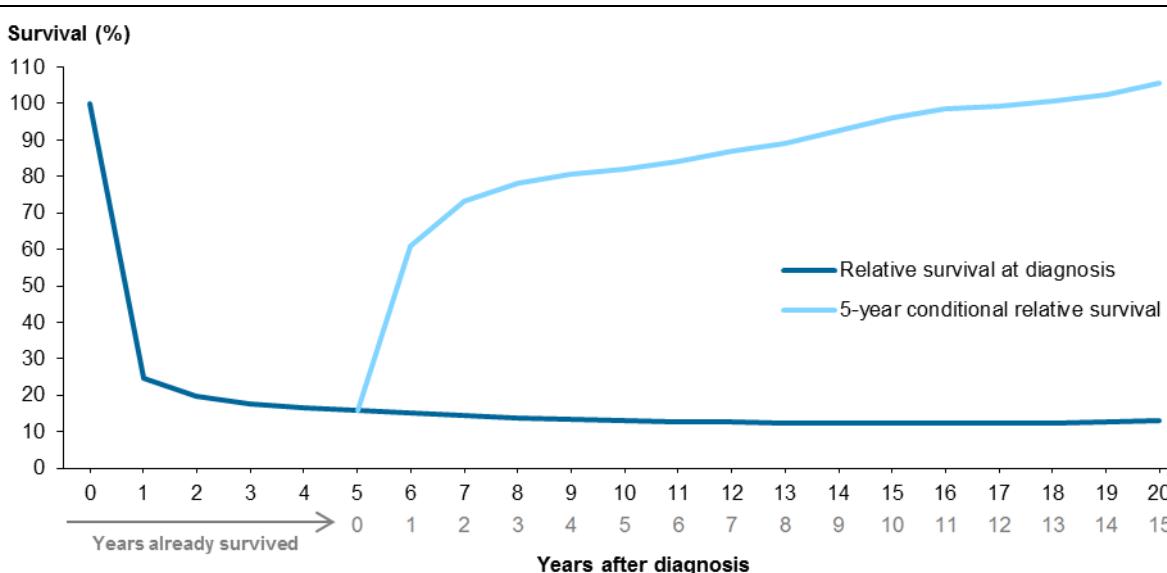


Notes

1. Incidence and mortality rates are age standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.
2. Survival data for this figure are presented in online Table S28.3.

Source: AIHW Australian Cancer Database (2007); AIHW 2010b.

Figure 4.79: Yearly trends in incidence, mortality and 5-year relative survival of cancer of unknown primary site, Australia, 1982 to 2007

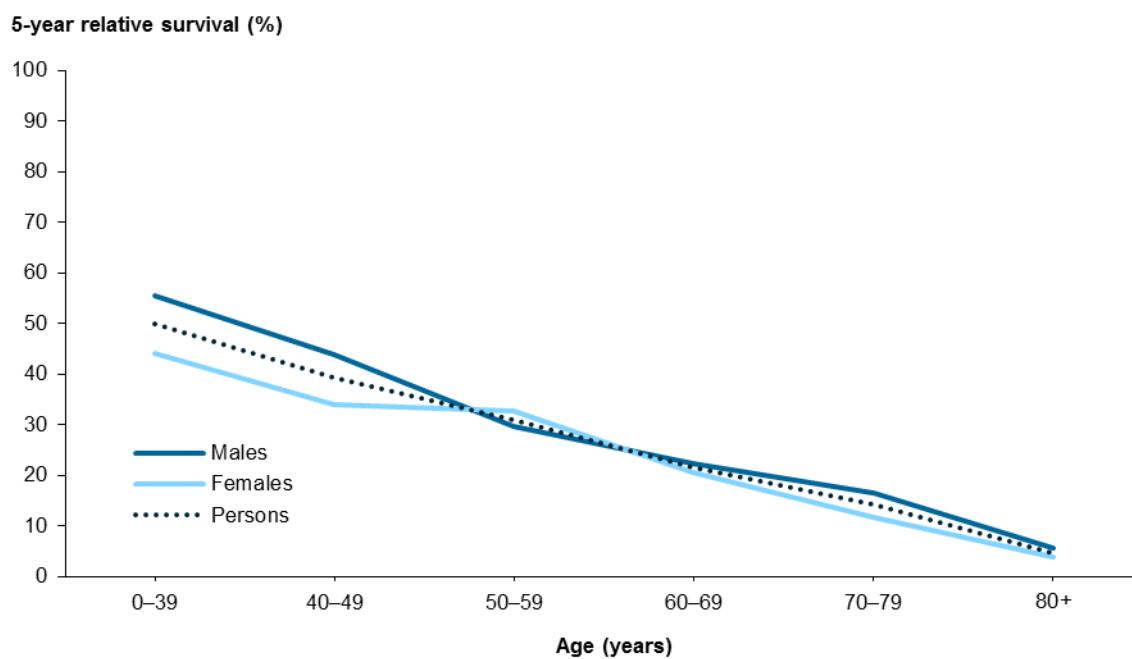


Note: Data for this figure are presented in online tables S28.1 and S28.4.

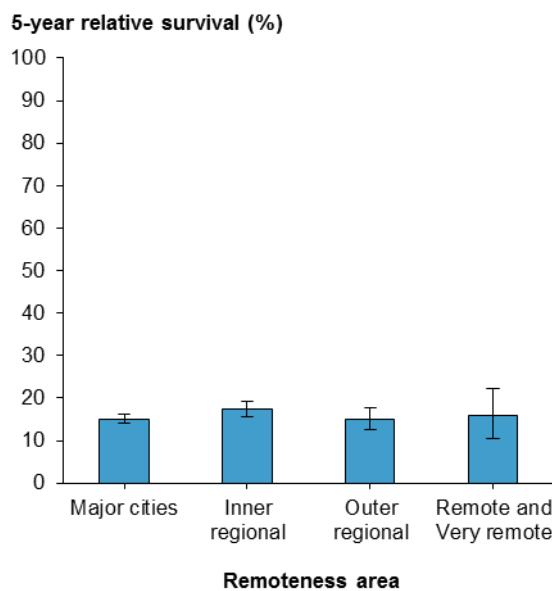
Source: AIHW Australian Cancer Database (2007).

Figure 4.80: Relative survival at diagnosis and 5-year conditional relative survival from cancer of unknown primary site, Australia, 2006–2010

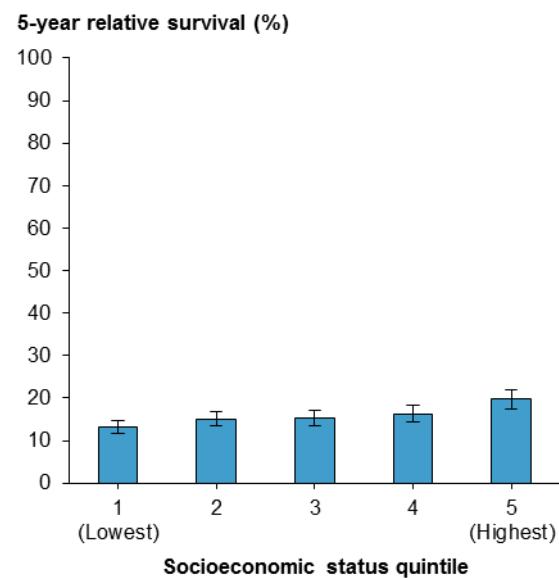
A. Sex and age



B. Remoteness



C. Socioeconomic status



Notes

- Error bars represent 95% confidence intervals.
- Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
- Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
- Data for this figure are presented in online tables S28.5 and S28.6.

Source: AIHW Australian Cancer Database (2007).

Figure 4.81: Five-year relative survival from cancer of unknown primary site by sex and age (A), remoteness (B) and socioeconomic status (C), Australia, 2006–2010

Uterine cancer (C54–C55)

Snapshot: in 2006–2010, women with uterine cancer had an 82% chance of surviving for at least 5 years compared with the general population.

Uterine cancer (which includes endometrial cancer) was the most common gynaecological cancer in Australia. Among women, it was the fifth most common cancer, accounting for 4.2% of all cancers. It was a rare cause of cancer death, ranked thirteenth for mortality. The prognosis of uterine cancer is generally good, partly because it is often diagnosed at an early stage (Cooper et al. 2008; NCI 2011d).

Incidence, mortality and survival trends

Between 1982 and 2007, incidence of uterine cancer increased from 14 to 17 new cases per 100,000. Mortality changed very little, dropping from 3.3 to 2.7 deaths per 100,000.

Survival from uterine cancer also improved over time: 5-year survival increased steadily between the periods 1982–1987 and 2006–2010, from 75% to 82%.

Survival in the period 2006–2010

Age: Survival was high for all age groups under 60 and dropped with age thereafter. Five-year survival was about 90% for women aged under 60 compared with 59% for women aged 80 and over.

Histology: There were distinct differences in survival by histological subtype. The most common type of uterine cancer is adenocarcinoma, which develops from the glandular tissue lining the uterus or endometrium. It had the highest 5-year survival at 87%. Uterine sarcoma is rarer and develops from the muscles or other tissues of the uterus. It had considerably lower 5-year survival at 46%.

Population group: Survival did not differ significantly by remoteness or by socioeconomic status.

Conditional survival

At diagnosis, the probability of surviving for at least 5 years was 82%. By 1 year after diagnosis, the probability of surviving for at least 5 more years had grown to 88%, and by 5 years after diagnosis it had grown to 96%.

Prevalence at the end of 2007

Uterine cancer had a relatively high prevalence because of its high incidence and good survival outcomes. At the end of 2007, there were about 21,100 women in Australia who were diagnosed with uterine cancer in the previous 26 years, including around 7,700 diagnosed in the previous 5 years. This equated to a 26-year prevalence of 198 women per 100,000 female population.

Table 4.82: Summary of new cases, deaths and prevalence for uterine cancer, Australia, 1982–2010

No. of new cases in 1982–2007	No. of subsequent deaths to 2010	5-year prevalence as at end of 2007	26-year prevalence	
			No. as at end of 2007	Rate per 100,000 population
34,724	16,003	7,657	21,098	197.6

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database (2007).

Table 4.83: Summary of relative survival from uterine cancer, Australia, 1982–1987 to 2006–2010

Time period	1-year relative survival		5-year relative survival		10-year relative survival	
	RS (%)	95% CI	RS (%)	95% CI	RS (%)	95% CI
1982–1987	88.5	87.5–89.4	74.7	72.9–76.5	n.a.	n.a.
1988–1993	90.8	90.0–91.5	78.1	76.8–79.3	73.2	71.4–74.9
1994–1999	91.2	90.5–91.9	79.6	78.5–80.7	75.4	74.0–76.8
2000–2005	92.0	91.4–92.5	80.9	79.9–81.9	76.8	75.6–78.1
2006–2010	92.8	92.0–93.6	82.0	80.8–83.1	78.5	77.2–79.9

Note: Additional data are presented in online tables S29.1 and S29.2.

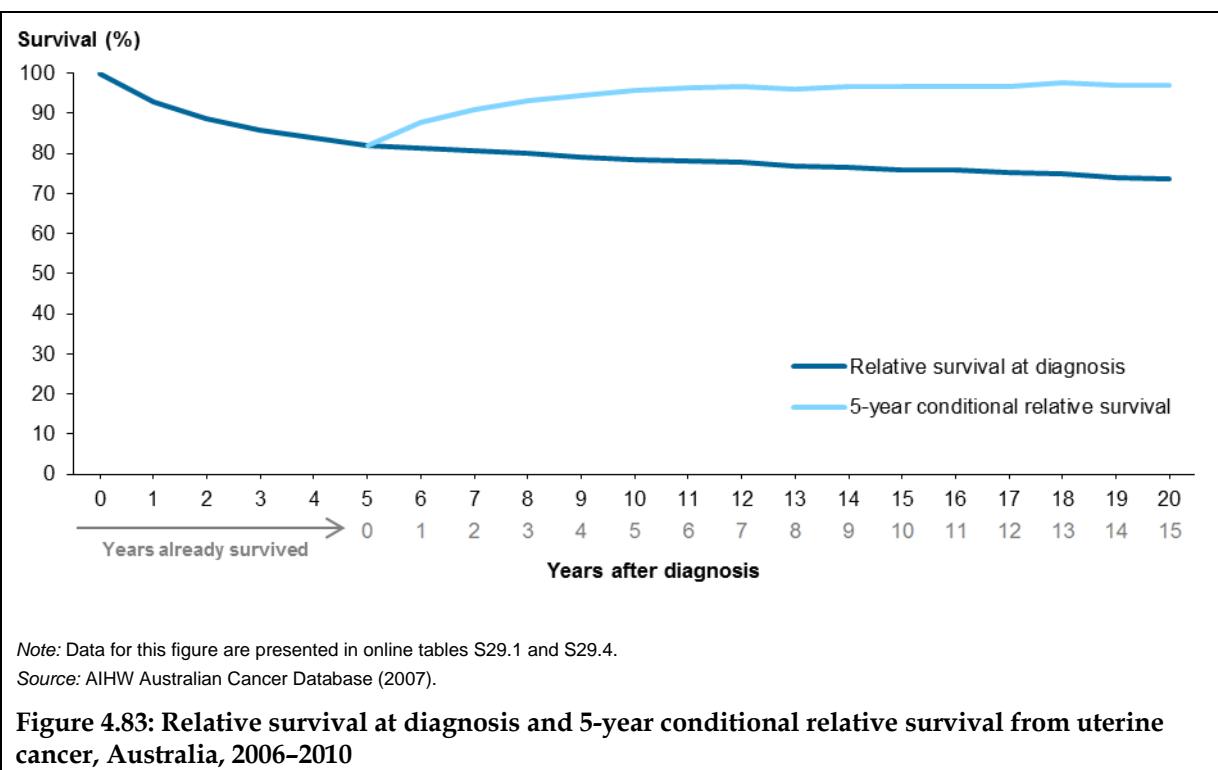
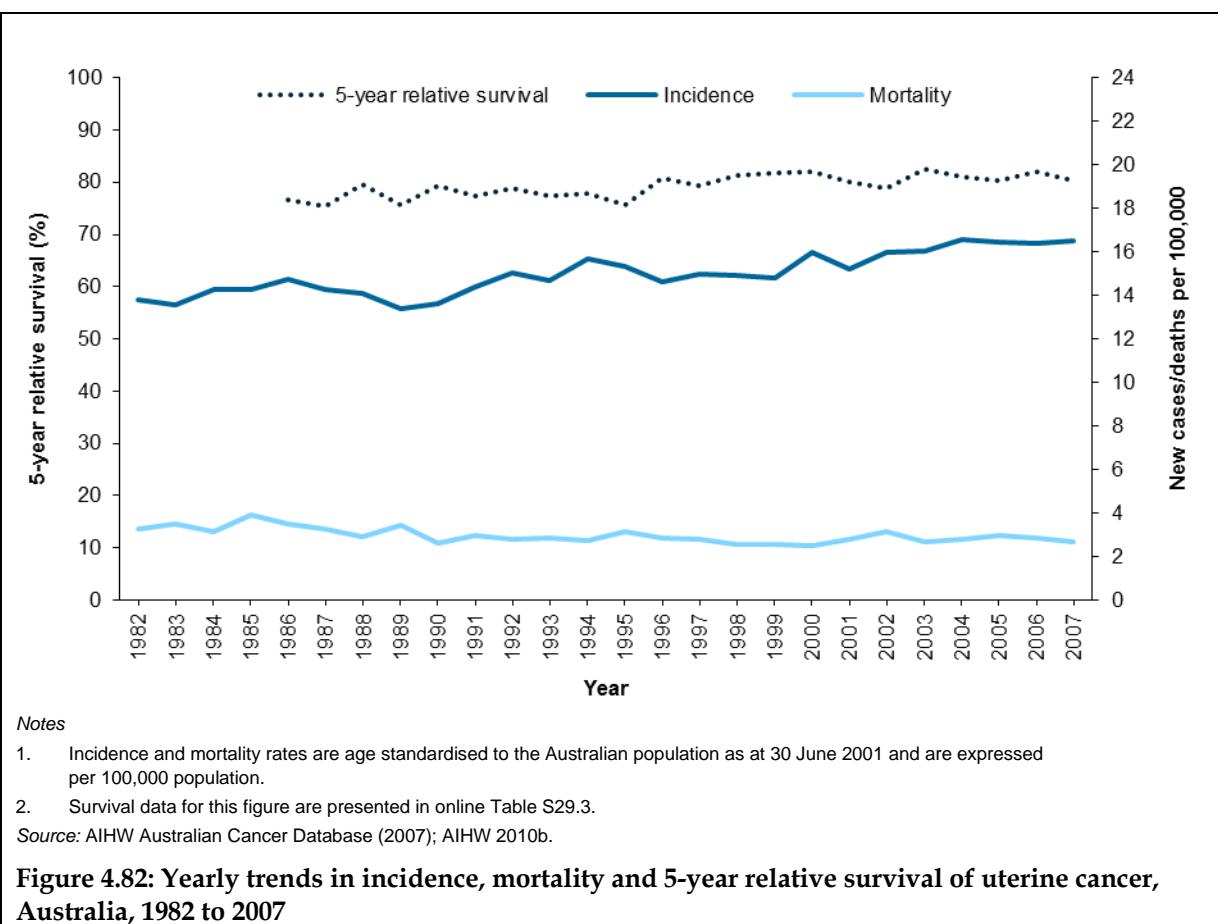
Source: AIHW Australian Cancer Database (2007).

Table 4.84: Summary of conditional relative survival from uterine cancer, Australia, 2006–2010

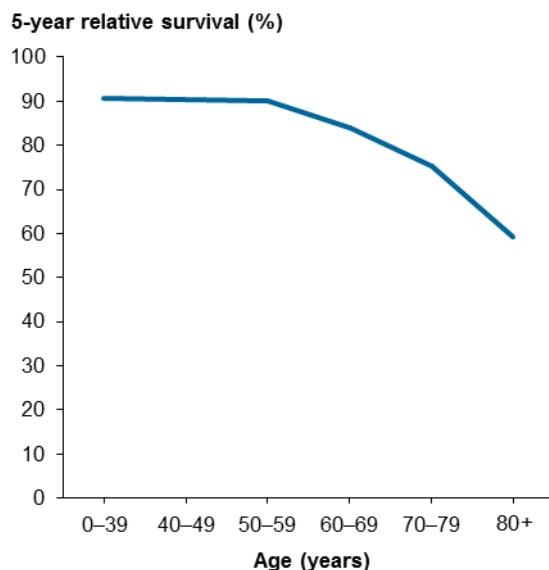
Years already survived	5-year conditional relative survival	
	CS (%)	95% CI
At diagnosis	82.0	80.8–83.1
Already survived 1 year after diagnosis	87.6	86.6–88.6
Already survived 5 years after diagnosis	95.7	94.9–96.6
Already survived 10 years after diagnosis	96.7	95.6–97.8

Note: Additional data are presented in online Table S29.4.

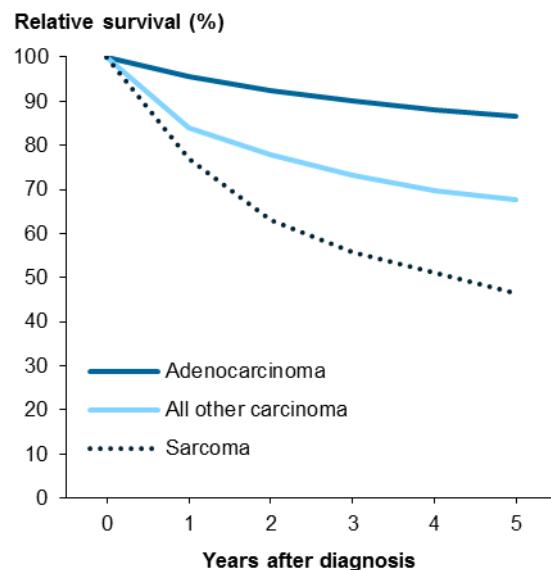
Source: AIHW Australian Cancer Database (2007).



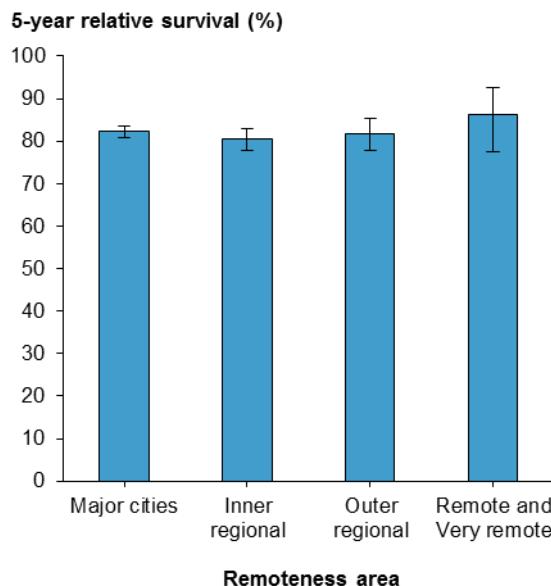
A. Age



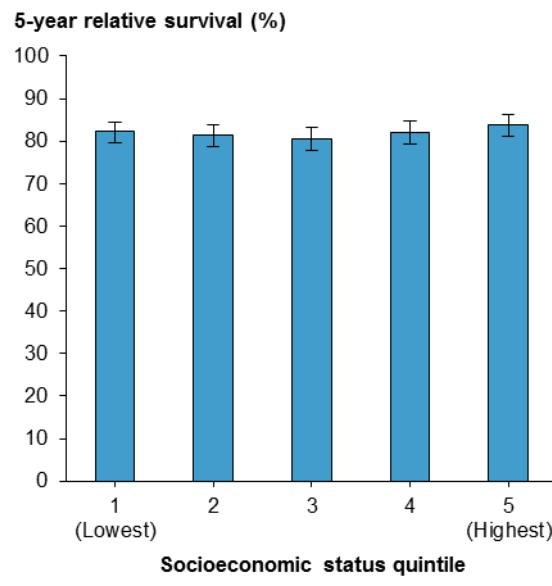
B. Histology



C. Remoteness



D. Socioeconomic status



Notes

1. Error bars represent 95% confidence intervals.
2. Remoteness is classified according to the Australian Standard Geographical Classification (ASGC) Remoteness Areas (see Appendix E).
3. Socioeconomic status is classified according to the ABS Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage (see Appendix E).
4. Data for this figure are presented in online tables S29.5, S29.6 and S29.7.

Source: AIHW Australian Cancer Database (2007).

Figure 4.84: Relative survival from uterine cancer by age (A), histology (B), remoteness (C) and socioeconomic status (D), Australia, 2006–2010

Appendix A: Guide to online supplementary data

Supplementary data are available as online Excel tables at <www.aihw.gov.au>. These tables contain detailed statistics, some of which are presented in summary form in the body of the report. Throughout the report, online supplementary tables are referred to with an 'S', for example, 'See online Table S1.1'.

There are 29 Excel files in total, representing 28 individual cancers as well as all cancers combined. Each Excel file contains the following worksheets:

- **Title page**
- **Explanatory notes**, including explanations for abbreviations and symbols
- **Table of contents**, including hyperlinks to each of the tables below
- **Table Sx.1**: survival by sex in the period 2006–2010
- **Table Sx.2**: survival by sex and time period, 1982–1987 to 2006–2010
- **Table Sx.3**: yearly trends in survival from 1986 to 2007
- **Table Sx.4**: 5-year conditional survival in the period 2006–2010
- **Table Sx.5**: survival by sex and age in the period 2006–2010
- **Table Sx.6**: survival by histology (or tumour thickness for melanoma of the skin) in the period 2006–2010 (for selected cancers)
- **Table Sx.6/7**: 1- and 5-year survival by remoteness and socioeconomic status in the period 2006–2010
- **Table Sx.7/8**: limited-duration prevalence at the end of 2007
- **Table Sx.8/9**: 26-year prevalence at the end of 2007

Appendix B: Survival estimates using the cohort method

Survival estimates using the cohort method are presented in Table B.1 for comparison with period estimates in this report. The cohort method focuses on a cohort of people diagnosed with cancer and follows this cohort over time whereas the period method focuses on the survival experience of a group of people in a recent time period.

Cohort estimates in Table B.1 are based on the 5-year survival experience of individuals diagnosed with cancer in 2003–2007. Figure B.1. illustrates the years of diagnosis and follow-up of cancer cases contributing to survival using the cohort method.

In general, cohort survival estimates for cancers diagnosed in 2003–2007 were similar to period estimates of survival for 2006–2010. Five-year survival from all cancers combined was 64% for males and 66% for females using the cohort method, compared with 65% and 67%, respectively, using the period method. For most individual cancers, the difference was within two percentage points. For males, survival from myeloma and cancer of unknown primary site was noticeably higher using the period method compared with the cohort method. For females, survival from cancers of the brain, kidney and unknown primary site was noticeably higher using the period method compared with the cohort method.

Year of diagnosis	Year of follow-up										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
2000	1	1/2	2/3	3/4	4/5	5/6	6/7	7/8	8/9	9/10	10/11
2001		1	1/2	2/3	3/4	4/5	5/6	6/7	7/8	8/9	9/10
2002			1	1/2	2/3	3/4	4/5	5/6	6/7	7/8	8/9
2003				1	1/2	2/3	3/4	4/5	5/6	6/7	7/8
2004					1	1/2	2/3	3/4	4/5	5/6	6/7
2005						1	1/2	2/3	3/4	4/5	5/6
2006							1	1/2	2/3	3/4	4/5
2007								1	1/2	2/3	3/4

Notes

- Entries in table cells indicate the number of years of follow-up for a person with a given combination of diagnosis and follow-up calendar years. For example, a person diagnosed with cancer in 2007 and followed up in 2007 would be undergoing their first year of follow-up, while a person diagnosed with cancer in 2007 and followed up in 2008 would be undergoing their first or second year of follow-up during this time (depending on which part of the year diagnosis and follow-up took place).
- The dashed box indicates the years of diagnosis and follow-up using the cohort method with a cohort of cancer cases diagnosed in 2003–2007.

Figure B.1: Years of diagnosis and follow-up for 5-year relative survival using the cohort method

Table B.1: Five-year relative survival calculated using the cohort method, Australia, cancers diagnosed in 2003–2007

Males				Females			
Site/type	RS (%)	95% CI	Δ ^(a)	Site/type	RS (%)	95% CI	Δ ^(a)
Testis	97.4	96.7–98.0	↗	Thyroid	97.0	96.3–97.6	↗
Lip	93.3	91.7–94.8	→	Melanoma of the skin	93.9	93.4–94.5	↗
Prostate	91.5	91.2–91.9	↗	Lip	92.9	89.9–95.6	→
Thyroid	90.8	89.1–92.5	↗	Breast	89.1	88.8–89.5	↗
Melanoma of the skin	88.8	88.2–89.3	↗	Hodgkin lymphoma	87.8	85.5–89.8	↗
Hodgkin lymphoma	85.1	82.8–87.2	↗	Uterus	81.2	80.2–82.2	↗
Chronic lymphocytic leukaemia	70.9	68.7–73.1	→	Chronic lymphocytic leukaemia	74.5	71.7–77.3	→
Kidney	70.6	69.3–71.8	↗	Cervix	72.3	70.7–73.9	↗
Non-Hodgkin lymphoma	69.0	67.9–70.1	↗	Kidney	70.2	68.5–71.9	↗
Larynx	64.1	61.8–66.3	→	Non-Hodgkin lymphoma	69.7	68.5–70.8	↗
Bowel	64.1	63.5–64.7	↗	Bowel	65.6	64.9–66.2	↗
Bladder	60.3	58.9–61.6	↘	Larynx	63.0	56.3–69.3	→
Tongue	59.9	57.3–62.5	↗	Tongue	62.6	58.7–66.2	→
Myeloma	41.7	39.7–43.7	↗	Bladder	50.1	47.9–52.3	↘
Stomach	25.6	24.4–26.9	↗	Myeloma	42.2	40.0–44.3	↗
Acute myeloid leukaemia	22.1	20.5–23.8	↗	Ovary	41.9	40.6–43.3	↗
Gallbladder	21.2	18.8–23.7	↗	Stomach	26.0	24.4–27.7	↗
Brain	19.2	18.0–20.5	→	Acute myeloid leukaemia	24.0	22.1–26.0	↗
Oesophagus	14.9	13.7–16.2	↗	Brain	21.9	20.4–23.4	→
Liver	14.6	13.5–15.9	↗	Gallbladder	17.2	15.3–19.2	↗
Unknown primary site	14.4	13.6–15.2	↗	Oesophagus	17.0	15.2–19.0	↗
Lung	11.9	11.5–12.3	↗	Lung	15.6	15.1–16.2	↗
Mesothelioma	5.2	4.3–6.3	→	Liver	13.8	12.0–15.6	→
Pancreas	4.8	4.2–5.4	↗	Mesothelioma	10.3	7.7–13.4	→
				Unknown primary site	10.2	9.5–10.8	↗
				Pancreas	5.3	4.7–6.0	↗
All cancers combined^(b)	63.6	63.4–63.8	↗	All cancers combined^(b)	66.1	65.9–66.4	↗

(a) Indicates the direction of any statistically significant change in 5-year relative survival between cancers diagnosed in 1982–1986 and 2003–2007. For mesothelioma in females, data for 1987–1993 were applied for the earlier period due to small numbers.

(b) Includes cancers coded in ICD-10 as C00–C96, D45, D46, D47.1 and D47.3 with the exception of those C44 codes which indicate a basal cell or squamous cell carcinoma of the skin.

Note: Survival trends for males and females separately may differ from trends for persons (males and females combined).

Source: AIHW Australian Cancer Database (2007).

Appendix C: Data sources

Australian Cancer Database

The Australian Cancer Database (ACD) was the primary data source for this report. The ACD holds information on about 2 million cancer cases of Australians who were diagnosed with cancer (other than basal cell and squamous cell carcinoma of the skin) between 1982 and 2007.

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. 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 are not part of the agreed ACD data set but are regularly provided by the state and territory registries.

Once the data are received, 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; this process reduces 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 such that records in the state and territory cancer registries may be modified if new information is received. The records in the cancer registries are always open and they are updated as required. In order 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 2010c).

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

Data Quality Statement: Australian Cancer Database

Important note

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 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 ACD 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. The 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/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 ACD, the only repository of national cancer incidence data.

Institutional environment

The 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 (Commonwealth)*, 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 <<http://www.aihw.gov.au/>>

The AIHW has been maintaining the ACD since 1986.

Timeliness

The version of the ACD used in this analysis contained data on all cancer cases diagnosed between 1982 and 2007.

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 of the AIHW 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/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 (for example, 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, and so forth; 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 classified according to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10).

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 to find out which of their study subjects 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 about every 5 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.

While all state and territory cancer registries collect information on Indigenous status, in some jurisdictions the level of identification of Indigenous Australians is considered to be insufficient 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, for example, the tumour was in fact benign, or the person is found to be not a resident of that state/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. While there are sometimes changes to coding for particular cancers, it is possible to map coding changes to make meaningful comparisons over time.

National Death Index

Additional information on deaths relating to all cancer cases was sourced from the National Death Index (NDI). While cancer registry data already include information on deaths, the ACD is routinely linked to the NDI to identify any remaining deaths, including those that occurred in a different state or territory to the cancer diagnosis.

The NDI is maintained by the AIHW and is a national database of all deaths that have occurred in Australia since 1980. The NDI is designed for record linkage purposes in order to facilitate epidemiological studies and health research. It contains a variety of identifiers useful for linkage, including names, sex, date of birth, date of death and state of death registration. These data are supplied monthly by state and territory Registrars of Births, Deaths and Marriages.

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 NDI is a database, housed at the 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 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 (Commonwealth)*, 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 (NMD), which records the underlying and other causes of death as ICD10 codes derived by the Australian Bureau of Statistics (ABS) 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 NDI 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; and
- 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/territory of registration, registration number. 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 NDI registration numbers for deaths with the NMD. This latter data base 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 NDI 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 utilised 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 remains 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 NMD, by linking it to the NDI. The causes of death are coded using the International Classification of Diseases (ICD) that 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 Mortality Database

Data from the NMD were used in combination with ABS population data to derive life tables for producing expected survival. The NMD was also the source of age-standardised cancer mortality rates presented at the beginning of each cancer summary.

The NMD is maintained by the AIHW and currently contains information for all deaths in Australia registered from 1964 to 2007. Unlike the NDI, which is used for linkage purposes to update other data collections with death status, the NMD is used chiefly for data analysis and health research. The database is often used for cause of death analysis, and contains demographic information for analysis by population groups such as age, sex, Indigenous status, country of birth and geographic location.

The registration of deaths has been compulsory since the mid-1850s. This information is sourced from the Registrars of Births, Deaths and Marriages in each jurisdiction, and from the National Coroners Information System. Since 1906, the Commonwealth Statistician has

compiled the information collected by the Registrars and published national death information.

Estimated resident populations

ABS estimated resident populations were used in combination with national mortality data to derive life tables for producing expected survival.

To derive their estimates of the resident populations, the ABS uses the five-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 (approximately 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>.

Appendix D: Classifications of cancers

The definitions of individual cancers in this report are consistent with those in *Cancer in Australia: an overview, 2010* (AIHW & AACR 2010). Cancers were coded according to the tenth version of the International Statistical Classification of Diseases and Related Health Problems (ICD-10). This classification is primarily based on cancer site (for example, breast, lung and liver cancer) or, in the case of cancers of the blood and lymphatic systems, according to current understanding and histology of these cancers.

Some cancers were further analysed by their histological subtype, with the exception of melanoma of the skin, which was analysed by tumour thickness. Histological subtypes were mainly based on the recommendations by the International Agency for Research on Cancer (Egevad et al. 2007) with further adjustments based on discussion with cancer coding staff. For cancers of the breast, cervix, lung, ovary and uterus, histological subtypes were based on those defined in other AIHW cancer-specific reports. All cancer histologies were coded according to the third edition of the International Classification of Diseases for Oncology (ICD-O-3). Table D.1 lists the cancer types and subtypes presented in this report, accompanied by their ICD-10 and ICD-O-3 codes.

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 to recognise new diseases, increased knowledge of diseases, and changing terminology in the description of diseases. The version that is 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 Classification of Diseases for Oncology

Cancers were originally classified solely under the ICD classification system, based on topographic site and behaviour. However, during the creation of the ninth revision of ICD in the late 1960s, working parties suggested the creation of a separate classification for cancers that included improved morphological information. The first edition of the International Classification of Diseases for Oncology (ICD-O) was subsequently released in 1976. In this classification, cancers were coded by both morphology (histology type and behaviour) and topography (site). Since the first edition of the ICD-O, a number of revisions have been made, mainly in the area of lymphomas and leukaemias. The current edition, the third edition, was released in 2000 (Fritz et al. 2000). It is currently used by most state and territory cancer registries in Australia, as well as by the AIHW for the Australian Cancer Database.

Table D.1: Definitions of cancer types and subtypes in this report

Cancer type/site (ICD-10 codes)	Histological subtype	ICD-O-3 codes
Acute myeloid leukaemia (C92.0, C92.3–C92.5, C93.0, C94.0, C94.2, C94.4, C94.5)	..	..
Bladder (C67)	Squamous cell carcinoma	8051–8078, 8083–8084
	Papillary transitional cell carcinoma	8130
	All other transitional cell carcinoma	8050, 8120–8122, 8131
	Adenocarcinoma	8140–8145, 8190–8231, 8260–8263, 8310, 8401, 8480–8490, 8550–8551, 8570–8574, 8576
Bowel (C18–C20)	Adenocarcinoma, NOS	8140
	Mucinous adenocarcinoma	8480
	Adenocarcinoma in tubulovillous adenoma	8263
	Adenocarcinoma in adenomatous polyp	8210
	Adenocarcinoma in villous adenoma	8261
Brain (C71)	Astrocytoma	9384, 9400–9421, 9424, 9440–9442
	Oligodendrogloma	9382, 9450–9451
	Ependymoma	9383, 9391–9394
	Other glioma	9380–9381, 9423, 9430, 9444, 9460
	Medulloblastoma	9470–9472, 9474
Breast (C50)	Invasive ductal carcinoma	8231, 8500, 8521–8523, 8541, 8543
	Invasive lobular carcinoma	8520, 8524
	Mucinous carcinoma	8430, 8480–8481, 8490
	Tubular and invasive cribriform carcinoma	8201, 8211
Cervix (C53)	Squamous cell carcinoma	8050–8078, 8083–8084
	Adenocarcinoma	8140–8141, 8190–8211, 8230–8231, 8260–8263, 8310, 8380, 8382–8384, 8440–8490, 8570–8574, 8576
	Adenosquamous carcinoma	8560
Chronic lymphocytic leukaemia (C91.1)	..	..
Gallbladder and bile ducts (C23–C24)	..	..

(continued)

Table D.1 (continued): Definitions of cancer types and subtypes in this report

Cancer type/site (ICD-10 codes)	Histological subtype	ICD-O-3 codes
Hodgkin lymphoma (C81)	..	..
Kidney (C64)	Renal cell carcinoma	8050, 8140, 8260, 8270, 8280–8312, 8316–8320, 8340–8344
	All other carcinoma	8010–8576 (excluding codes for renal cell carcinoma)
Larynx (C32)	..	..
Lip (C00)	..	..
Liver (C22)	Hepatocellular carcinoma	8170–8176
	Cholangiocarcinoma	8050, 8140–8141, 8160–8161, 8260, 8440, 8480–8500, 8570–8572
Lung (C33–C34)	Small cell carcinoma	8041–8045, 8246
	Squamous cell carcinoma	8050–8078, 8083–8084
	Adenocarcinoma	8140, 8211, 8230–8231, 8250–8260, 8323, 8480–8490, 8550–8551, 8570–8574, 8576
	Large cell carcinoma	8010–8012, 8014–8031, 8035, 8310
Melanoma of the skin (C43)	..	..
Mesothelioma (C45)	..	..
Myeloma (C90)	..	..
Non-Hodgkin lymphoma (C82–C85)	Diffuse large B-cell lymphoma	9678, 9679, 9680
	Follicular lymphoma	9690, 9691, 9695, 9698
	Peripheral T-cell lymphoma	9702, 9705, 9708, 9709, 9714, 9716, 9717
	Marginal zone lymphoma	9689, 9699
	Mantle cell lymphoma	9673
Oesophagus (C15)	Squamous cell carcinoma	8050–8078, 8083–8084
	Adenocarcinoma	8140–8141, 8143–8145, 8190–8231, 8260–8263, 8310, 8401, 8480–8490, 8550–8551, 8570–8574, 8576
Ovary (C56)	Serous carcinoma	8441, 8460–8463, 9014
	Mucinous carcinoma	8470–8490, 9015
	Endometrioid carcinoma	8380–8383, 8560, 8570
	Clear cell carcinoma	8310–8313, 9110
	Adenocarcinoma, NOS	8140–8147, 8170–8190, 8211–8231, 8260, 8384, 8440, 8576
Pancreas (C25)	..	..
Prostate (C61)	..	..

(continued)

Table D.1 (continued): Definitions of cancer types and subtypes in this report

Cancer type/site (ICD-10 codes)	Histological subtype	ICD-O-3 codes
Stomach (C16)	..	..
Testis (C62)		
	Seminoma, including spermatocytic seminoma	9060–9064
	Other germ cell tumour	9065–9102
Thyroid (C73)		
	Follicular carcinoma	8290, 8330–8335
	Papillary carcinoma	8050, 8260, 8340–8344, 8350, 8450–8460
	Medullary carcinoma	8345, 8510–8513
Tongue (C01–C02)	..	..
Unknown primary site (C80)	..	..
Uterus (C54–C55)		
	Adenocarcinoma	8140–8141, 8190–8211, 8230–8231, 8260–8263, 8310, 8380, 8382–8384, 8430, 8440–8490, 8510, 8560, 8570–8574, 8576
	All other carcinoma	8010–8035, 8036–8139, 8142–8189, 8212–8229, 8232–8259, 8264–8309, 8311–8379, 8381, 8385–8429, 8431–8439, 8491–8509, 8511–8559, 8561–8569
	Sarcoma	8800–8811, 8830, 8840–8921, 8990–8991, 9040–9044, 9120–9133, 9150, 9540–9681

Appendix E: Classifications of population groups

Survival data were analysed by two types of population groups in this report: remoteness and socioeconomic status. Remoteness was classified into areas according to the Australian Standard Geographical Classification (ASGC) while socioeconomic status was classified into socioeconomic status quintiles using the Index of Relative Socio-economic Disadvantage (IRSD).

Relative survival was calculated from expected survival, which was derived from population and national mortality data, as well as observed survival, which was based on national cancer data. All three components of population, mortality and cancer data had to be classified by remoteness and socioeconomic status to produce relative survival by these two population groups.

Appendix F describes in detail the steps required for assigning remoteness and socioeconomic status to population and mortality data, which together formed the life tables used to produce expected survival.

Remoteness and socioeconomic status for cancer data were assigned using postcodes, the smallest geographical unit from the Australian Cancer Database available for analysis. Because socioeconomic status is classified using another geographical unit, the statistical local area (SLA), and because both remoteness and socioeconomic status classifications are based on data from Census years, a series of concordances were used to convert postcodes to SLAs and to adjust SLA boundaries from one year to the next. However, the precision of data on socioeconomic status for years further away from Census years may be affected due to these changing boundaries.

It should be noted that the postcode at the *time of diagnosis* was used for assigning remoteness and socioeconomic status for those with cancer. However, individuals may move to different geographic areas after their cancer diagnosis, which is not accounted for in the data.

Australian Standard Geographical Classification

The ASGC was used to assign areas across Australia to remoteness categories (ABS 2001). These remoteness categories were constructed from data on census collection districts, which aggregated into SLAs and were defined using the Accessibility/Remoteness Index for Australia (ARIA). The ARIA is a measure of the remoteness of a location from the services provided by large towns or cities.

The ASGC consists of five remoteness areas: *Major cities*, *Inner regional*, *Outer regional*, *Remote*, and *Very remote* (AIHW 2004). Because of small numbers, the latter two areas were combined for all analyses in this report. For rare cancers, all five remoteness areas were further aggregated to *Major cities* and outside *Major cities* (which comprised the remaining four remoteness areas).

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 2008). This index is based on factors such as average household income, education levels and unemployment rates. The IRSD is not a person-based measure; rather, it 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 living in that area.

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; the fifth group (labelled '5') corresponds to the 20% of the population with the highest socioeconomic status.

Appendix F: Statistical methods and technical notes

Data preparation

Definition of cancer and data extraction

The primary data source for this report was the Australian Cancer Database (ACD), a database of all new cases of cancer (excluding basal cell and squamous cell carcinoma of the skin) diagnosed in Australia since 1982. The database also excludes cases of secondary cancers, recurrences of previous primary cancers, and non-malignant tumours.

For this report, data on all cases of primary, invasive cancers diagnosed between 1982 and 2007 were extracted for analysis. 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.

Data exclusion

A number of criteria were used to determine the eligibility of cancer records for survival and prevalence analyses.

Survival: Exclusion criteria were based on standard criteria for survival analysis developed by the Australasian Association of Cancer Registries in 2005, with advice from Timo Hakulinen from the Finnish Cancer Registry.

A total of 42,031 records (2.1% of total records) were excluded because the cancer case was diagnosed based on a death certificate only, the age at diagnosis was unknown, the age on the censor date, 31 December 2010, was invalid (for example, older than 115), the diagnosis date was later than the death date, or if there was zero survival time. Some records met more than one criterion for exclusion. Table F.1 shows a summary of the number of records after these exclusion criteria were applied.

Table F.1: Summary of data exclusion for survival analysis

Types of cancer cases	Number	% of total cases
Cases included for analysis	1,929,154	97.9
Cases excluded ^(a)	42,031	2.1
Age at diagnosis unknown	189	0.0
Death certificate only diagnosis	30,868	1.6
Invalid age at censor date	125	0.0
Invalid sequence of death and diagnosis dates	27	0.0
Zero survival time	31,153	1.6
Total cases diagnosed between 1982–2007	1,971,185	100.0

(a) Some records met more than one criterion for exclusion.

Prevalence: records were excluded if the age on the prevalence index date, 31 December 2007, was deemed invalid (for example, older than 115). Thirty-three records were excluded, leaving a total of 774,674 living people at the end of 2007 diagnosed with cancer in the previous 26 years.

Calculation of relative survival

Relative survival is a measure of the survival of people with 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 as the ratio between the observed survival of those with cancer and the expected survival of the entire Australian population. The numerator and denominator are matched for sex, age, calendar year and, where applicable, remoteness area and socioeconomic status.

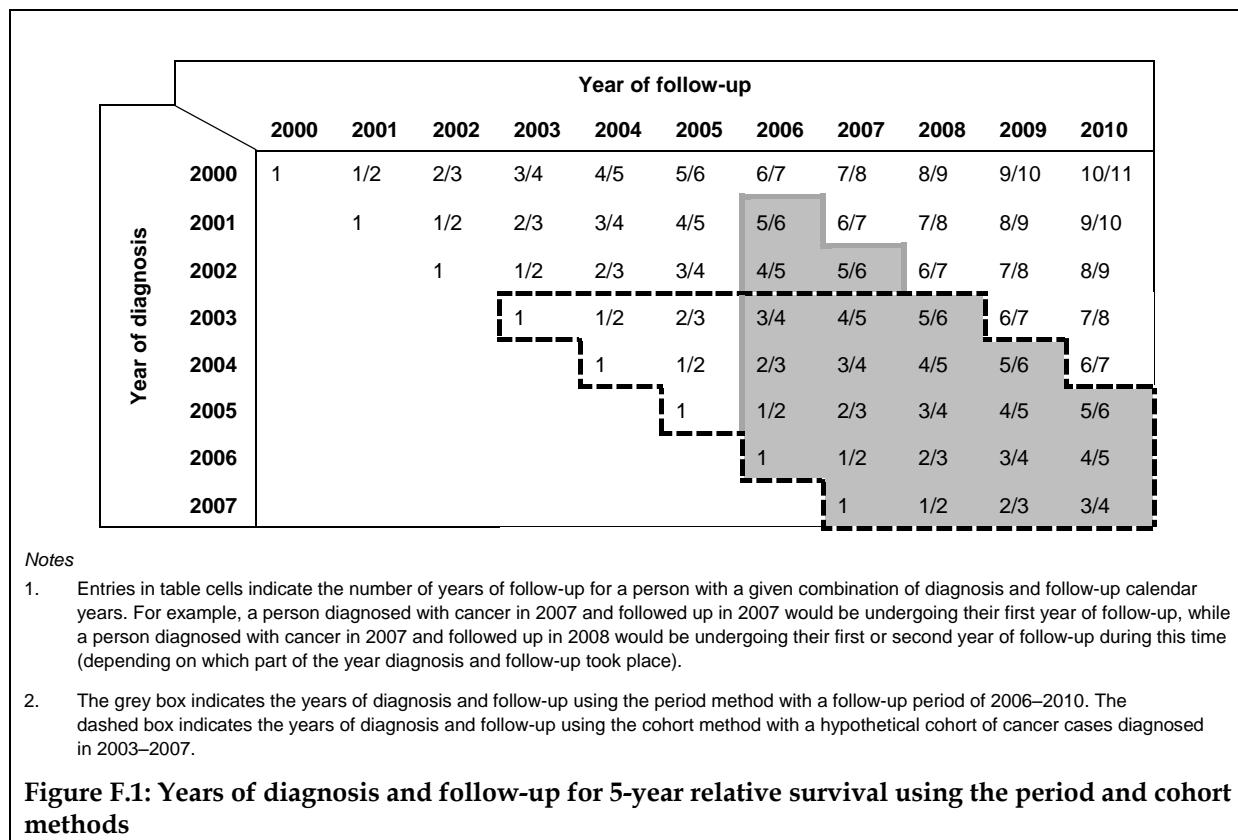
All observed survival was calculated from data in the ACD. Expected survival was calculated from the life tables of the entire Australian population, as well as the Australian population stratified by remoteness area and socioeconomic status quintile. The Ederer II method was used to determine how long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

All survival statistics in this report were produced using SAS statistical software and calculated using software written by Dickman (2004).

Period method

Survival estimates in this report were calculated using the period method (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 sex, age, histological subtype, remoteness and socioeconomic status. The years of diagnosis and follow-up for this time period are illustrated in Figure E.1 for 5-year relative survival, based on the years of data available for the ACD at the time of analysis.



Both observed and expected survival are cumulative survival proportions calculated from the product of interval-specific survivals. This can be expressed through the following formula:

$$\text{Pr}(5) = \text{Pr}(1) \times \text{Pr}(2|1) \times \text{Pr}(3|2) \times \text{Pr}(4|3) \times \text{Pr}(5|4)$$

where $\text{Pr}(n)$ is the probability of surviving at least n years and $\text{Pr}(n|n-1)$ is the probability of surviving at least n years given that the person has already survived $n-1$ years. For example, the probability of surviving to 5 years at diagnosis would be calculated from the product of the probability of surviving the first year, the probability of surviving the second year given survival of the first, the probability of surviving the third year given survival of the second, and so on until the probability of surviving the fifth year given survival of the fourth.

As survival is calculated from the product of interval-specific survival probabilities, for the period 2006–2010, the following cases contributed towards the 5-year survival rate:

- $\text{Pr}(1)$: 1-year interval-specific survivals from diagnoses in 2005–2007. In other words, 1-year interval-specific survival is calculated from those people with cancer who had a portion of their first year of life post-diagnosis overlapping with the at-risk period 2006–2010. This includes everyone diagnosed in 2006 and 2007 plus everyone diagnosed in 2005 who did not die before 2006 (on 1 January 2006 they would be part-way through their first year of life post-diagnosis). Anyone still alive at the end of 2005 who was diagnosed in 2004 or earlier had already completed their first year of life post-diagnosis and as a result were not included.
- $\text{Pr}(2 | 1)$: 2-year interval-specific survivals from diagnoses in 2004–2007
- $\text{Pr}(3 | 2)$: 3-year interval-specific survivals from diagnoses in 2003–2007
- $\text{Pr}(4 | 3)$: 4-year interval-specific survivals from diagnoses in 2002–2007
- $\text{Pr}(5 | 4)$: 5-year interval-specific survivals from diagnoses in 2001–2006. Note that because follow-up data were not available for 2011 at the time of analysis, 5-year interval specific survivals for people diagnosed in 2007 were also not available.

In sum, 5-year survival is calculated from those with cancer who had some portion of their first 5 years of life post-diagnosis overlapping the at-risk period 2006–2010. This includes everyone diagnosed in 2006 and 2007 plus everyone diagnosed in 2001–2005 who did not die before 1 January 2006. Note that there was a lag of three years between the most recent year of cancer diagnosis and the most recent year of follow-up. While there is a lack of complete data from these years, this bias is believed to be small.

The period method differs from the traditional cohort method, which focuses on a cohort of people diagnosed with cancer in the past and follows this cohort over time. In the example described in Figure E.1, one such 5-year survival using the cohort method would have required cases diagnosed in 2003 to 2007. This 5-year survival would have then been based on the survival experience for all the interval-specific survivals from 2003 and onwards. While the cohort method allows for a staggered start and follows a group of people with cancer from their diagnosis in 2003–2007, the period method left truncates these survival experiences and focuses only on the survival of people with cancer who were *at risk of dying* in the period 2006–2010. Unlike the cohort method that starts observing cases as soon as they are diagnosed, the period method allows cases to enter the at-risk period with a non-zero survival time. For comparison, survival estimates using the cohort method are presented in Table B.1 in Appendix B.

Because the period method allows the selection of a recent follow-up period, it tends to produce more up-to-date estimates and identify survival trends sooner than the cohort method (Brenner & Hakulinen 2002a; Brenner & Hakulinen 2002b). However, there is a trade-off between precision and recency: narrower (and more recent) follow-up periods will be based on fewer cases and yield wider confidence intervals compared with wider follow-up periods. For this reason, 5 years of follow-up were combined for the latest survival estimates.

Derivation of life tables

Estimates of expected survival were calculated from tables of annual probabilities of death in the general population, known as life tables.

The life tables required for this report were:

- an Australia-wide life table, for all national estimates of relative survival
- a life table for each of the four remoteness areas (*Major cities, Inner regional, Outer regional, and Remote and Very remote*) for analysis of relative survival by remoteness
- a life table for each of the five socioeconomic status quintiles for analysis of relative survival by socioeconomic status.

Australia-wide life tables are published by the ABS but tables by remoteness or socioeconomic status are not readily available. Therefore it was necessary to derive approximate life tables for these subpopulations. In order to build a life table for subpopulation '*S*', the following two pieces of information were required for each combination of calendar year, sex and 1-year age group:

- the mid-year population of *S* for that calendar year, sex and age (referred to as 'populations' below)
- the number of deaths in *S* for that calendar year, sex and age (referred to as 'mortality' below).

The methods used to construct those data and the subsequent life tables are explained below. Note that, with the exception of survival probabilities for the very old, the life tables obtained were not smoothed and were simply used in 'raw' form.

Life tables for remoteness areas

Populations by remoteness area

ABS population data include two files that break down the Australian population:

- by calendar year, sex and 1-year age group
- by remoteness, calendar year, sex and 5-year age group.

The populations in the first file were converted to 5-year age group populations and then the value of each 1-year age group population as a fraction of its parent 5-year age group population was calculated. For example, in 2001 for males aged 0–4, 19.76% were aged 0 years, 19.89% were aged 1, 19.99% were aged 2, 19.98% were aged 3 and 20.40% were aged 4. These fractions were then applied to the populations in the second file to convert the 5-year age-group populations to 1-year age group populations. An approximation was made so that the same fractions were used regardless of the remoteness area. This will not be perfectly correct but the variation in fractions between regions within 5-year age groups was sufficiently small that it made little impact.

Mortality by remoteness area

The National Mortality Database (NMD) at the AIHW contains, for each death, the statistical local area (SLA) of usual residence of the deceased person. Using ABS concordances that map SLA to ASGC remoteness area from 1997 onwards, the NMD has the remoteness area for each death registered since 1997, or, more precisely, the fractions that can be attributed to each remoteness area. This is because an SLA might contain some areas that are in one remoteness area and some areas in another. The ABS files supply the fraction of the total population of

each SLA in each remoteness area. For example, if 70% of the population of an SLA lives in *Major cities* and 30% live in *Inner regional* areas, then each death which belongs to that SLA contributes 0.7 and 0.3 to the total number of deaths in *Major cities* and *Inner regional* areas, respectively. In this way, the number of deaths by remoteness area, calendar year (of registration of death), sex and 1-year age group can be obtained directly from the NMD.

Combining populations and mortality to construct life tables by remoteness

For each calendar year (2006–2010), sex and 1-year age group i (0 to 115), the above procedures yielded:

- the mid-year population of age group i , denoted by m_i
- the number of deaths in age group i , denoted by d_i .

The population at the beginning of the year, denoted by l_i , was needed. It was assumed that there is no net effect from people ageing into the age group and people ageing out of it.

Therefore l_i equals m_i plus the number of people who died before mid-year. Using common practice in demography, for age group 0 it was assumed that 80% of the deaths occurred before mid-year, for age group 1 the figure 65% was used, and for all other age groups the figure 50% was used. Therefore $l_0 = m_0 + 0.8d_0$, $l_1 = m_1 + 0.65d_1$ and $l_i = m_i + 0.5d_i$ for all other i . Then the probability of dying during the year, denoted by q_i , is given by $q_i = d_i/l_i$. Finally, the probability of surviving that year, denoted by p_i , is given by $p_i = 1 - q_i$. These probabilities are the ones used to calculate expected survival for the general population.

The final approximation was that life tables were required for calendar years up to and including 2010 but the NMD only had data up to 2007. The p_i values for 2008, 2009 and 2010 were assumed to be the same as for 2007.

Life tables for socioeconomic status quintiles

The methods for building life tables by socioeconomic status quintiles were the same as those just described for remoteness areas. However, additional work was required to develop the background data as populations by socioeconomic status quintile, calendar year, sex and 5-year age group were not available and had to be built. Further, the NMD does not have information on the socioeconomic status of the deceased. Instead the source files used to build the life tables were:

- annual populations by SLA, sex and 5-year age group (from the ABS)
- concordances that mapped annual SLAs to 2001 and 2006 SLAs, allocating appropriate fractions of the annual population to various 2001 and 2006 SLAs (from the ABS)
- concordances that mapped 2001 and 2006 SLAs to 2001 and 2006 socioeconomic status quintiles (derived by collapsing a file from the ABS that mapped SLAs to SEIFA scores for each of the Census years).

By appropriately combining the data in the above files, the following were compiled:

- two files of annual populations by 2001 and 2006 socioeconomic status quintile, sex and 5-year age group
- a concordance that mapped each year's SLAs to 2001 or 2006 socioeconomic status quintiles, depending on which Census year it was closest to.

The first of these files was used to find the 1-year age group populations by the same method as described for the remoteness areas. The second file was used in conjunction with the NMD to determine the number of deaths by socioeconomic status quintile. Then the life tables were built just as described for the remoteness areas.

Standard errors and confidence intervals

Standard errors for relative survival were calculated using the standard approach developed by Ederer and colleagues (1961). The standard error for observed survival was estimated using Greenwood's method (Greenwood 1926). The standard error of the expected survival proportion was assumed to be very small and in practice was represented by a fixed constant. In this approach, expected survival was treated as known rather than estimated with random error. Hence, the standard error for relative survival was calculated as the standard error of observed survival divided by the expected survival proportion.

Confidence intervals for observed survival were calculated assuming that the survival estimate is normally distributed around the true value. Confidence intervals for observed survival were calculated using a complementary log-log transformation that involved constructing confidence intervals on a log-hazard scale. This was done so that observed survivals were restricted between the range 0–1 and did not include any implausible values. Confidence intervals for the relative survival proportion were calculated by dividing the upper and lower confidence limits for observed survival by the expected survival.

Calculation of conditional relative survival

Conditional survival is the probability of surviving j more days given that an individual has already survived i days. It was calculated using the formula

$$S(j|i) = \frac{S(i+j)}{S(i)}$$

where

- $S(j|i)$ indicates the probability of surviving at least j more days given survival of at least i days,
- $S(i+j)$ indicates the probability of surviving at least $i+j$ days and
- $S(i)$ indicates the probability of surviving at least i days.

Confidence intervals for conditional survival were calculated using a variation of Greenwood's formula for variance (Skuladottir & Olsen 2003):

$$\text{Var}[S(j|i)] = \sum_{k=i+1}^{i+j} \frac{d_k}{r_k(r_k - d_k)}$$

where

- d_k is the number of deaths and
- r_k is the number at risk during the k th interval.

The 95% confidence intervals were constructed assuming that conditional survival estimates follow a normal distribution.

Calculation of prevalence

Limited duration prevalence

Limited-duration prevalence is expressed as *N-year prevalence* throughout this report. *N-year prevalence* on a given index date (31 December 2007), where *N* is any number 1, 2, 3 etc., is defined as the number of people alive at the end of that day who were diagnosed with 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 2007.
- 5-year prevalence is the number of living people who were diagnosed in the past 5 years to 31 December 2007. This includes the people defined by 1-year prevalence.

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

Prevalence rates

Prevalence is also presented as a proportion of the population (also known as the prevalence 'rate'), which is calculated from the total Australian population as at 31 December 2007. Given low prevalence numbers relative to the total population, these rates are expressed per 100,000 population rather than as a percentage. These rates have not been age standardised and should not be compared over time with prevalence statistics from earlier reports.

Calculation of age-standardised rates

While survival and prevalence statistics are the focus of this report, additional data on age-standardised incidence and mortality rates are presented at the start of each cancer summary to provide context to survival trends. Age-standardised rates adjust for age in order to facilitate comparisons between populations that have different age structures. This standardisation process effectively removes the influence of age structure on the summary rate. Note that the data exclusion criteria applied to survival and prevalence were not used for calculation of age-standardised incidence and mortality rates.

In this report, rates were calculated using the direct standardisation approach presented by Jensen and colleagues (1991). This involved obtaining population numbers and numbers of cases (or deaths) in age rates – typically 5-year age ranges. Age-specific rates were then calculated by dividing the number of cases (or deaths) occurring in each given age group by the corresponding 'at-risk' population of interest in the same age group, and then multiplying the result by a constant (for instance, 100,000) to derive the rate.

Next, age-specific rates for the population of interest were multiplied by age-specific population numbers for the standard population (in this case, the Australian population as at 30 June 2001).

Afterwards, the products of these age groups were summed and divided by the sum of the total of the standard population to give an age-standardised rate for the population of interest. Finally, this was converted to a rate per 100,000 population.

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.

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.

At-risk period: See *Follow-up period*.

Benign: Non-cancerous tumours that may grow larger but do not spread to other parts of the body.

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

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

Complete prevalence: A measure of *prevalence* that reflects the number of living people on a given date who have ever been diagnosed with cancer.

Conditional relative survival: The probability that individuals with cancer will be alive for a given amount of time provided that they have already survived for some time after diagnosis.

Confidence interval: 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.

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

Follow-up period: A specified window of time that is used as the basis of survival estimates in the period method. Time at risk is left truncated at the start of this period and right censored at the end so that anyone diagnosed before this period and whose survival experience overlaps with this period would contribute towards the survival analysis.

Histology: The microscopic characteristics of cellular structure and composition of tissue.

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

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.

Invasive: See *Malignant*.

Lead-time bias: A time shift in the detection of cancer resulting in an artificial increase in *survival* without changing the natural course of the disease.

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

Limited-duration prevalence: A measure of *prevalence* that reflects the number of living people who were diagnosed with cancer within a given time period up to a particular date (known as the index date).

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

Metastasis: The process by which cancerous cells are transferred from one part of the body to another, for example, via the lymphatic system or bloodstream.

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

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

New cancer case: See *Incidence*.

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

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

Prevalence: A general term indicating the number of people alive with a prior diagnosis of cancer.

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

Relative survival: The ratio of *observed survival* of a group of people diagnosed with cancer to the *expected survival* of the general population, matched for age, sex, calendar year and where applicable, remoteness or socioeconomic status. Relative survival measures the excess mortality associated with a cancer diagnosis.

Screening: The performance of tests of apparently well people in order to detect a medical condition at an earlier stage than would otherwise be the case.

Secondary cancer: A tumour that originated from a cancer elsewhere in the body.

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

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. In this report, rates are deemed statistically significantly different when their *confidence intervals* do not overlap, since their difference is greater than what could be explained by chance.

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

Tumour: An abnormal growth of tissue. Can be *benign* (not a cancer) or *malignant* (a cancer).

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Related publications

This report, *Cancer survival and prevalence in Australia: period estimates from 1982 to 2010*, is part of a cancer series. Other publications in this series and any published subsequently can be downloaded for free from the AIHW website <<http://www.aihw.gov.au/publications>>. The website also includes information on ordering printed copies.

Online supplementary tables relating to this report are published separately online. See <<http://www.aihw.gov.au>>.

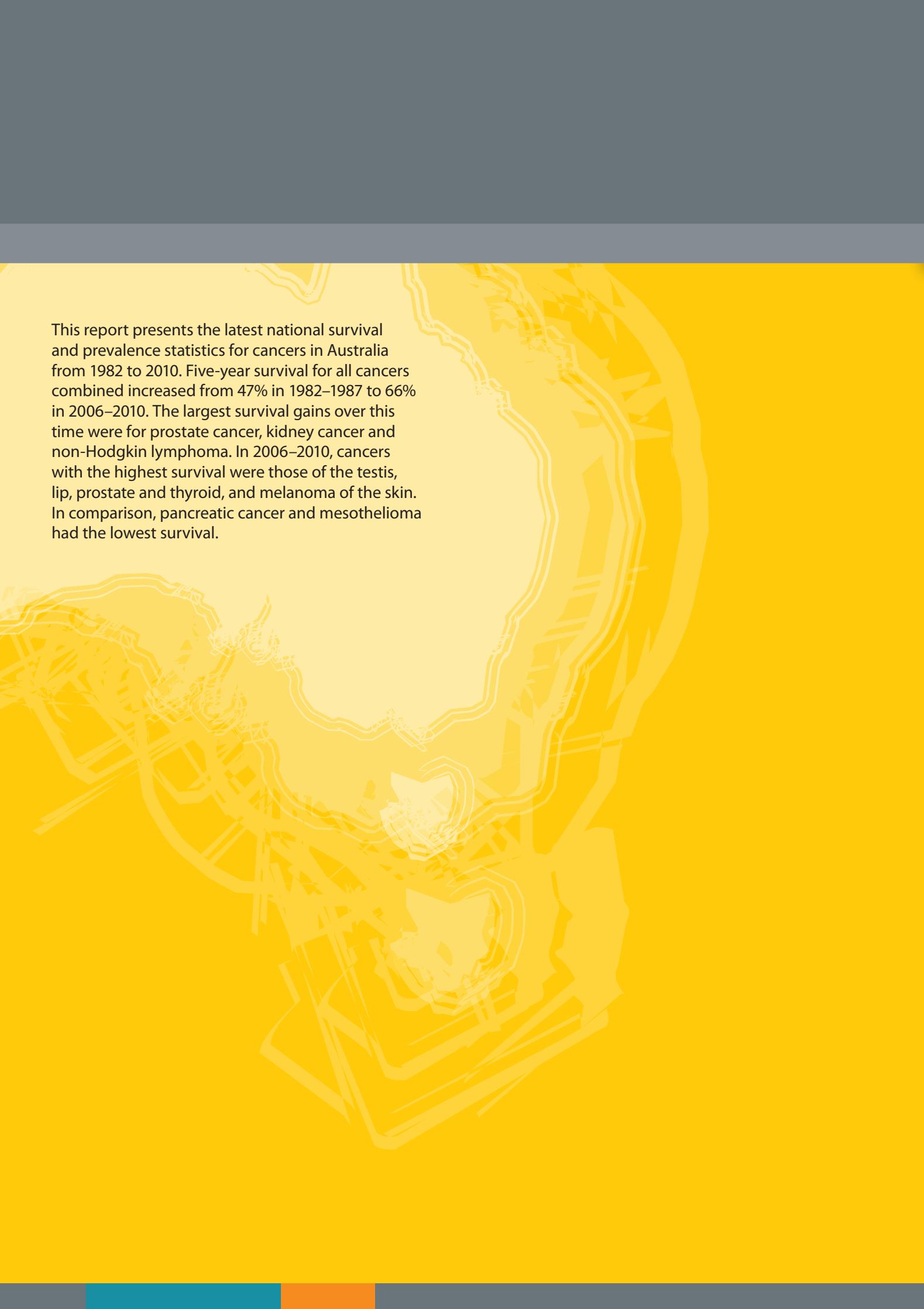
For further reading, other recent national, state and territory and international publications on cancer survival are listed below.

Australian survival publications

- **Australian Capital Territory:** ACT Cancer Registry, ACT Health 2008. Cancer survival in the Australian Capital Territory. Canberra: ACT Government.
- **National paediatric cancer survival:** Youlden D, Baade P, Ward L, Valery P, Hassall T, Green AC & Aitken JF 2010. Childhood cancer survival in Australia, 1995–2004. Brisbane: Vieret Centre for Research in Cancer Control, Cancer Council Queensland and the Australian Paediatric Cancer Registry.
- **New South Wales:** Cancer Institute NSW 2012. Cancer survival in New South Wales 2002–06. Sydney: Cancer Institute NSW.
- **Victoria:** English D, Farrugia H, Thursfield V, Chang P & Giles G 2007. Cancer survival Victoria 2007. Melbourne: The Cancer Council Victoria Epidemiology Centre.

International survival studies

- **England and Wales:** Richards MA, Rachet B, Woods LM, Mitry E, Riga M, Cooper N, Quinn MJ et al. 2008. Trends and inequalities in survival for 20 cancers in England and Wales 1986–2001: population-based analyses and clinical commentaries. British Journal of Cancer 99: S1–S120.
- **Canada:** Minister of Industry 2011. Cancer survival statistics: 1992 to 2002. Ottawa: Statistics Canada Health Statistics Division.
- **New Zealand:** Ministry of Health 2010. Cancer patient survival covering the period 1994 to 2007. Wellington: Ministry of Health.
- **Norway:** Småstuen M, Aagnes B, Johannessen TB, Møller B, & Bray F 2008. Long-term cancer survival: patterns and trends in Norway 1965–2007. Oslo: Cancer Registry of Norway.
- **United States of America:** Ries LAG, Young JL, Keel GE, Eisner MP, Lin YD & Horner M-J (Ed.) 2007. Cancer survival among adults: US SEER Program 1988–2001. Bethesda: National Cancer Institute SEER Program.
- **Various countries:** Coleman MP, Forman D, Bryant H, Butler J, Rachet B, Maringe C, Nur U et al. 2011. Cancer survival in Australia, Canada, Denmark, Norway, Sweden, and the UK, 1995–2007 (the International Cancer Benchmarking Partnership): an analysis of population-based cancer registry data. Lancet 377: 127–138.



This report presents the latest national survival and prevalence statistics for cancers in Australia from 1982 to 2010. Five-year survival for all cancers combined increased from 47% in 1982–1987 to 66% in 2006–2010. The largest survival gains over this time were for prostate cancer, kidney cancer and non-Hodgkin lymphoma. In 2006–2010, cancers with the highest survival were those of the testis, lip, prostate and thyroid, and melanoma of the skin. In comparison, pancreatic cancer and mesothelioma had the lowest survival.