Cancer survival in Australia, 2001

Part 1: National summary statistics

The Australian Institute of Health and Welfare is an independent health and welfare statistics and information agency. The Institute's mission is to inform community discussion and decision making though national leadership in the development and provision of authoritative and timely information on the health and welfare of Australians.

The Australasian Association of Cancer Registries (AACR) is a collaborative body representing State and Territory cancer registries in Australia and New Zealand. Most are members of the International Association of Cancer Registries (IARC). The AACR was formed in November 1982 to provide a formal mechanism for promoting uniformity of collection and collation of cancer data.

The purposes of the AACR are:

- to provide a continuing framework for the development of population-based cancer registration in Australia and New Zealand,
- to facilitate exchange of scientific and technical information between cancer registries and to promote standardisation in the collection and classification of cancer data,
- to facilitate cancer research both nationally and internationally,
- to facilitate the dissemination of cancer information.

The Australian Institute of Health and Welfare has joined the AACR to produce national cancer statistics from the National Cancer Statistics Clearing House.

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Cancer survival in Australia, 2001

Part 1: National summary statistics

Australian Institute of Health and Welfare
and Australasian Association of Cancer Registries

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Foreword

This Government is strongly committed to the control of cancer in Australia, providing substantial ongoing funding for initiatives aimed at improving the prevention, detection, treatment, and palliation of cancer, cancer research and cancer education for the Australian community.

In 1996, cancer was identified as one of the National Health Priority Areas (NHPAs) in order to focus public attention and health policy to achieve significant gains in the health status of the Australians. Lung cancer, colorectal cancer, melanoma, non-melanocytic skin cancer, breast cancer, prostate cancer, cervical cancer, and non-Hodgkin's lymphoma have been identified as the eight priority cancers.

I am now delighted to present to you the national cancer survival analysis, which is the first report of its kind. Previously, cancer survival data has been collected by the State and Territory Cancer Registries and published in separate reports. The Commonwealth has commissioned the Australian Institute of Health and Welfare to bring together national cancer survival data.

Cancer survival data tells us how well we are doing in diagnosing cancer early and treating it effectively and provides essential information about what outcome is likely when cancer is diagnosed. I am proud to announce that internationally, Australia is one of the world leaders in cancer survival rates. This is an excellent achievement.

Australia's biggest improvements in five-year relative cancer survival between 1982–1986 and 1992–1997 have included:

- Breast cancer in women, where survival increased from 72% to 84%;
- Hodgkin's disease—from 74% to 84%;
- Cancer of the kidney—from 50% to 59%;
- Colorectal cancer—the second largest cause of cancer deaths, with colon cancer survival improving from 51% to 59%, and rectal cancer survival improving from 50% to 58%; and
- Cervical cancer, with survival improving from 70% to 75%.

Australia's improving cancer survival rates can be partly attributed to our effective detection programs, such as BreastScreen Australia and the National Cervical Screening program. These are world-leading programs. Our progressively improving management and treatment programs are also reflected in the data presented here. The Commonwealth Government will continue to implement other innovative programs and monitor our progress in all aspects of cancer control. Initiatives, in areas of high need, such as colorectal cancer, ovarian cancer, prostate cancer and lung cancer, will hopefully continue these improvements and build on our record in the fight against cancer.

The Hon. Dr Michael Wooldridge, MP

Minister for Health and Aged Care

September 2001

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Detailed tables are presented in *Cancer survival in Australia, 2001, Part 2: Statistical tables*.

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Acknowledgments

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- provided leadership to the project through its members of the Project Steering Committee,
- contributed through the State and Territory cancer registries the cancer data underlying the analyses,
- assisted in refereeing of drafts of the report.

The Project Steering Committee comprised:

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Abbreviations

AACR	Australasian Association of Cancer Registries
ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
CI	confidence intervals
IACR	International Association of Cancer Registries
ICD-9	International Classification of Diseases, 9th Revision
ICD-O2	International Classification of Diseases for Oncology, 2nd edn
NCI	National Cancer Institute (United States)
NCSCH	National Cancer Statistics Clearing House
NDI	National Death Index
NHMRC	National Health and Medical Research Council
PSA	prostate-specific antigen testing
PYLL	person-years of life lost
SACR	South Australian Cancer Registry
SEER	Surveillance, Epidemiology and End Results Program (National Cancer Institute, United States)
SEIFA	Socio Economic Index for Areas
SNOMED	Systematised Nomenclature of Medicine
WHO	World Health Organization

Executive summary

This project was undertaken jointly by the Australian Institute of Health and Welfare (AIHW) and the Australasian Association of Cancer Registries, and was funded by the Department of Health and Aged Care.

The cancer incidence period covers all persons diagnosed with cancer during the 16-year period from 1 January 1982 to 31 December 1997. The period of death matched to the incidence data was 1 January 1982 to 31 December 1999. The analysis presents relative survival for 20 individual sites and for all cancers. Trends were analysed over three diagnostic periods—1982–1986, 1987–1991, and 1992–1997. The first two periods contain five years each and the latter period contains six years, in order to make full use of the available data.

Relative survival has been used because it is a measure that takes into consideration the crude survival (time between diagnosis and death) in the cancer population, and the corresponding expected survival in the general population. Expressed as a percentage, it is the cancer population that survives a specific number of years after the diagnosis divided by the general population that survives the same number of years.

For example, in the general population during 1992–1997, the expected proportion of males aged 60–69 years who survive for the next five years is 90.6%. The observed survival rate after five years for males diagnosed with lung cancer at age 60–69 is 10.8%. The five-year relative survival proportion for males diagnosed with lung cancer at age 60–69 is the ratio of these two percentages (10.8/90.6), that is 0.119, or 11.9% (Table 8.1).

The main findings were as follows.

Survival estimates for all cancers

Sex differences

- Females had higher survival proportions than males. On average, during the 1992–1997 diagnosis period, males and females diagnosed with cancer had five-year relative survival rates of 56.8% and 63.4% respectively (Table 3.1).

Improvement over time

- There were significant increases in survival proportions for cancer during the three diagnosis periods (1982–1986, 1987–1991 and 1992–1997).
  - For males, from 1982–1986 to 1992–1997 (Figure 3.1; Table 3.5):
  - the one-year relative survival proportion improved from 64.5% to 73.6%
  - the five-year relative survival proportion improved from 43.8% to 56.8%.

  The ten-year relative survival proportion, for males, rose from 38.9% to 43.2% between the 1982–1986 and 1987–1991 periods.
  - For females, from 1982–1986 to 1992–1997 (Figure 3.1; Table 3.6):
  - the one-year relative survival proportion improved from 73.5% to 77.5%
  - the five-year relative survival proportion improved from 55.3% to 63.4%.

  The ten-year relative survival proportion for females rose from 50.8% to 55.0% between the 1982–1986 and 1987–1991 periods.

Age group differences

- The five-year relative survival proportion (1992–1997) for all cancers was highest in the 20–29 age group (82.9% for males and 87.2% for females) after which five-year relative survival decreased progressively as age increased. These proportions decreased to 30.2% for males and 32.7% for females in the 90–99 age group (Figure 3.2; Tables 3.8 and 3.9).
- There was a significant increase in five-year relative survival between diagnosis periods 1982–1986 and 1992–1997 for males and females in all age groups below 90 years. The largest of these increases occurred for males aged 40–59 (by about 16 percentage points) and for females aged 30-59 (by about 10 percentage points) (Figures 3.2; Tables 3.8 and 3.9).

Survival estimates for cancer sites

Cancers with highest survival

- Cancer sites with the highest five-year relative survival proportions in males were cancer of the testis (95.4%), melanoma of the skin (90.0%), cancer of the thyroid (87.9%) and cancer of the prostate (82.7%). Cancer sites with the highest five-year relative survival proportions in females were cancer of the thyroid (95.6%), melanoma of the skin (94.6%), Hodgkin's lymphoma (84.4%) and cancer of the breast (84.0%) (Figures 3.4 and 3.5; Tables 3.3 and 3.4).

Cancers with lowest survival

- Cancer sites with the lowest relative survival proportions in males were cancer of the pancreas (5.4%), cancer of the lung (11.0%), cancer of unknown primary site (13.4%), cancer of the stomach (22.6%) and cancer of the brain (23.8%). Females had the same five cancer sites with the lowest relative survival proportions—cancer of the pancreas (5.2%), cancer of unknown primary (11.5%), cancer of the lung (14.0%), cancer of the brain (23.8%) and cancer of the stomach (24.8%) (Figures 3.4 and 3.5; Tables 3.3 and 3.4).

Cancer survival over time

- There were significant improvements in the five-year relative survival proportion over the three diagnosis periods for most of the cancer sites that were analysed (Tables 3.3 and 3.4). The exceptions were leukaemia in males and cancers of the pancreas, bladder, brain and unknown primary site, which experienced no improvement.

International comparisons

International comparisons were made between selected countries based on availability of relative survival estimates. The selected countries were Denmark, England, Finland, Iceland, Italy, Scotland, Wales, the United States (Table 1.1). A weighted estimate was used when a figure for Europe was provided.

International comparison of five-year relative survival is difficult because of definitional and coding differences between countries. For instance, multifocal disease of the kidney is counted as one primary malignant neoplasm in Australia, whereas in other countries it is counted as more than one primary malignant neoplasm. Also, different countries include different histology behaviours for particular cancer sites. For instance, the United States SEER Program combines in situ and invasive bladder cancers, whereas Australia includes only invasive bladder cancers.

Cancer screening also makes international comparisons of relative survival difficult by introducing lead-time bias for those countries where screening is practised (Parkin et al. 1992). Lead-time bias extends the length of time between diagnosis (which is made earlier due to screening) and the end of life even if this remains at the same point in time, thus inflating cancer relative survival.

Therefore, the following comparisons should be considered with caution.

- Five-year relative survival after cancer was highest in the United States, followed by Australia, then Iceland and Finland. Five-year relative survival after individual cancers tended to be highest in these four countries, with the United States and Australia tending to rank first and second (Figure 3.3; Table 3.11).
- The United States recently reported on five-year relative survival proportions for the period 1992–1997 (the earlier period 1987–1991 was used in the international comparison sections of this report). For the 1992–1997 period, five-year relative survival for females for all cancers was higher for Australia (63.4%) than the United States (62.3%). Five-year relative survival for males for all cancers was 56.8% in Australia compared with 61.2% in the United States.
- Some specific cancer differences between the United States and Australia also exist. These differences are largely due to coding differences between the two countries. For example, the United States includes in situ bladder cancers with invasive bladder cancers, increasing relative survival estimates (Parkin et al. 1992).

Compared with the other countries for the 1987–1991 period, Australian five-year relative survival proportions were highest for males with lung cancer, testicular cancer, stomach cancer, Hodgkin's disease and non-Hodgkin's lymphoma; for females with pancreatic cancer and leukaemia; and for males and females with melanoma of the skin.

Table A: Five-year cancer relative survival proportions, Australia, 1992–1997

Male five-year survival %		Female five-year survival %	
Cancer site	**%**	**Cancer site**	**%**
Cancer of the testis	95.4	Cancer of the thyroid	95.6
Melanoma of the skin	90.0	Melanoma of the skin	94.6
Cancer of the thyroid	87.9	Hodgkin's disease	84.4
Cancer of the prostate	82.7	Cancer of the breast	84.0
Hodgkin's disease	82.6	Cancer of the uterus	81.4
Cancer of the bladder	70.8	Cancer of the cervix	74.6
Cancer of the kidney	59.9	Cancer of the bladder	64.7
Cancer of the colon	58.3	**All cancer sites**	**63.4**
All cancer sites	**56.8**	Cancer of the rectum	60.6
Cancer of the rectum	56.6	Cancer of the colon	58.7
Non-Hodgkin's lymphoma	54.6	Cancer of the kidney	57.5
Leukaemia	41.2	Non-Hodgkin's lymphoma	55.8
Cancer of the brain	23.8	Leukaemia	43.2
Cancer of the stomach	22.6	Cancer of the ovary	42.0
Cancer of unknown primary site	13.4	Cancer of the stomach	24.8
Cancer of the lung	11.0	Cancer of the brain	23.8
Cancer of the pancreas	5.4	Cancer of the lung	14.0
		Cancer of unknown primary site	11.4
		Cancer of the pancreas	5.2

1 Introduction

Cancer describes a range of diseases in which abnormal cells proliferate and spread out of control. Other terms for cancer are tumours and neoplasms, although these terms can also be used for non-cancerous growths.

Normally, cells grow and multiply in an orderly way and have a specific function in the body. Occasionally, however, they multiply in an uncontrolled way after being affected by a carcinogen, or after developing from a random genetic mutation, and form a lump which is called a tumour or neoplasm. Tumours can be benign (not a cancer) or malignant (a cancer). Benign tumours do not invade other tissues or spread to other parts of the body, although they can expand to interfere with healthy structures.

The main features of a malignant tumour are its ability to grow in an uncontrolled way and to invade and metastasise, i.e. spread to other parts of the body. Invasion occurs when cancer cells push between and break through other surrounding cells and structures. Spread to other parts of the body occurs when some cancer cells are carried by the bloodstream or the lymphatic system and lodge some distance away. They can then start a new tumour (a secondary cancer) and begin invading again.

Cancer can develop from most types of cells in different parts of the body, and each cancer has its own pattern of growth and spread. Some cancers remain in the body for years without showing any symptoms. Others can grow, invade and spread rapidly and are fatal less than a year after detection. Apart from the cancer's natural behaviour, its effects can also depend on how much room it has before it damages nearby structures, and whether it starts in a vital organ or is close to other vital organs.

Each year there are about 350,000 new cancer cases diagnosed, of which about 270,000 are non-melanocytic skin cancers (AIHW & AACR 2000). Despite the high incidence rate for non-melanocytic skin cancers, estimated at 1,374 new cases per 100,000 population for males and 857 per 100,000 population for females (Staples et al. 1998), the mortality rate is relatively low (about 1.8 per 100,000 population). Cancer registries do not routinely collect data for non-melanocytic skin cancers and they have been excluded from the analyses in this report.

Excluding non-melanocytic skin cancers, there were 79,538 new cancer cases and 33,966 deaths due to cancer in Australia in 1997 (AIHW & AACR 2000).

Content of this report

The report is presented in three parts. This part (Part 1) reports on national measures of survival for 20 cancer sites, presenting one-, five- and ten-year relative survival proportions by year of diagnosis and age at diagnosis, and provides detailed tables for all cancers combined. In addition to this information, international comparisons are presented for a selected group of countries for five-year relative survival. Part 2 supports the findings in Part 1, presenting detailed tables for each cancer site. Part 2 will be published as tables on the AIHW web site http://www.aihw.gov.au.

Part 3, to be published later, will present five-year relative survival for the States and Territories, geographical categories and Socio Economic Index for Areas (SEIFA) quintiles.

Measurement

Measures of progress in reducing the impact of cancer in the population include incidence, mortality and survival.

Cancer incidence

Cancer incidence refers to new occurrences of cancer during a given period. It is possible for one person to have more than one cancer and therefore to be counted twice in incidence statistics, if it is decided that the cancers are not of the same origin.

Cancer mortality

Mortality is a measure of the number of deaths due to a particular cause during a given period. Cancer mortality is influenced by the number of new cases of cancer and the length of time lived after a diagnosis of cancer is made. For instance, mortality due to a particular cancer might be relatively low if those diagnosed with the cancer have long survival periods, thus increasing the chance of death due to other causes.

Survival

In general terms, survival is the length of time lived after the initial diagnosis of cancer. Relative survival and other measures of survival are defined in Chapter 2. By convention, the proportion of people surviving is measured at one, two, or three years and at five years and ten years after diagnosis (Supramaniam et al. 1998; NCI 1998; Bonnett et al. 1992). These periods reflect different stages of management during the life of a person diagnosed. For instance, the proportion of people surviving after one year can be a measure of the success of the interventions on the immediately detectable cancer, whereas five- and ten-year measurements are strong indicators for remission or cure.

Previous studies

This report follows the most recent publications of cancer survival measures for the States of South Australia (SACR 2000), New South Wales (Supramaniam et al. 1999), Western Australia (Threlfall & Brameld 2000), and Queensland (Baade et al. 2000a). A national breast cancer survival study has also been produced as a joint report by the Australian Institute of Health and Welfare, the Australasian Association of Cancer Registries and the NHMRC National Breast Cancer Centre (AIHW, AACR & NHMRC National Breast Cancer Centre 1998).

International studies

There are few international reports on national cancer survival statistics for other countries. Neither Canada nor New Zealand, the two countries with health systems and population age structures most similar to Australia, had published cancer survival data at the time of writing this report.

Hence, countries chosen to provide comparisons with Australia in this report were selected mainly on the basis of available published statistics. Table 1.1 lists these countries, the diagnosis period and the coverage proportion of the country to which their survival proportions relate.

The major references are:

- *The EUROCARE-2 Study:* This is a comprehensive report describing relative survival rates throughout Europe. From this study, the cancer registries of Finland, Scotland, Denmark, Iceland and Italy have been chosen, as well as a weighted average of total Europe. The cancers diagnosed in EUROCARE were all diagnosed between 1978 and 1985, with follow-up for at least six years (Berrino et al. 1999).
- *The United States National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) program:* This provides a survival analysis for the United States using thirteen cancer registries in Connecticut, New Mexico, Utah, Iowa, Hawaii, Atlanta, Detroit, Seattle–Puget Sound and San Francisco–Oakland. The cancers used in the SEER data were diagnosed between 1989 and 1994 with follow-up to the end of 1997 (Ries et al. 1999).
- *Cancer Survival Trends in England and Wales, 1971–1995: Deprivation and NHS region*: This explores survival trends among almost three million cancer patients diagnosed in England, Scotland and Wales between 1971–1990, with follow-up to the end of 1995 (Coleman et al. 1999).

Not all countries produce or have recent national cancer survival figures.

Table 1.1: Coverage of national population and diagnosis period of countries involved in comparison

Country	Coverage of national population (%)	Diagnosis period
Australia	100	1987–1991
Denmark	100	1985–1989
England	100	1986–1990
Finland	100	1985–1989
Iceland	100	1985–1989
Italy	10	1985–1989
Scotland	100	1985–1989
United States	14	1984–1990
Wales	100	1986–1990

2 Method overview

The objective of this report was to estimate relative survival proportions for persons with cancer in Australia. The persons included in this analysis were those diagnosed with cancer from 1982 to 1997, with survival follow-up to 31 December 1999.

In undertaking this analysis, data sets and computer codes were brought together in the following steps:

- Cancer incidence data for the analysis were provided by the Australian State and Territory cancer registries.
- These cancer incidence data were matched to data in the National Death Index maintained by the AIHW.
- Population data for each of the 16 years in the study, by age and sex, were sourced from the Australian Bureau of Statistics.
- Population mortality numbers by age and sex were extracted from the AIHW's National Mortality Database and, with the population data supplied by the ABS, were used to create Australian population hazard rates.
- Relative survival proportions for the 20 individual cancer sites, and for all cancers, were produced using a suite of codes developed by the Mayo Foundation in the United States from statistical software produced by the SAS Institute. The Mayo code was adapted by the Queensland Cancer Registry and the AIHW to produce the required estimates.

The analysis produced estimates of relative survival by three diagnosis periods (1982–1986, 1987–1991 and 1992–1997), survival time (1 to 15 years), age group (specific to cancer site), and sex (male, female, and total persons).

For a more detailed discussion on the method and process used see Appendix 1.

Relative survival analysis

Relative survival analysis compares the survival of persons diagnosed with cancer (observed) with that experienced by the general age- and sex-matched population to which they belong (expected). The ratio of observed to expected is used to estimate the proportion of people whose risk of dying has been affected by their disease. This method of analysis does not require knowledge of the cause of death.

Survival period

This analysis focuses on one-year and five-year survival. Although ten-and fifteen-year survival proportions have been calculated, their interpretation can be problematic and thus they have not been discussed within the cancer chapters.

One-year survival is an indicator of:

- how effective a cancer treatment has been
- the stage at which the cancer was detected.

Five-year survival is an indicator of:

- the effectiveness of treatment
- the impact of the cancer treatment and whether treatment side-effects are associated with additional mortality
- cancer monitoring rather than cancer treatment, and may also be interpreted as a milestone indicating an arrest in the disease process or a slow development of the disease.

Ten- and fifteen-year relative survival estimates indicate survival in the longer term, extending the survival picture that five-year relative survival begins. However, problems of interpretation arise as the age at diagnosis increases. Expectation of length of life in the general population needs to be in excess of fifteen years for a survival estimate of fifteen years to be sensible. As a person moves into the 60+ ages, expectation of the remaining years of life decreases to fifteen years and below. Another problem associated with interpreting longer survival is that patients may get lost to follow-up, thus a date of death may not get recorded. Given that many cancers are first detected at later ages, these effects need to be considered when analysing ten- and fifteen-year survival.

The relative survival proportion statistics are influenced by the stage at which cancers are detected. Stage of cancer is currently not routinely coded by most State and Territory cancer registries. Hence analysis of survival by stage of cancer for Australia as a whole is not possible. The New South Wales Cancer Registry, however, has a well-developed coding system for stage of cancer, and this is, in time, likely to be implemented in other States and Territories.

Interpretation of survival measures

Increased survival may arise from a number of factors. These include:

- public education about screening programs and self-examination
- the effect of changing mortality patterns from other causes of death
- increased effectiveness of general practitioners in diagnosing and following up on suspicious signs and symptoms
- increased speed in referral
- more effective investigation and staging of disease
- more widespread availability of treatment
- more effective treatment (Coleman et al. 1999).

Interpretation of relative survival also needs to done in the context of the healthcare setting. In addition to the factors affecting survival, screening can bring about large increases in relative survival. Earlier diagnosis may lead to a greater probability of a cure. However, earlier detection will simply add to the survival time if the death date does not change. Differences in coding practices by cancer registries may also influence survival measures. For instance, it has been reported that the US SEER program combines in situ and invasive bladder cancers when reporting incidence, making comparability difficult (Parkin et al. 1992).

3 All cancers

Introduction

'All cancers' refers to all the cancers that occur within the International Classification of Diseases, 9th revision (ICD-9) rubric range 140 to 208, excluding non-melanocytic skin cancers (ICD-9 173).

Australian five-year relative survival proportions for all cancers was ranked second behind the United States for both males and females when compared with other Western countries for which relative survival data are available. Females had higher relative survival proportions than males. On average, during the 1992–1997 diagnosis period, 56.8% of males and 63.4% of females survived five years (Table 3.1).

Five-year relative survival ranged from 95% for cancer of the testis down to 5% for cancer of the pancreas for males. For females, the range was 96% for cancer of the thyroid down to 5% for cancer of the pancreas (Figures 3.4 and 3.5; Tables 3.3 and 3.4).

Table 3.1: All cancers: number of new cases and deaths, and five-year relative survival proportions, by age and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	2,953	2,357	736	507	74.9	78.0
20–29 years	4,248	4,288	732	546	82.9	87.2
30–39 years	7,940	11,993	1,817	2,071	77.5	82.9
40–49 years	15,602	25,448	5,433	5,534	65.5	78.7
50–59 years	33,515	33,364	14,440	10,122	58.5	70.6
60–69 years	71,761	44,202	35,372	18,693	56.5	60.9
70–79 years	78,420	47,938	47,057	27,036	52.4	50.9
80–89 years	31,580	26,741	24,219	19,765	44.2	41.4
90–99 years	2,878	4,021	2,585	3,540	30.2	32.7
All ages	**248,897**	**200,352**	**132,391**	**87,814**	**56.8**	**63.4**

Incidence and mortality

There were 79,545 new cancer cases and 33,966 deaths due to cancer in Australia in 1997 (excluding non-melanocytic skin cancers). Based on these figures, it is expected that 1 in 3 men and 1 in 4 women will be directly affected by cancer before the age of 75. Further, it is estimated that each year cancer is responsible for about 261,000 years of life lost before the age of 75 years. Cancer currently accounts for 28% of male deaths and 24% of female deaths.

The most common cancers in males in 1997 were prostate cancer (9,725 new cases), lung cancer (5,322), melanoma of the skin (4,647) and colon cancer (3,694). These four cancers accounted for 54.1% of all new cases of cancer in males. The most common female cancers in

1997 were breast cancer (10,096), melanoma of the skin (3,717), colon cancer (3,515) and lung cancer (2,497). These four cancers accounted for 54.6% of all new cases of cancer in females.

The cancers most commonly causing death in males were lung cancer (4,615 deaths in 1997), prostate cancer (2,449) and colon cancer (1,869); in females they were breast cancer (2,596), lung cancer (2068) and colon cancer (1662). Lung cancer was responsible for the highest number of person-years of life lost before the age of 75 (44,578 in 1997), followed by breast cancer (31,508) and colon cancer (23,328).

Between 1992 and 1997, age-standardised incidence rates for all cancers (excluding non-melanocytic skin cancers) declined for males by an average of 0.3% per year, and rose for females by an average of 0.9% per year. These incidence rates were influenced by the steady rise in breast cancer incidence in females, and the rise and fall of prostate cancer incidence in males, related to a surge in incidence arising from the introduction of PSA testing for prostate cancer (AIHW 2000). Mortality rates declined for both males and females by an average of 1.3% and 0.6% respectively per year. A decline in lung cancer deaths was the main contributor to the falling mortality rate for males (AIHW 2000).

Survival by period of diagnosis

During 1992–1997 the relative survival proportions for females were higher than those for males. The difference in the one-year relative survival was 3.9 percentage points higher, and the difference in the five-year relative survival rate was 6.6 percentage points higher (Figure 3.1; Tables 3.5 and 3.6).

As the survival time after diagnosis increased, the proportion surviving decreased. During the 1992–1997 period, one-year relative survival after diagnosis with cancer was 73.6% for males and 77.5% for females and five-year relative survival after diagnosis was 56.8% for males and 63.4% for females (Table 3.1). Survival ten years after diagnosis was 43.2% for males and 55.0% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 3.1; Tables 3.5 and 3.6).

There were significant increases in relative survival proportions for all cancers during the three diagnosis periods (1982–1986, 1987–1991, and 1992–1997). For males, the one-year relative survival proportion improved from 64.5% to 73.6%, the five-year relative survival proportion improved from 43.8% to 56.8%, and the ten-year relative survival proportions increased from 38.9% to 43.2%. For females, the one-year relative survival proportion improved from 73.5% to 77.5%, the five-year relative survival proportion improved from 55.3% to 63.4%, and the ten-year relative survival proportions increased from 50.8% to 55.0% (Figure 3.1; Tables 3.5 and 3.6).

Survival by age at diagnosis

Five-year relative survival proportions for all cancers diagnosed in 1992–1997 were highest in the 20–29 age group, after which five-year relative survival decreased progressively as age increased. The highest relative survival proportions for males and females occurred in the 20–29 age group at 82.9% and 87.2% respectively. These proportions decreased to 30.2% for males and 32.7% for females in the 90–99 age group (Figure 3.2; Tables 3.8 and 3.9).

Five-year relative survival proportions increased in most age groups over the three diagnosis periods (Figure 3.2; Tables 3.8 and 3.9). The largest increases occurred for males

aged 60–69 (by about 17 percentage points) and for females aged 50–59 (by about 12 percentage points).

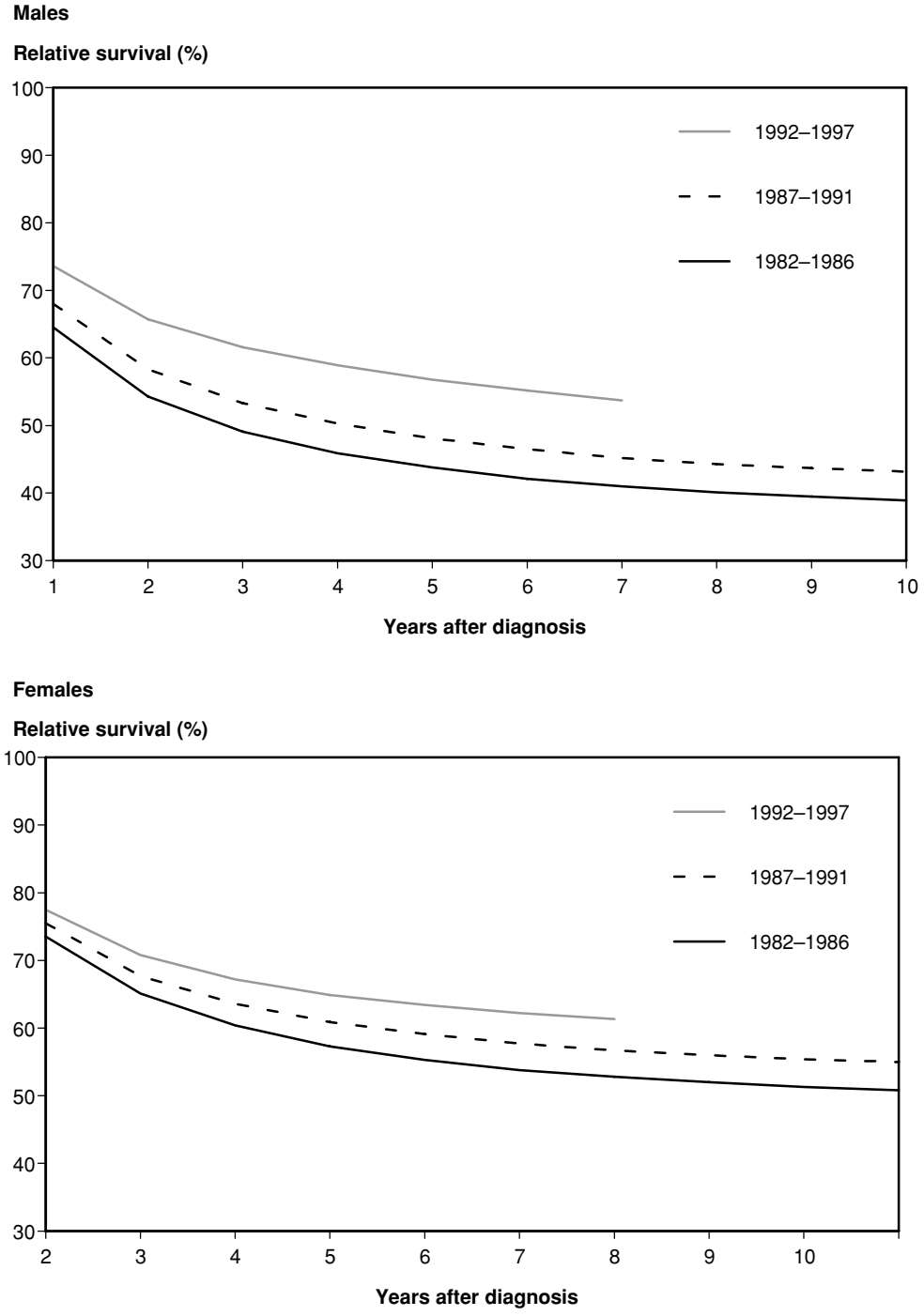
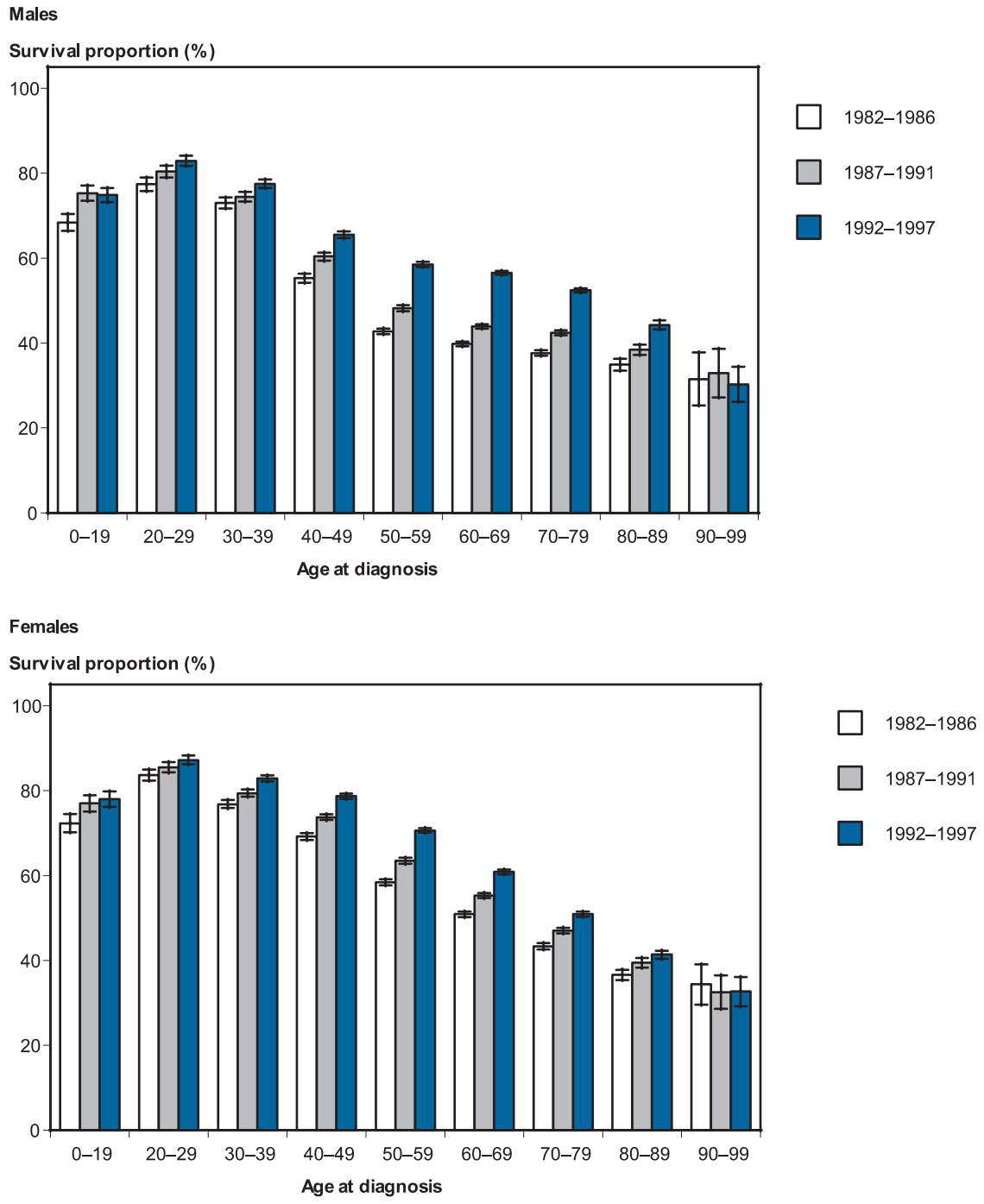


Figure 3.1: All cancers relative survival proportions: period of diagnosis, Australia

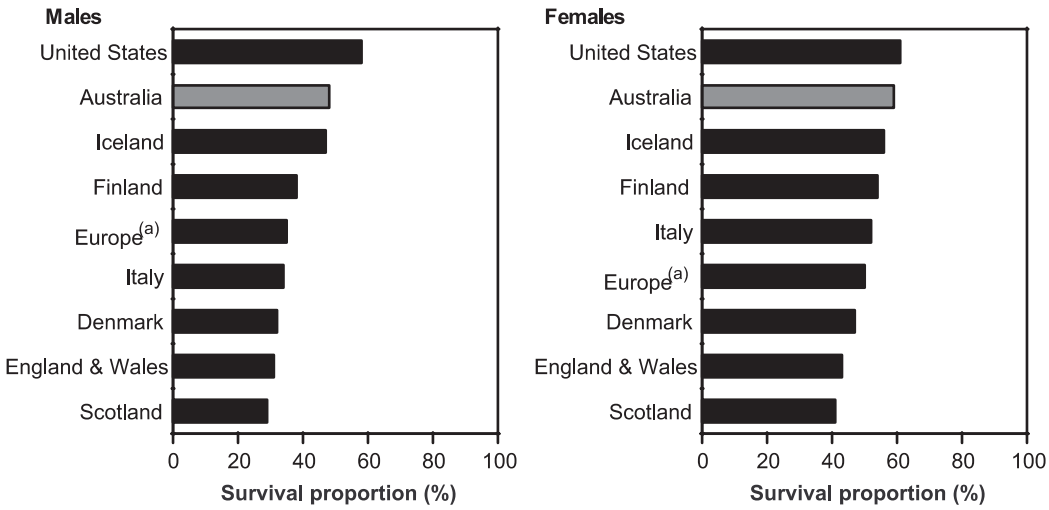


Note: 95% confidence intervals are shown for each age group.

Figure 3.2: All cancers five–year relative survival proportions: age at diagnosis by period of diagnosis, Australia

International comparisons

In the preparation of this report, the time period for which Australian data were most comparable with that of other countries was 1987–1991. Using this time period, Australia was ranked second to the United States. Australian five-year relative survival proportions for all cancers for females were 2 percentage points lower than for the United States, whereas for males they were 10 percentage points lower. European countries had lower five-year relative survival rates than Australia for all cancers (Figure 3.3; Table 3.11).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 3.3: All cancers five-year relative survival proportions: selected countries

As this report was being finalised, 1992–1997 data became available for the United States and are compared directly with Australia in Table 3.2, with the following highlights:

- Five-year relative survival for females for all cancer was 63.4% for Australia, higher than the 62.3% experienced by the United States; and
- Australia has closed much of the gap in five-year relative survival for males, although the 56.8% is still below the 61.2% achieved by the United States.

However, in comparing the United States and Australia, the following differences need to be noted:

- Screening can increase survival time for cancers by moving the diagnosis date to a date earlier in time. Consequently, for cancers where screening activity is present in the United States but not Australia, or happening at a slower rate in Australia than in the United States, survival will be longer in the United States than in Australia. Hence the relative survival proportions are likely to be higher in the United States than in Australia. For example, PSA screening for cancer of the prostate began a number of years earlier in the United States than in Australia, and consequently the relative survival proportions in the United States for cancer of the prostate are longer.

- Some of the cancers in the United States are coded differently under ICD-O2 and the Systematised Nomenclature of Medicine (SNOMED). Also, some cancers under the United States system include in situ and invasive cases together. Consequently, cancers such as those of the ovary and bladder have different inclusions resulting in different relative survival proportions.
- Brain cancers also do not have consistent coding for benign and malignant tumours.

Table 3.2: Five-year cancer relative survival proportions for Australia and the United States (SEER): cancer site by sex, 1992–1997

	Australia		USA (SEER)	
Cancer site	**Males (%)**	**Females (%)**	**Males (%)**	**Females (%)**
All sites	56.8	63.4	61.2	62.3
Stomach	22.6	24.8	20.5	24.1
Colon	58.3	58.7	61.9	60.5
Rectum	56.6	60.6	60.2	61.5
Pancreas	5.4	5.2	4.1	4.4
Lung	11.0	14.0	13.0	16.5
Melanoma	90.0	94.6	86.4	91.5
Female breast	—	84.0	—	85.5
Uterus	—	81.4	—	84.9
Cervix	—	74.6	—	69.9
Ovary	—	42.0	—	52.1
Prostate	82.7	—	96.2	—
Testis	95.4	—	95.3	—
Bladder	70.8	64.7	83.4	75.3
Kidney	59.9	57.5	61.7	61.7
Brain	23.8	23.8	29.7	28.2
Thryroid	87.9	95.6	91.4	96.5
Hodgkin's disease	82.6	84.4	80.5	86.1
Non-Hodgkin's lymphoma	54.6	55.8	49.3	57.8
Leukaemia	41.2	43.2	46.3	42.6

Note: The Australian estimates combine codes 179 and 182 for cancer of the uterus, whereas United States publishes these separately.

Survival by individual cancer site

Cancers with the highest five-year relative survival proportions in males were cancer of the testis (95.4%), melanoma (90.0%), cancer of the thyroid (87.9%) and cancer of the prostate (82.7%). Cancers with the highest relative survival proportions in females were cancer of the thyroid (95.6%), melanoma (94.6%)), Hodgkin's lymphoma (84.4%) and cancer of the breast (84.0%) (Figures 3.4 and 3.5; Table 3.12).

Cancers with the lowest five-year relative survival proportions in males were cancer of the pancreas (5.4%), cancer of the lung (11.0%), cancers of unknown primary site (13.4%), cancer of the stomach (22.6%) and cancer of the brain (23.8%). Females had the same five cancer sites with the lowest relative survival proportions, but in a different order—cancer of the pancreas (5.2%), cancers of unknown primary site (11.5%), cancer of the lung (14.0%), cancer of the brain (23.8%) and cancer of the stomach (24.8%) (Figures 3.4 and 3.5; Table 3.12).

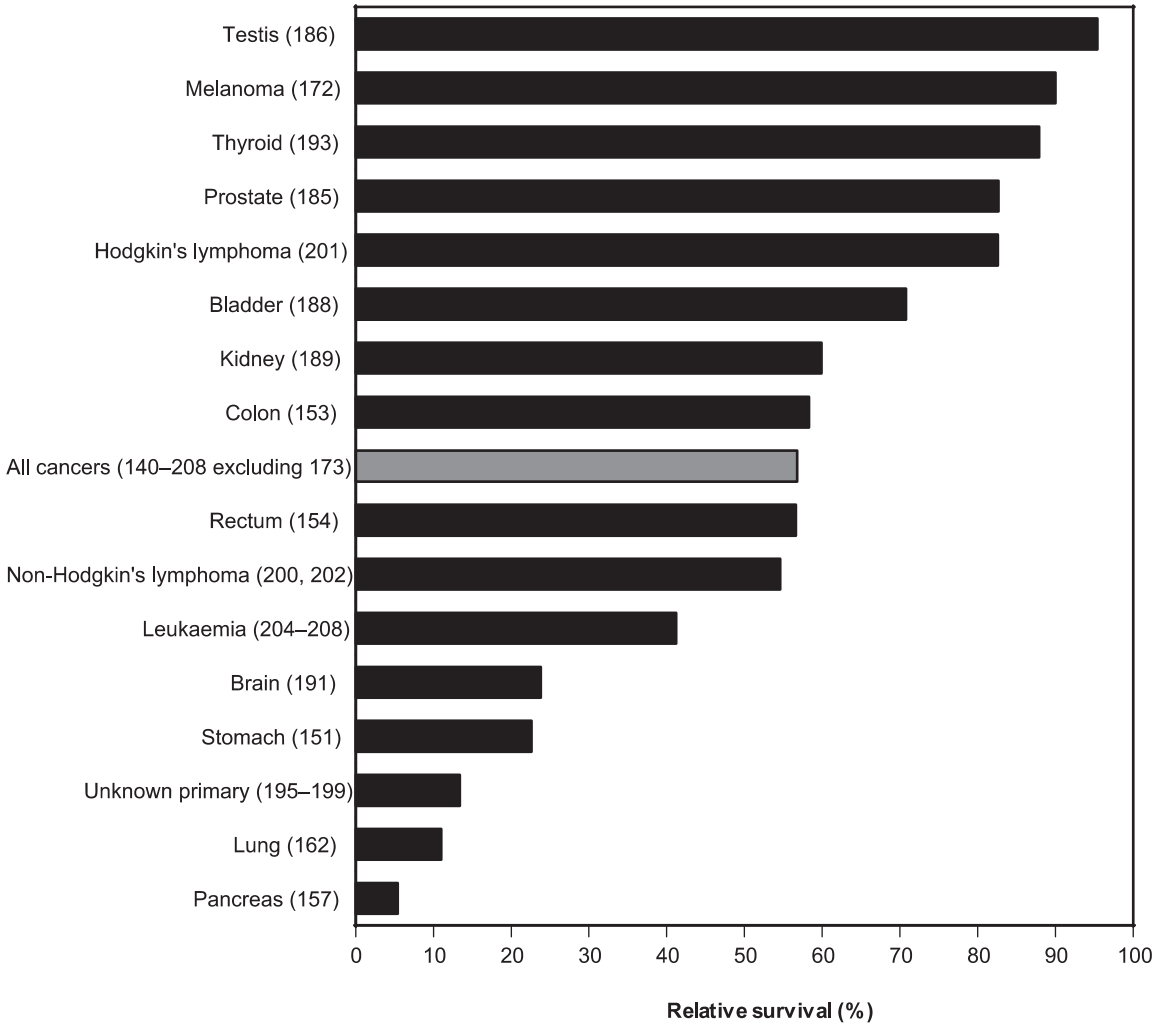


Figure 3.4: Five-year relative survival by cancer site, males, 1992–1997

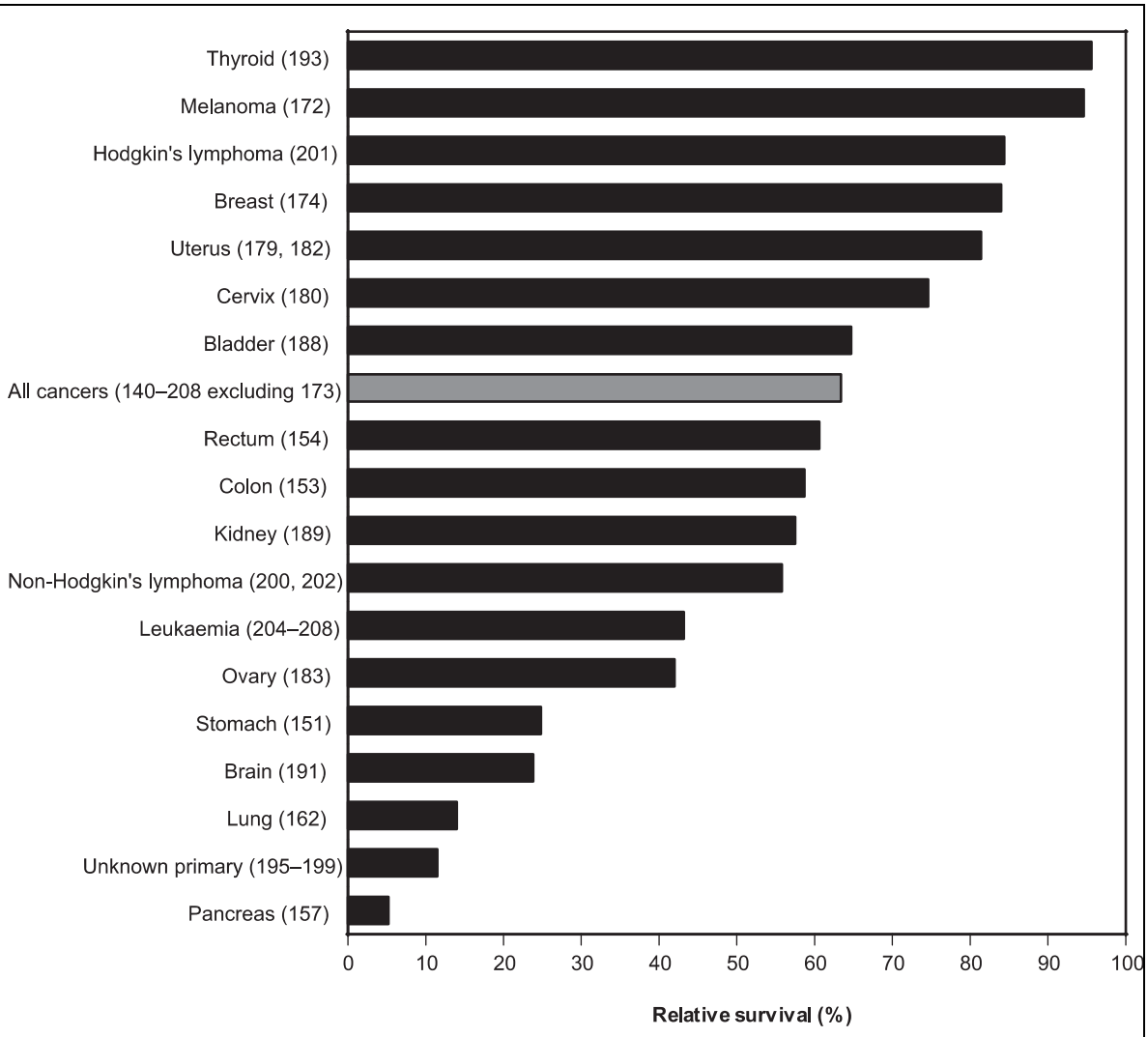


Figure 3.5: Five-year relative survival by cancer site, females, 1992–1997

Comparison of survival by period of diagnosis for individual cancer sites

For each cancer site, five-year relative survival was examined across three diagnosis periods: 1982–1986, 1987–1991 and 1992–1997. Relative survival increased significantly for almost all cancers analysed. The exceptions were cancer of the pancreas, bladder, brain and unknown primary site for males and females, and leukaemia for males (Tables 3.3 and 3.4).

For males, increases in relative survival proportions were greatest for cancer of the prostate (an increase of 23.4 percentage points), cancer of the kidney (9.1 percentage points), Hodgkin's lymphoma (8.5 percentage points), cancer of the colon (8.1 percentage points) and cancer of the rectum (7.9 percentage points) (Table 3.3).

For females, the increases in relative survival proportions were greatest for cancer of the breast (an increase of 11.7 percentage points), Hodgkin's lymphoma (10.6 percentage points), cancer of the rectum (8.3 percentage points), cancer of the kidney (8.1 percentage points), cancer of the thyroid (7.8 percentage points), cancer of the ovary (7.6 percentage points), and cancer of the colon (7.4 percentage points) (Table 3.4).

Table 3.3: Five-year relative survival proportions: diagnosis period by cancer site, males, Australia

	Five-year relative survival (%)						Change in percentage points over the three periods
	1982–1986		1987–1991		1992–1997		
Cancer site (ICD codes)	%	CI (95%)	%	CI (95%)	%	CI (95%)	
All cancers (140–208) (excluding 173)	43.8	43.4–44.1	48.1	47.8–48.4	56.8	56.6–57.1	*13.0
Stomach (151)	19.2	18.0–20.4	21.6	20.4–22.9	22.6	21.4–23.8	*3.4
Colon (153)	50.2	49.0–51.3	54.7	53.6–55.7	58.3	57.4–59.3	*8.1
Rectum (154)	48.7	47.3–50.1	51.2	49.9–52.4	56.6	55.5–57.8	*7.9
Pancreas (157)	4.2	3.4–5.0	4.4	3.6–5.2	5.4	4.6–6.2	1.2
Lung (162)	9.3	8.9–9.7	10.7	10.2–11.1	11.0	10.6–11.4	*1.7
Melanoma (172)	83.0	82.0–84.0	87.2	86.4–87.9	90.0	89.4–90.7	*7.0
Prostate (185)	59.3	58.2–60.3	64.3	63.5–65.2	82.7	82.1–83.2	*23.4
Testis (186)	91.1	89.5–92.6	95.2	94.1–96.4	95.4	94.5–96.3	*4.3
Bladder (188)	71.2	69.8–72.7	71.6	70.2–73.1	70.8	69.5–72.1	–0.4
Kidney (189)	50.8	48.7–52.8	53.7	51.9–55.5	59.9	58.4–61.5	*9.1
Brain (191)	24.8	23.0–26.6	24.3	22.6–26.0	23.8	22.3–25.3	–1.0
Thyroid (193)	81.0	77.0–85.1	82.6	78.9–86.3	87.9	85.1–90.6	7.9
Unknown primary (195–199)	11.7	10.7–12.6	13.0	12.1–13.9	13.4	12.5–14.3	1.7
Hodgkin's lymphoma (201)	74.1	71.0–77.2	79.1	76.1–82.0	82.6	79.9–85.3	*8.5
Non-Hodgkin's lymphoma (200, 202)	49.6	47.9–51.4	51.1	49.6–52.5	54.6	53.2–55.9	*5.0
Leukaemia (204–208)	39.4	37.6–41.1	43.3	41.7–44.9	41.2	39.7–42.7	1.8

*Statistically significant.

Table 3.4: Five-year relative survival proportions: diagnosis period by cancer site, females, Australia

Cancer site	Five-year relative survival (%)						Change in percentage points over the three periods
	1982–1986		1987–1991		1992–1997		
	%	CI (95%)	%	CI (95%)	%	CI (95%)	
All cancers (140–208) (excluding 173)	55.3	55.0–55.7	59.1	58.8–59.4	63.4	63.1–63.6	*8.1
Stomach (151)	21.1	19.5–22.8	21.8	20.2–23.5	24.8	23.1–26.5	*3.7
Colon (153)	51.3	50.3–52.4	54.7	53.7–55.7	58.7	57.7–59.6	*7.4
Rectum (154)	52.3	50.7–53.8	56.0	54.6–57.5	60.6	59.2–61.9	*8.3
Pancreas (157)	4.1	3.2–4.9	5.4	4.5–6.3	5.2	4.4–6.0	1.1
Lung (162)	11.8	11.0–12.7	11.9	11.2–12.6	14.0	13.3–14.7	*2.2
Melanoma (172)	90.9	90.1–91.6	93.5	92.8–94.1	94.6	94.0–95.2	*3.7
Breast (174)	72.3	71.7–73.0	77.8	77.3–78.4	84.0	83.5–84.4	*11.7
Uterus (179, 182)	76.1	74.6–77.6	78.5	77.2–79.9	81.4	80.2–82.6	*5.3
Cervix (180)	69.6	68.1–71.0	72.0	70.6–73.3	74.6	73.2–75.9	*5.0
Ovary (183)	34.4	32.9–35.9	37.7	36.2–39.2	42.0	40.6–43.4	*7.6
Bladder (188)	67.2	65.0–69.5	65.2	62.9–67.5	64.7	62.6–66.9	–2.5
Kidney (189)	49.4	47.1–51.7	52.7	50.6–54.7	57.5	55.7–59.4	*8.1
Brain (191)	24.1	22.0–26.1	25.3	23.4–27.1	23.8	22.1–25.4	–0.3
Thyroid (193)	87.8	85.8–89.9	91.9	90.3–93.5	95.6	94.6–96.7	*7.8
Unknown primary (195–199)	10.4	9.5–11.4	10.9	10.0–11.8	11.5	10.6–12.3	1.1
Hodgkin's lymphoma (201)	73.8	70.0–77.5	79.9	76.6–83.2	84.4	81.7–87.2	*10.6
Non-Hodgkin's lymphoma (200, 202)	49.9	48.1–51.7	54.6	53.0–56.2	55.8	54.3–57.2	*5.9
Leukaemia (204–208)	39.4	37.5–41.4	44.2	42.4–46.1	43.2	41.5–44.9	*3.8

*Statistically significant.

Table 3.5: Relative survival proportions for all cancers: period of diagnosis, males, Australia

	1982–1997		1982–1986		1987–1991		1992–1997	
Years after diagnosis	%	95% CI	%	95% CI	%	95% CI	%	95% CI
1	69.7	69.6–69.9	64.5	64.2–64.8	68.0	67.8–68.3	73.6	73.4–73.8
2	60.7	60.6–60.9	54.3	54.0–54.6	58.3	58.0–58.5	65.7	65.4–65.9
3	56.1	55.9–56.2	49.1	48.8–49.4	53.3	53.0–53.6	61.6	61.4–61.8
4	53.1	52.9–53.3	45.9	45.6–46.2	50.3	50.0–50.6	58.9	58.6–59.1
5	50.9	50.8–51.1	43.8	43.4–44.1	48.1	47.8–48.4	56.8	56.6–57.1
6	49.3	49.1–49.4	42.1	41.8–42.4	46.5	46.2–46.8	55.2	54.9–55.5
7	47.9	47.7–48.1	41.0	40.6–41.3	45.2	44.9–45.5	53.7	53.3–54.0
8	46.9	46.7–47.1	40.1	39.8–40.5	44.3	44.0–44.6		
9	46.2	46.0–46.4	39.5	39.1–39.9	43.7	43.3–44.0		
10	45.6	45.4–45.8	38.9	38.6–39.3	43.2	42.8–43.5		
11	45.2	45.0–45.5	38.6	38.2–39.0	42.8	42.4–43.1		
12	45.1	44.8–45.3	38.5	38.1–38.9	42.5	42.1–42.9		
13	44.8	44.5–45.1	38.4	38.0–38.8				
14	44.7	44.4–45.1	38.3	37.9–38.8				
15	44.8	44.4–45.1	38.4	37.9–38.8				

Table 3.6: Relative survival proportions for all cancers: period of diagnosis, females, Australia

	1982–1997		1982–1986		1987–1991		1992–1997	
Years after diagnosis	%	95% CI	%	95% CI	%	95% CI	%	95% CI
1	75.9	75.8–76.0	73.5	73.3–73.8	75.5	75.2–75.7	77.5	77.4–77.7
2	68.4	68.3–68.6	65.1	64.8–65.4	67.7	67.5–68.0	70.8	70.5–71.0
3	64.3	64.2–64.5	60.4	60.1–60.7	63.6	63.3–63.9	67.2	66.9–67.4
4	61.7	61.5–61.9	57.3	57.0–57.7	60.9	60.6–61.2	64.9	64.7–65.2
5	59.9	59.7–60.1	55.3	55.0–55.7	59.1	58.8–59.4	63.4	63.1–63.6
6	58.5	58.3–58.7	53.8	53.5–54.2	57.7	57.4–58.0	62.2	61.9–62.5
7	57.5	57.3–57.7	52.8	52.4–53.1	56.7	56.4–57.1	61.3	60.9–61.6
8	56.6	56.4–56.8	52.0	51.6–52.3	56.0	55.6–56.3		
9	56.0	55.8–56.2	51.3	50.9–51.7	55.4	55.1–55.8		
10	55.5	55.3–55.8	50.8	50.4–51.2	55.0	54.7–55.4		
11	55.2	55.0–55.4	50.5	50.1–50.9	54.7	54.4–55.1		
12	55.0	54.7–55.2	50.3	49.9–50.7	54.4	54.0–54.8		
13	54.9	54.6–55.1	50.3	49.9–50.7				
14	54.9	54.6–55.2	50.3	49.8–50.7				
15	54.9	54.6–55.2	50.3	49.8–50.7				

Table 3.7: Relative survival proportions for all cancers: period of diagnosis, persons, Australia

	1982–1997		1982–1986		1987–1991		1992–1997	
Years after diagnosis	%	95% CI	%	95% CI	%	95% CI	%	95% CI
1	72.6	72.5–72.7	68.8	68.6–68.9	71.5	71.3–71.7	75.4	75.2–75.5
2	64.3	64.2–64.4	59.4	59.2–59.6	62.7	62.5–62.9	68.0	67.8–68.1
3	60.0	59.8–60.1	54.5	54.3–54.8	58.2	58.0–58.4	64.1	64.0–64.3
4	57.2	57.1–57.3	51.4	51.2–51.7	55.4	55.2–55.6	61.7	61.5–61.8
5	55.2	55.1–55.3	49.4	49.2–49.6	53.4	53.2–53.6	59.9	59.7–60.0
6	53.7	53.6–53.9	47.9	47.6–48.1	52.0	51.8–52.2	58.5	58.3–58.7
7	52.6	52.5–52.7	46.8	46.6–47.1	50.9	50.7–51.1	57.3	57.0–57.5
8	51.7	51.6–51.9	46.1	45.8–46.3	50.1	49.9–50.3		
9	51.1	51.0–51.3	45.5	45.2–45.7	49.6	49.3–49.8		
10	50.7	50.5–50.8	45.0	44.7–45.3	49.2	48.9–49.4		
11	50.4	50.2–50.5	44.7	44.5–45.0	48.9	48.6–49.2		
12	50.2	50.0–50.4	44.6	44.4–44.9	48.6	48.3–48.9		
13	50.1	49.9–50.3	44.6	44.3–44.9				
14	50.1	49.9–50.4	44.7	44.4–45.0				
15	50.2	50.0–50.5	44.7	44.4–45.1				

Table 3.8: All cancers five-year relative survival proportions: age at diagnosis by period of diagnosis, males, Australia

	1982–1997		1982–1986		1987–1991		1992–1997	
Age at diagnosis	%	95% CI	%	95% CI	%	95% CI	%	95% CI
0–19	73.0	72.0–74.1	68.4	66.4–70.4	75.3	73.5–77.1	74.9	73.2–76.5
20–29	80.6	79.8–81.4	77.4	75.8–79.0	80.4	79.0–81.8	82.9	81.7–84.1
30–39	75.3	74.6–75.9	73.0	71.7–74.3	74.4	73.3–75.6	77.5	76.5–78.5
40–49	61.4	60.8–61.9	55.3	54.2–56.3	60.4	59.4–61.3	65.5	64.7–66.3
50–59	50.9	50.5–51.3	42.7	42.1–43.4	48.2	47.5–48.9	58.5	57.9–59.1
60–69	48.4	48.1–48.7	39.8	39.2–40.3	43.9	43.4–44.4	56.5	56.1–57.0
70–79	46.1	45.8–46.4	37.6	37.0–38.3	42.4	41.8–43.0	52.4	51.9–52.9
80–89	40.6	39.9–41.3	34.9	33.5–36.3	38.4	37.2–39.6	44.2	43.2–45.3
90–99	31.6	28.6–34.5	31.5	25.3–37.8	32.9	27.2–38.6	30.2	26.1–34.4
All ages	**50.9**	**50.8–51.1**	**43.8**	**43.4–44.1**	**48.1**	**47.8–48.4**	**56.8**	**56.6–57.1**

Table 3.9: All cancers five-year relative survival proportions: age at diagnosis by period of diagnosis, females, Australia

	1982–1997		1982–1986		1987–1991		1992–1997	
Age at diagnosis	%	95% CI	%	95% CI	%	95% CI	%	95% CI
0–19	76.1	75.0–77.2	72.3	70.2–74.5	77.0	75.1–78.9	78.0	76.2–79.8
20–29	85.7	85.0–86.3	83.7	82.4–85.0	85.5	84.3–86.7	87.2	86.2–88.3
30–39	80.1	79.6–80.5	76.8	75.9–77.8	79.4	78.6–80.3	82.9	82.2–83.6
40–49	74.8	74.4–75.2	69.2	68.4–70.0	73.7	73.1–74.4	78.7	78.1–79.3
50–59	65.1	64.7–65.5	58.4	57.7–59.1	63.5	62.8–64.2	70.6	70.1–71.2
60–69	56.3	56.0–56.7	50.9	50.2–51.5	55.3	54.7–55.9	60.9	60.3–61.4
70–79	47.8	47.4–48.1	43.3	42.6–44.1	47.0	46.4–47.7	50.9	50.3–51.5
80–89	39.6	39.0–40.2	36.6	35.4–37.8	39.5	38.3–40.6	41.4	40.4–42.3
90–99	33.1	30.9–35.4	34.4	29.6–39.1	32.5	28.6–36.5	32.7	29.2–36.1
All ages	**59.9**	**59.7–60.1**	**55.3**	**55.0–55.7**	**59.1**	**58.8–59.4**	**63.4**	**63.1–63.6**

Table 3.10: All cancers five-year relative survival proportions: age at diagnosis by period of diagnosis, persons, Australia

	1982–1997		1982–1986		1987–1991		1992–1997	
Age at diagnosis	%	95% CI	%	95% CI	%	95% CI	%	95% CI
0–19	74.4	73.6–75.1	70.1	68.6–71.6	76.1	74.7–77.4	76.3	75.0–77.5
20–29	83.2	82.7–83.7	80.7	79.7–81.8	83.0	82.1–83.9	85.1	84.3–85.9
30–39	78.2	77.8–78.6	75.4	74.6–76.1	77.5	76.8–78.2	80.8	80.2–81.3
40–49	69.6	69.3–69.9	63.7	63.1–64.4	68.5	67.9–69.1	73.7	73.2–74.2
50–59	57.9	57.7–58.2	50.3	49.8–50.8	55.7	55.3–56.2	64.6	64.2–65.0
60–69	51.7	51.5–51.9	44.6	44.2–45.0	48.8	48.4–49.2	58.2	57.9–58.6
70–79	46.8	46.6–47.1	40.2	39.7–40.7	44.4	44.0–44.9	51.8	51.4–52.2
80–89	40.1	39.6–40.5	35.8	34.9–36.8	39.0	38.2–39.8	42.7	42.0–43.4
90–99	32.5	30.7–34.3	33.4	29.6–37.2	32.7	29.4–35.9	31.6	28.9–34.2
All ages	**55.2**	**55.1–55.3**	**49.4**	**49.2–49.6**	**53.4**	**53.2–53.6**	**59.9**	**59.7–60.0**

Table 3.11: Relative survival proportions for all cancers: selected countries

Country	Relative survival (%) for males	Relative survival (%) for females
Australia (1987–1991)	48	59
Denmark (1985–1989)	32	47
England and Wales (1986–1990)	31	43
Europe* (1985–1989)	35	50
Finland (1985–1989)	38	54
Iceland (1985–1989)	47	56
Italy (1985–1989)	34	52
Scotland (1985–1989)	29	41
United States (1984–1990)	58	61

*Weighted average.

Table 3.12: Number of new cases and deaths and five-year relative survival proportions: by cancer site and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Cancer site	Males	Females	Males	Females	Males	Females
All cancers (140–208) (excluding 173)	248,897	200,352	132,391	87,814	56.8	63.4
Stomach (151)	7,166	3,860	5,925	3,043	22.6	24.8
Colon (153)	20,388	19,574	10,622	9,890	58.3	58.7
Rectum (154)	13,461	8,988	6,973	4,263	56.6	60.6
Pancreas (157)	4,600	4,415	4,396	4,218	5.4	5.2
Lung (162)	30,545	13,352	27,575	11,611	11.0	14.0
Melanoma (172)	24,060	19,582	5,058	2,513	90.0	94.6
Breast (174)	—	55,815	—	12,889	—	84.0
Uterus (179, 182)	—	7,844	—	2,154	—	81.4
Cervix (180)	—	5,803	—	1,732	—	74.6
Ovary (183)	—	6,621	—	4,006	—	42.0
Prostate (185)	63,055	—	23,196	—	82.7	—
Testis (186)	3,130	—	187	—	95.4	—
Bladder (188)	11,269	3,714	5,004	1,752	70.8	64.7
Kidney (189)	6,718	4,466	3,289	2,234	59.9	57.5
Brain (191)	4,073	2,996	3,175	2,326	23.8	23.8
Thyroid (193)	1,183	3,435	225	287	87.9	95.6
Unknown primary (195–199)	8,966	7,995	7,991	7,230	13.4	11.5
Hodgkin's lymphoma (201)	1,198	996	264	193	82.6	84.4
Non-Hodgkin's lymphoma (200, 202)	4,852	3,919	2,765	2,151	54.6	55.8
Leukaemia (204–208)	6,646	4,991	4,334	3,121	41.2	43.2

4 Cancer of the stomach

Summary

Relative survival after a diagnosis of cancer of the stomach was poor when compared with other cancer sites. For the period 1992–1997, relative survival one year after diagnosis of cancer of the stomach was 46.4% for males and 47.0% for females. The five-year relative survival proportion for males was 22.6% and for females was 24.8% (Table 4.1). Survival ten years after diagnosis was 20.1% for males and 21.4% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Tables 4.2 and 4.3).

Between the diagnosis periods 1982–1986, 1987–1991 and 1992–1997, stomach cancer relative survival increased. This increase was significant between 1982–1986 and 1992–1997 (Figure 4.1). Also, there was a significant increase in stomach cancer relative survival for males between the diagnosis periods 1982–1986 and 1987–1991 for both one- and two-year relative survival. Similarly, between the diagnosis periods 1987–1991 and 1992–1997 for females, there was a significant increase in one-, two- and four- year relative survival (Tables 4.2 and 4.3).

Five-year relative survival proportions tended to decrease as age increased. For males, relative survival was highest for those aged 30–39 and 40–49 years (30.6%), and five-year relative survival was highest for females aged 20–29 years (45.6%). Five-year relative survival proportions decreased to 18.7% for males and 19.8% for females aged 70–79 years, and 6.1% for males and 11.0% for females aged 90–99 years (Figure 4.3; Table 4.1).

For individual age groups, five-year relative survival after diagnosis of stomach cancer increased between 1982–1986 and 1992–1997 for males aged 70–79 years and for females aged 80–89 years only (Figure 4.3; Tables 4.5 and 4.6).

Table 4.1: Cancer of the stomach: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	1	2	0	1	*	*
20–29 years	27	22	20	13	24.8	45.6
30–39 years	121	87	84	46	30.6	43.5
40–49 years	419	230	293	141	30.6	38.1
50–59 years	922	365	666	248	27.6	31.4
60–69 years	1,990	814	1,555	597	23.5	26.6
70–79 years	2,388	1,214	2,014	992	18.7	19.8
80–89 years	1,181	981	1,065	865	17.0	19.7
90–99 years	117	145	114	140	6.1	11.0
All ages	**7,166**	**3,860**	**5,811**	**3,043**	**22.6**	**24.8**

* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

Incidence and mortality

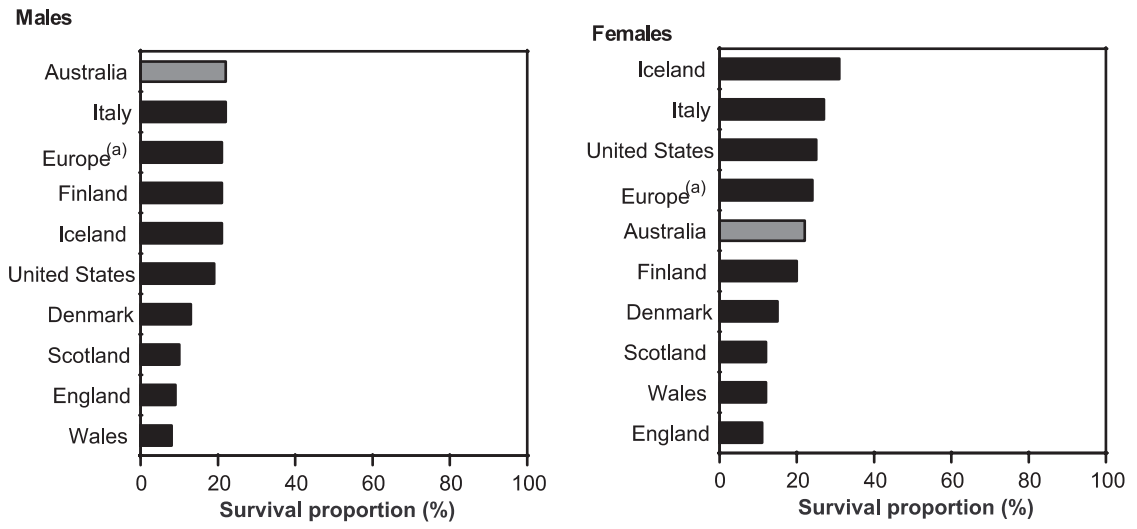
In 1997, there were 1,928 new cases of stomach cancer diagnosed in Australia. Of these 1,201 were for males, and 727 were for females.

In 1997, 768 males and 476 females died from stomach cancer. It is estimated that stomach cancer is responsible for about 5,300 years of life lost in males, and 2,900 years of life lost in females before the age of 75 each year.

For the six-year period 1992–1997, age-standardised incidence and mortality rates for cancer of the stomach in males decreased, with incidence falling by 2.6% per annum and mortality falling by 2.9% per annum. For females, age-standardised incidence rates increased slightly by 0.3% per annum, and age-standardised mortality rates decreased by 2.0% per annum.

International comparisons

Five-year relative survival after diagnosis of stomach cancer in Australia compares favourably with that in other Western countries for which relative survival data are available. Australian males have the highest five-year relative survival, followed closely by Italy, Europe, Finland, Iceland and the United States. Although the ranking is quite different, the same six countries have similar five-year relative survival proportions for females, with Australia ranked fifth of the selected countries (Figure 4.1).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 4.1: Cancer of the stomach: five-year relative survival proportions, selected countries

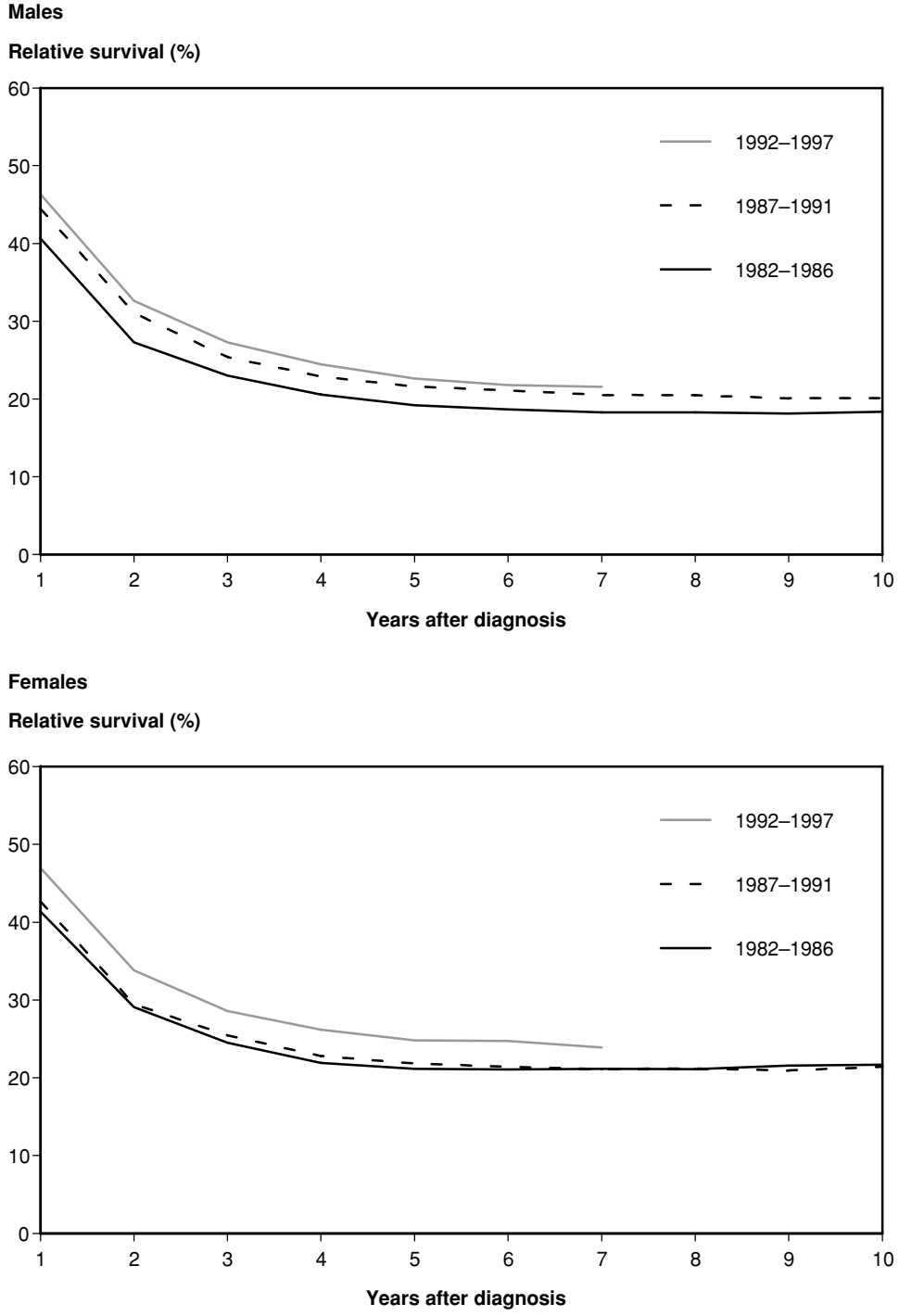
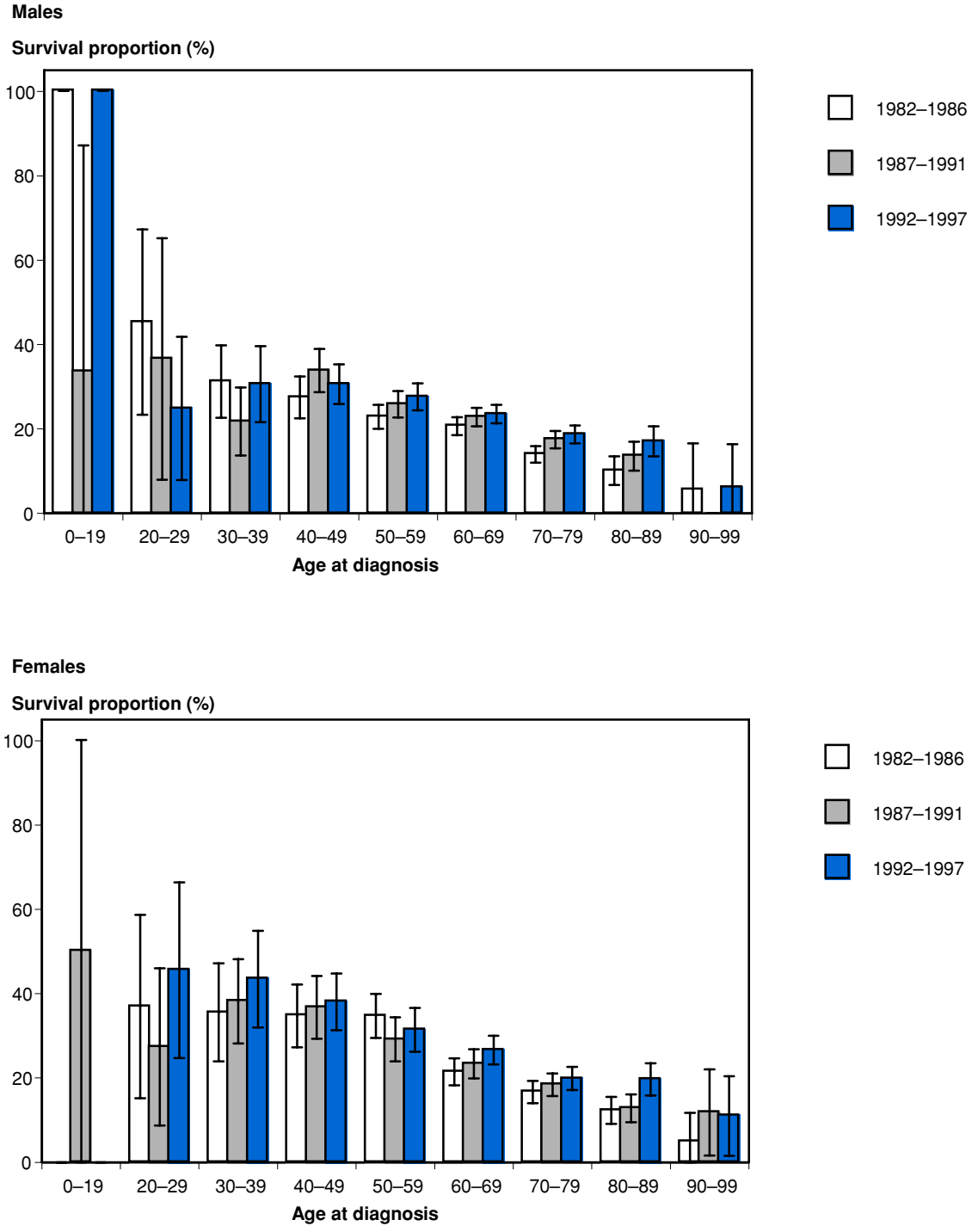


Figure 4.2: Cancer of the stomach relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 4.3: Cancer of the stomach five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

5 Cancer of the colon

Summary

In 1992–1997 relative survival one year after diagnosis was 77.6% for males and 76.0% for females. Five-year relative survival proportions were 58.3% and 58.7% for males and females, respectively (Table 5.1). Survival ten years after diagnosis was 51.0% for males and 52.0% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Tables 5.2 and 5.3).

Relative survival after diagnosis of colon cancer increased significantly between 1982–1986 and 1992–1997 diagnostic periods. Increases in relative survival have been statistically significant for all relative survival times (including one-, five- and ten- year relative survival) for males and females. Five-year relative survival increased by 8.1 percentage points for males and 7.4 percentage points for females between 1982–1986 and 1992–1997 (Figure 5.2; Tables 5.2 and 5.3).

Five-year relative survival proportions for the period 1992–1997 were highest for the younger age groups. Colon cancer five-year relative survival was 63.2% for males and 68.7% for females aged 20–29 years, and decreased steadily with age, declining to 51.5% and 54.6% for males and females aged 80–89 respectively. There was a further decline in the 90–99 age group to 33.3% for males and 37.1% for females (Figure 5.3; Table 5.1).

For individual age groups, five-year relative survival after diagnosis of colon cancer significantly increased between 1982–1986 and 1992–1997 for males aged between 40–49 and 70–79 years and for females aged between 50–59 and 80–89 years (Figure 5.3; Tables 5.5 and 5.6).

Table 5.1: Cancer of the colon: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	11	14	2	2	82.2	85.9
20–29 years	55	62	21	19	63.2	68.7
30–39 years	249	272	92	92	63.8	68.1
40–49 years	1,115	1,045	430	409	60.9	59.5
50–59 years	3,116	2,652	1,263	1,038	61.1	61.4
60–69 years	6,218	4,708	2,871	1,980	59.4	60.7
70–79 years	6,551	6,171	3,697	3,126	56.8	57.4
80–89 years	2,828	4,005	2,030	2,666	51.5	54.6
90–99 years	245	645	216	558	33.3	37.1
All ages	**20,388**	**19,574**	**10,622**	**9,890**	**58.3**	**58.7**

Incidence and mortality

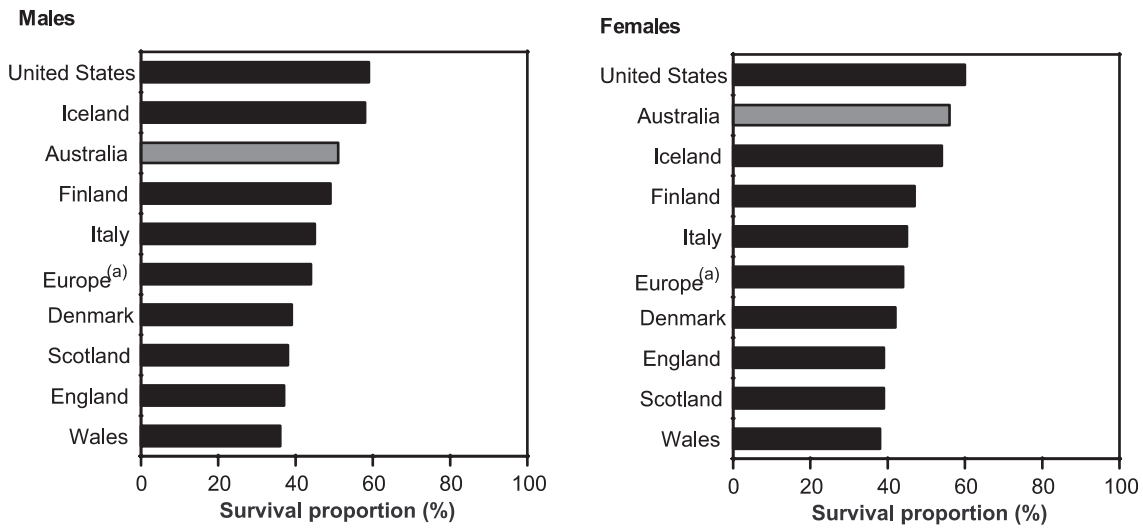
In 1997, there were 7,210 new cases of colon cancer diagnosed in Australia. Of these, 3,694 were male and 3,516 were female.

Colon cancer was the cause of 1,869 male and 1,662 female deaths in 1997. It is estimated that each year colon cancer is responsible for about 13,300 years of life lost in males, and 10,000 years of life lost in females before the age of 75.

For the six-year period 1992–1997, age-standardised rates for cancer of the colon in males increased by 0.3% per annum for incidence and deaths declined by 0.1% per annum. For females, age-standardised rates decreased for both incidence and deaths by 0.1% and 0.2% per annum respectively.

International comparisons

Five-year relative survival after a diagnosis of cancer of the colon compares favourably with that in other Western countries for which relative survival data are available. Australian cancer of the colon five-year relative survival ranked third behind the United States for males and second behind the United States for females, 5 percentage points lower.



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Source: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 5.1: Cancer of the colon five-year relative survival proportions: selected countries

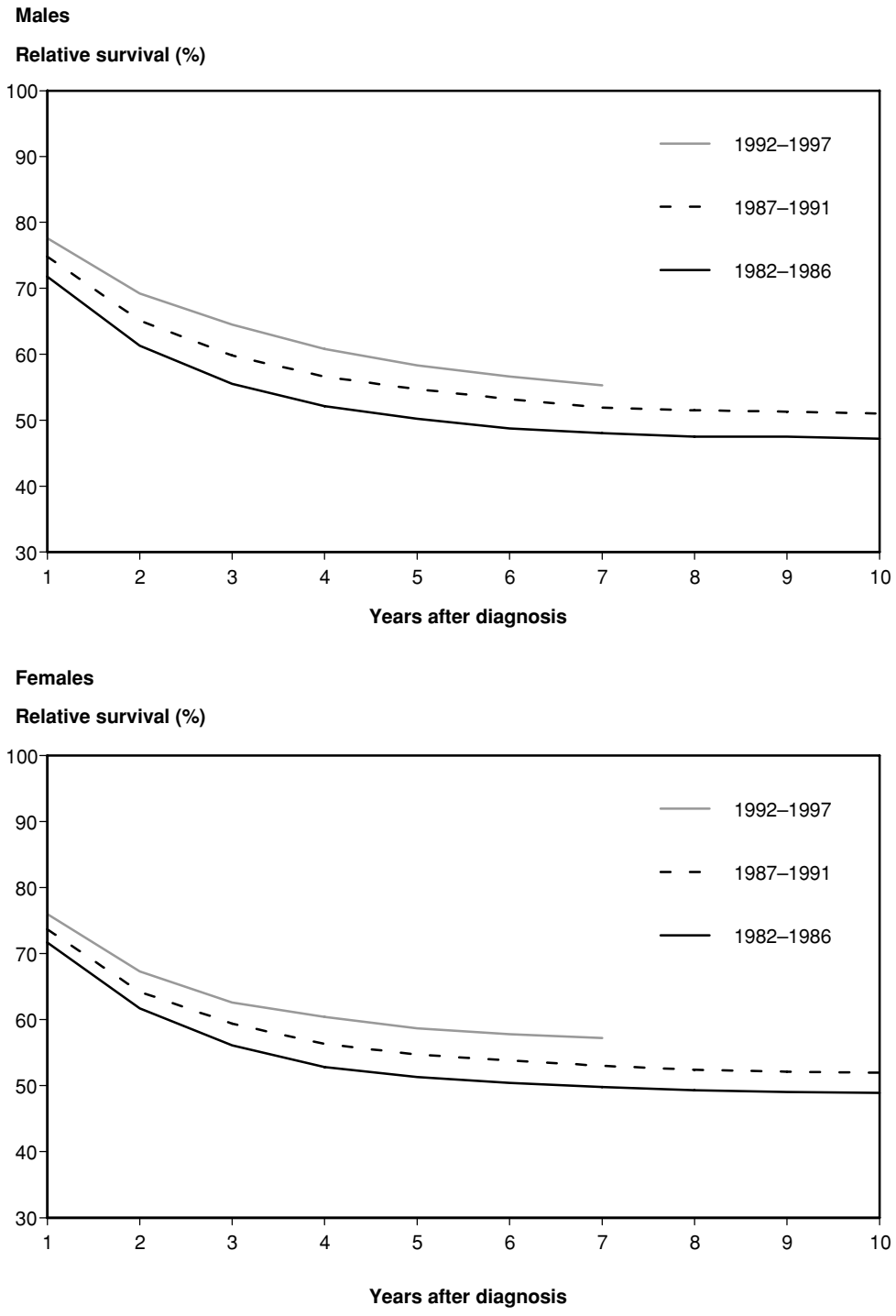
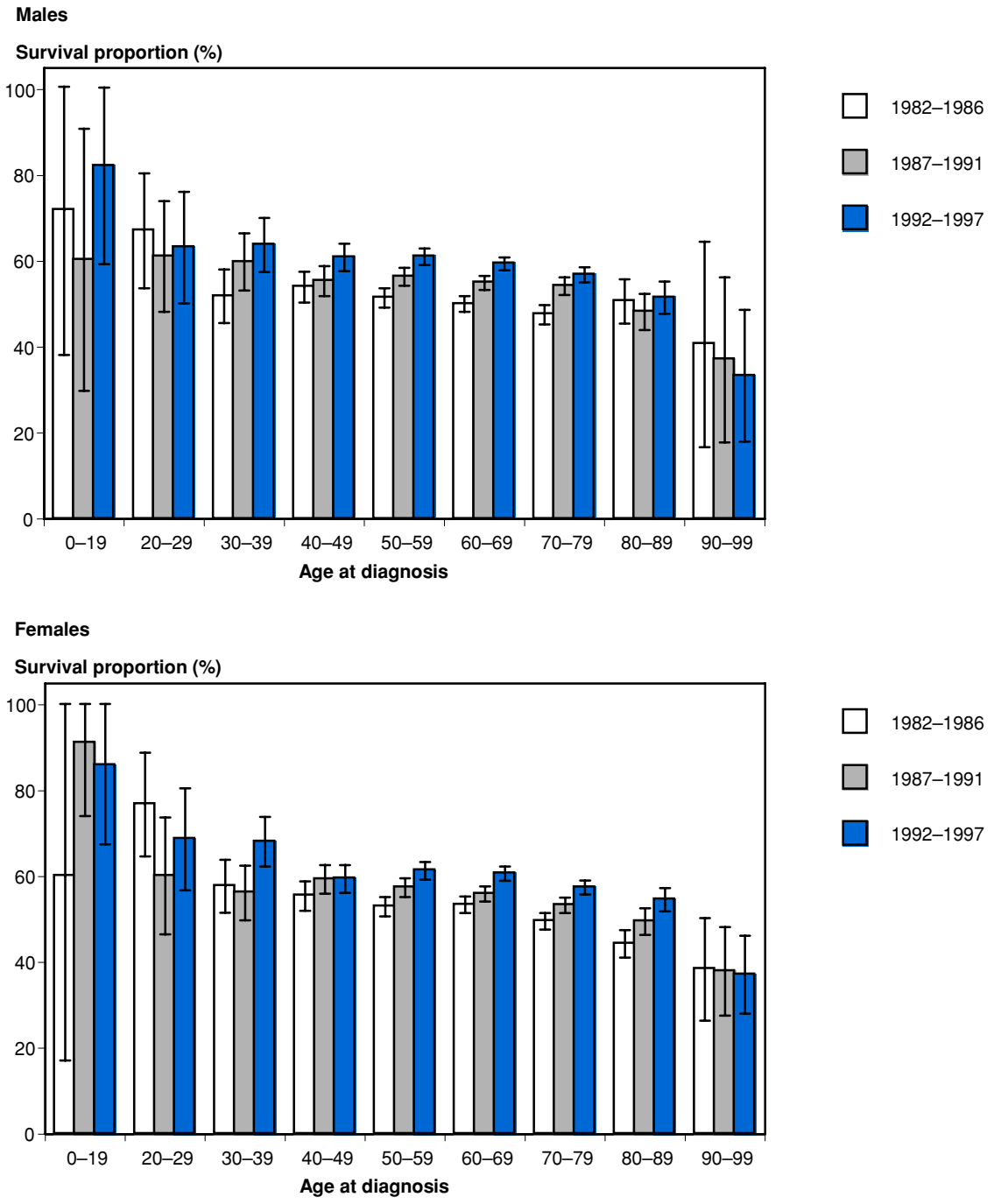


Figure 5.2: Cancer of the colon relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 5.3: Cancer of the colon five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

6 Cancer of the rectum

Summary

In 1992–1997, relative survival one year after diagnosis with cancer of the rectum was 82.2% for males and 82.6% for females. Five-year relative survival for the period 1992–1997 was 56.6% for males and 60.6% for females (Table 6.1). Ten years after diagnosis, relative survival proportions were 44.1% for males and 51.0% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Tables 6.2 and 6.3).

There has been a significant increase in relative survival proportions for cancer of the rectum between 1982–1986 and 1992–1997 (Figure 6.2; Tables 6.2 and 6.3). One-year relative survival increased by 4.3 percentage points for males and 5.0 percentage points for females, and five-year relative survival increased by 7.9 percentage points for males and 8.3 percentage points for females.

There was no clear relationship between rectal cancer five-year relative survival and age. Five-year relative survival was highest for males aged 30–39 years (64.4%) and females aged 50–59 years (65.2%) (Figure 6.3; Table 6.1).

There were significant increases in five-year relative survival proportions between the periods 1982–1986 and 1992–1997 for males aged from 50–59 to 80–89 years and females aged from 50–59 to 70–79 years. All the other age groups showed no significant difference between the diagnosis periods (Figure 6.3; Tables 6.5 and 6.6).

Table 6.1: Cancer of the rectum: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	2	3	1	1	*	*
20–29 years	30	27	15	12	46.3	58.7
30–39 years	180	208	64	71	64.4	63.1
40–49 years	907	659	359	226	59.3	64.9
50–59 years	2,448	1,475	996	520	60.6	65.2
60–69 years	4,370	2,211	2,113	890	56.6	62.9
70–79 years	4,013	2,635	2,298	1,287	54.1	59.6
80–89 years	1,390	1,535	1,026	1,046	49.3	49.7
90–99 years	121	235	101	210	53.7	27.5
All ages	**13,461**	**8,988**	**6,973**	**4,263**	**56.6**	**60.6**

* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

Incidence and mortality

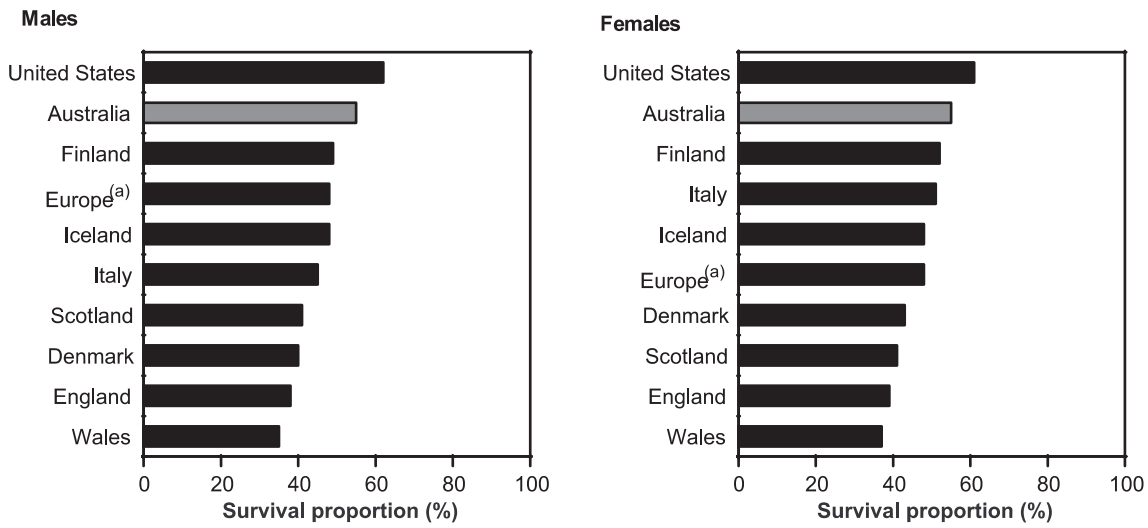
In 1997 there were 4,030 new cases of rectal cancer diagnosed. Of these, 2,447 were males and 1,583 were females.

Rectal cancer was the cause of 675 male deaths and 472 female deaths in 1997. It is estimated that each year rectal cancer is responsible for about 5,200 years of life lost in males and 3,100 years of life lost in females before the age of 75.

For the six-year period 1992–1997, age-standardised incidence rates for cancer of the rectum increased by 1.6% per annum for males and decreased slightly by 0.2% per annum for females. Age-standardised mortality rates decreased in both males and females by 2.6% and 1.9% respectively.

International comparisons

Five-year relative survival after diagnosis of cancer of the rectum in Australia compares favourably with the selected countries. Male five-year relative survival is about 8 percentage points lower than that for the United States and Iceland, and for females the difference with the United States is 4 percentage points.



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 6.1: Cancer of the rectum five-year relative survival proportions: selected countries

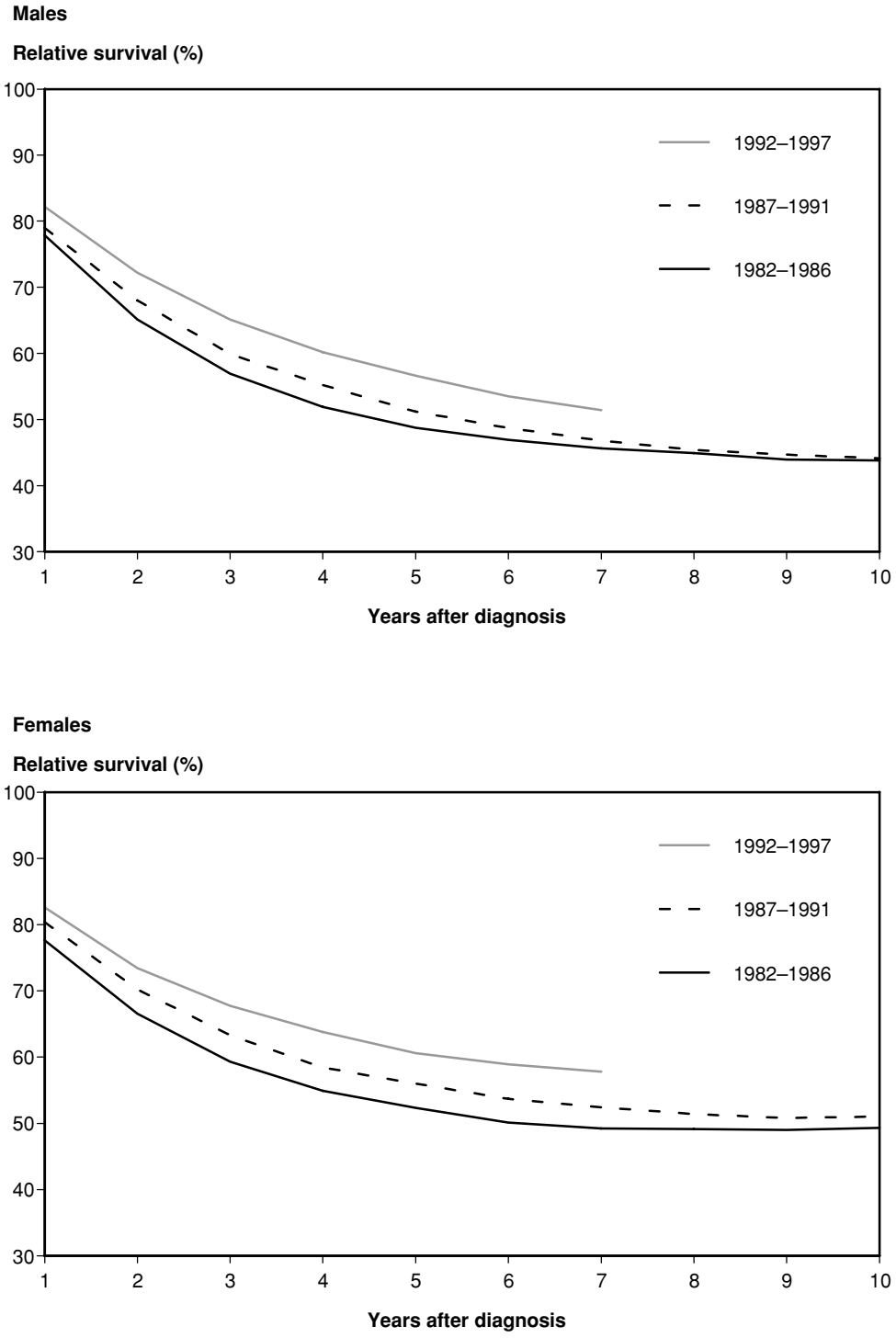
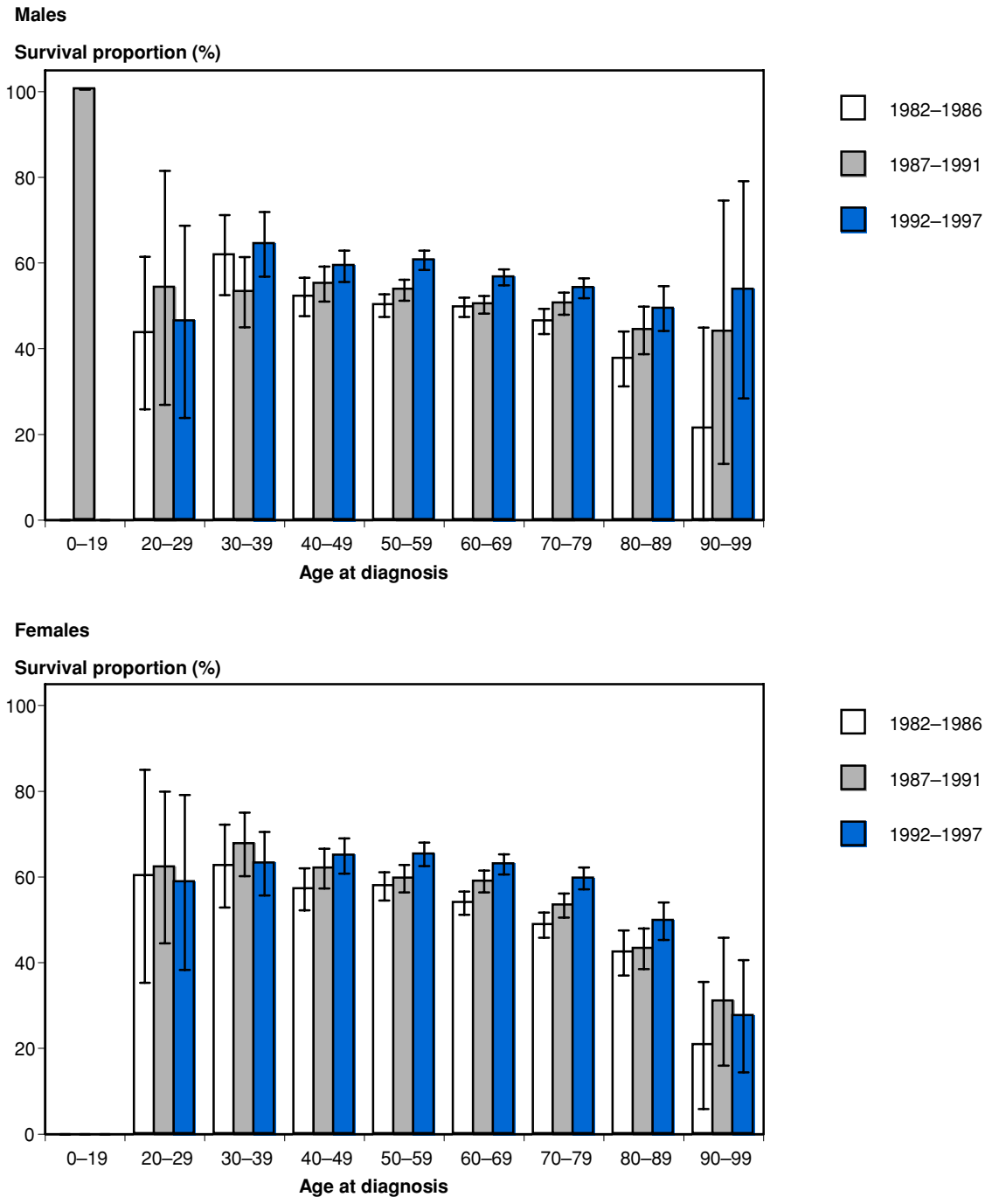


Figure 6.2: Cancer of the rectum relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 6.3: Cancer of the rectum five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

7 Cancer of the pancreas

Summary

Five-year relative survival after diagnosis of pancreatic cancer in Australia was poor, having the lowest relative survival proportions of all cancer sites studied. In 1992–1997 one-year relative survival proportions were 19.5% for males and 18.0% for females. Survival five years after diagnosis was 5.4% for males and 5.2% for females (Table 7.1). Ten-year relative survival proportions were 4.1% for males and 5.3% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 7.2; Tables 7.2 and 7.3).

There were no significant changes in relative survival for males and females between 1982–1986 and 1992–1997, except for one-year relative survival for males which increased from 16.4% to 19.5% (Figure 7.2; Tables 7.2 and 7.3).

Five-year relative survival after a diagnosis of pancreatic cancer was highest in the younger age groups and decreased sharply as age increased. However, the numbers of new cases and deaths were small for age groups below 30 years, making survival estimates for these age groups less robust. During 1992–1997, five-year relative survival was 11.2% for males aged 30–39 years and 24.5% for females in this age group. The relative survival proportions decreased to 6.9% for males and 5.8% for females aged 50–59 years. After this age, five-year relative survival decreased more slowly, to 2.4% in males and 3.3% in females aged 80–89 years (Figure 7.3; Table 7.1).

There was significant increase in five-year relative survival for females aged 40–49 between 1982–1986 and 1992–1997, from 6.5% to 19.3%. All other age groups showed no significant difference between the diagnosis periods (Figure 7.3; Tables 7.5 and 7.6).

Table 7.1: Cancer of the pancreas: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	1	7	1	2	*	68.7
20–29 years	7	11	6	5	14.4	50.0
30–39 years	51	42	43	32	11.2	24.5
40–49 years	235	152	211	122	9.7	19.3
50–59 years	632	369	590	340	6.9	5.8
60–69 years	1,308	958	1,243	911	6.2	4.9
70–79 years	1,573	1,523	1,520	1,480	3.0	3.2
80–89 years	727	1,150	717	1,124	2.4	3.3
90–99 years	66	203	65	202	10.5	3.2
All ages	**4,600**	**4,415**	**4,396**	**4,218**	**5.4**	**5.2**

* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

Incidence and mortality

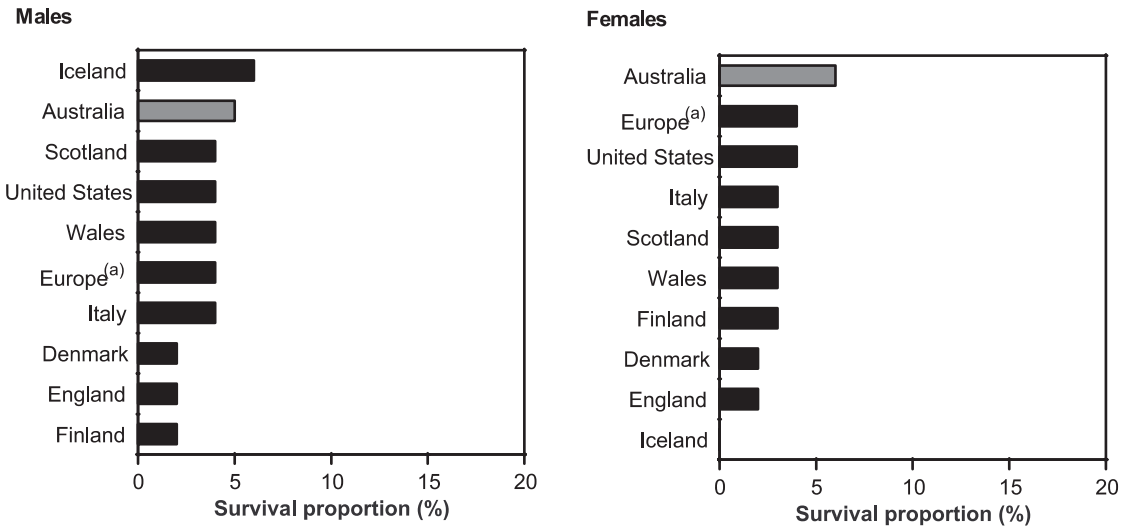
There were 829 and 845 new cases of pancreatic cancer in males and females respectively in 1997.

In 1997, 773 males and 830 females died from cancer of the pancreas. It is estimated that each year pancreatic cancer is responsible for about 5,200 male and 4,000 female years of life lost before the age of 75.

For the six-year period 1992–1997, age-standardised incidence and mortality rates for cancer of the pancreas in males decreased, with incidence falling by 0.8% per annum and mortality falling by 1.4% per annum. For females, age-standardised incidence and mortality rates showed evidence of a slight annual increase of 0.4% and 0.5%.

International comparisons

Five-year relative survival was poor in all the countries for which relative survival data were available. This trend was also reflected in the Australian statistics. In countries where data were available, five-year relative survival after pancreatic cancer was between 2% and 6%. The Australian relative survival proportion was not notably different from the other countries (Figure 7.3).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 7.1: Cancer of the pancreas five-year relative survival proportions: selected countries

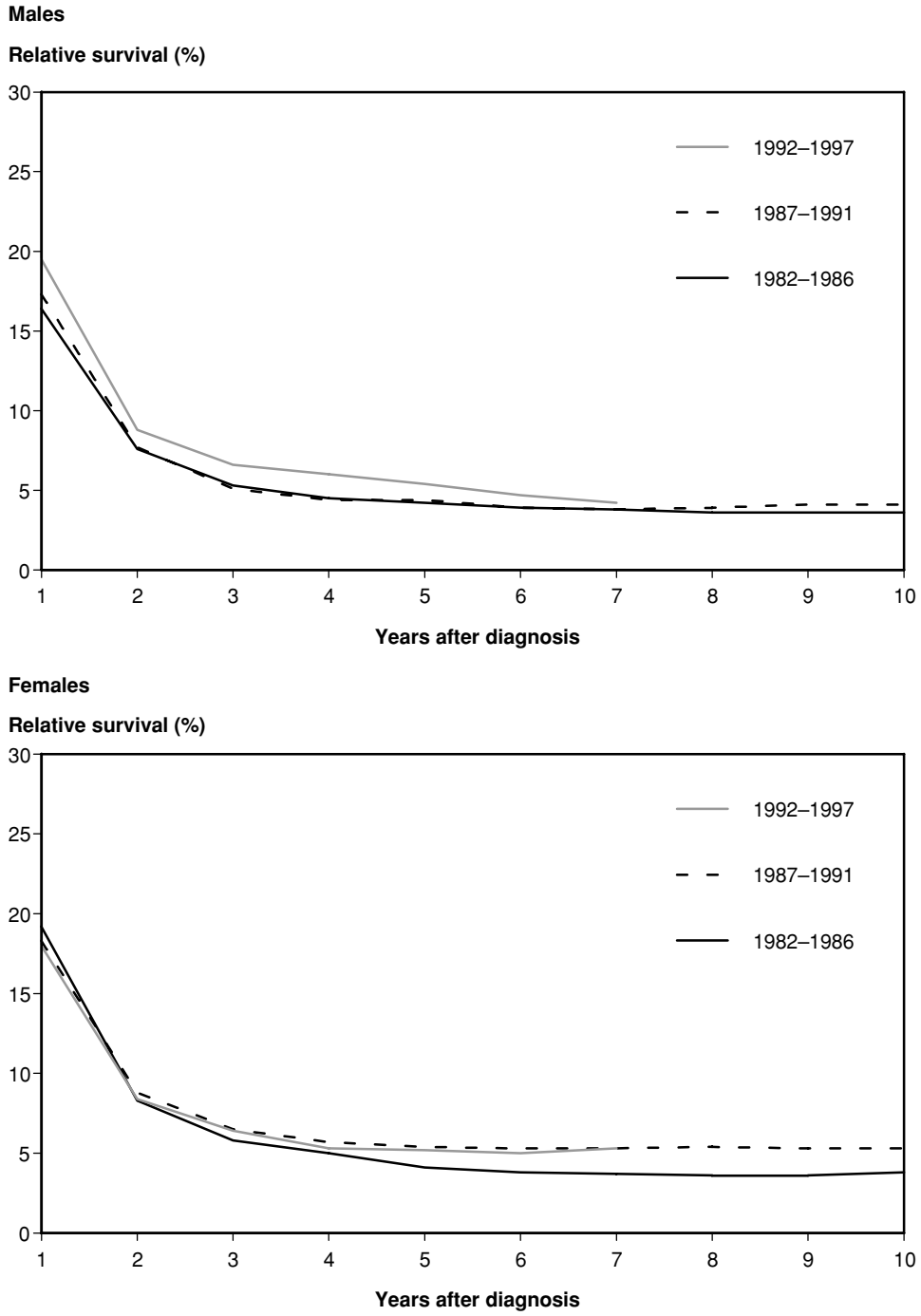
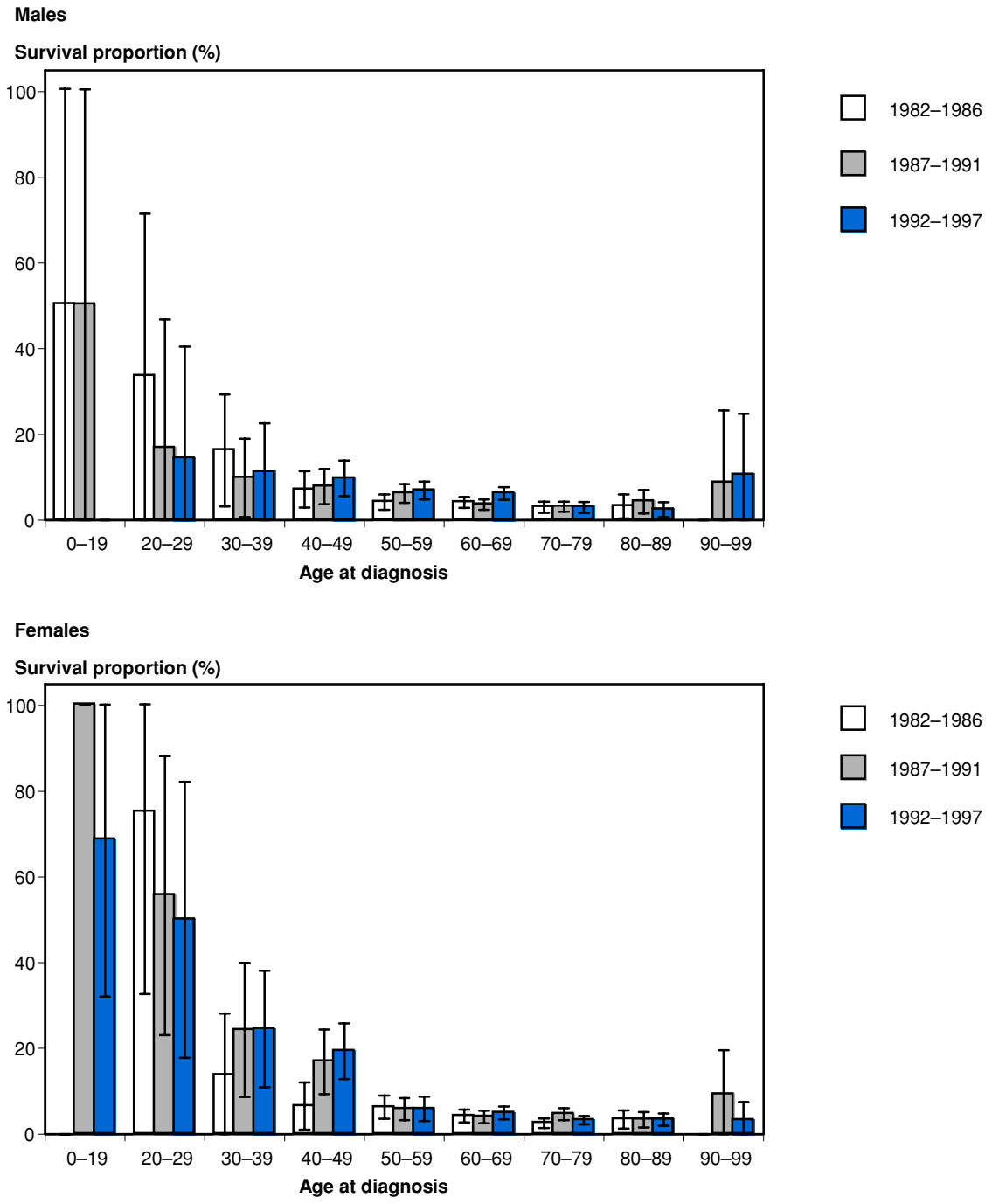


Figure 7.2: Cancer of the pancreas relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 7.3: Cancer of the pancreas five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

8 Cancer of the lung

Summary

Cancer of the lung is the most common cancer in Australia and the world, and relative survival after diagnosis remains very poor when compared with other cancers. During the 1992–1997 period, one-year relative survival proportions were 34.6% for males and 37.6% for females. The five-year relative survival proportions fell to 11.0% for males and 14.0% for females (Table 8.1). Survival ten years after diagnosis was only 8.2% for males and 9.2% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Tables 8.2 and 8.3).

Between 1982–1986 and 1992–1997 there was a slight but significant increase in the one-year through to seven-year survival proportions for males and females. Five-year relative survival increased by 1.7 percentage points for males and 2.2 percentage points for females between 1982–1986 and 1992–1997 (Figure 8.2; Tables 8.2 and 8.3).

For lung cancers diagnosed within the period 1992–1997, five-year relative survival proportions were highest for males and females aged below 30 years. Five-year relative survival was significantly less for those aged 30–39 years—24.5% for males and 35.3% for females. This decrease continued to 3.9% in males and 6.4% in females in the 80–89 age group (Figure 8.3; Table 8.1).

There was a significant increase in five-year relative survival proportions between the diagnosis periods 1982–1986 and 1992–1997 for males aged from 50–59 to 70–79 years and for females aged 60–69 years. The other male and female age groups showed no significant differences in relative survival between the diagnosis periods (Figure 8.3; Tables 8.5 and 8.6).

Table 8.1: Cancer of the lung: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	5	8	2	2	60.1	75.1
20–29 years	29	19	7	7	76.2	62.9
30–39 years	156	144	118	93	24.5	35.3
40–49 years	1,081	809	913	641	14.9	19.9
50–59 years	4,079	1,939	3,483	1,590	14.4	17.6
60–69 years	10,251	3,916	9,089	3,308	11.9	15.6
70–79 years	10,974	4,577	10,102	4,118	9.0	10.6
80–89 years	3,718	1,790	3,613	1,706	3.9	6.4
90–99 years	252	150	248	146	6.4	8.9
All ages	**30,545**	**13,352**	**27,575**	**11,611**	**11.0**	**14.0**

Incidence and mortality

There were 7,833 new cases of lung cancer diagnosed in 1997. Of these, 5,333 were males and 2,500 were females.

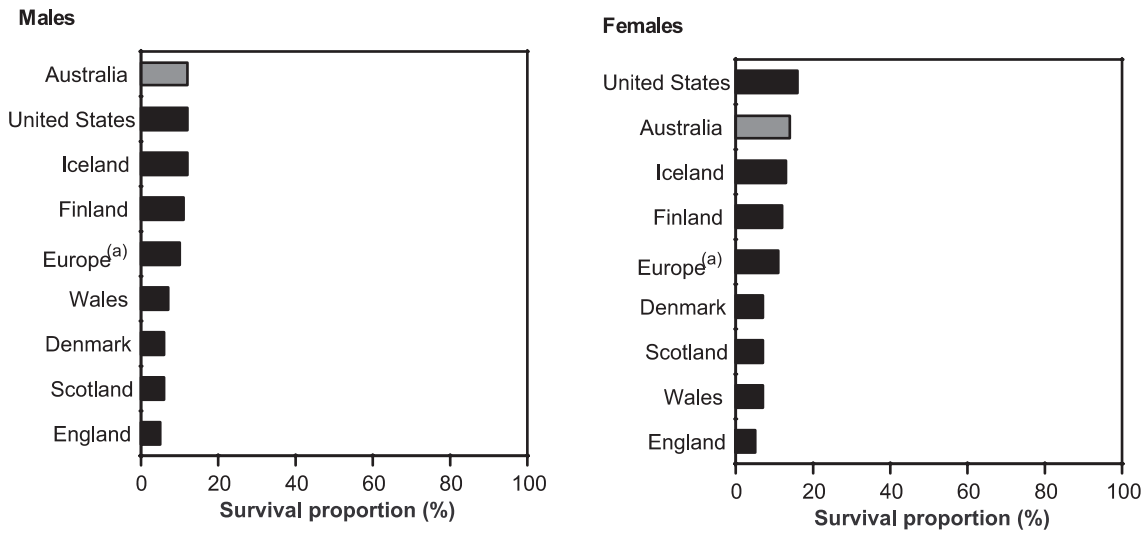
Lung cancer was the cause of 4,615 male deaths and 2,068 female deaths in 1997. It is estimated that each year lung cancer is responsible for about 29,800 years of life lost in males and 14,800 years of life lost in females before the age of 75.

For the six-year period 1992–1997, age-standardised incidence and mortality rates for lung cancer in males decreased, with incidence falling by 1.5% per annum and mortality by 2.1% per annum. Conversely, female age-standardised rates increased, with incidence increasing by approximately 1.9% per annum and mortality by 1.4% per annum.

International comparisons

Lung cancer five-year relative survival proportions were poor in all the countries for which relative survival data were available. In countries where data were available, five-year relative survival after lung cancer was between 5% and 16%.

Five-year relative survival after diagnosis of lung cancer in Australia (14%), although quite low compared with other cancers, was relatively high compared with relative survival after lung cancer in other countries (Figure 8.3; Table 8.8).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 8.1: Cancer of the lung five-year relative survival proportions: selected countries

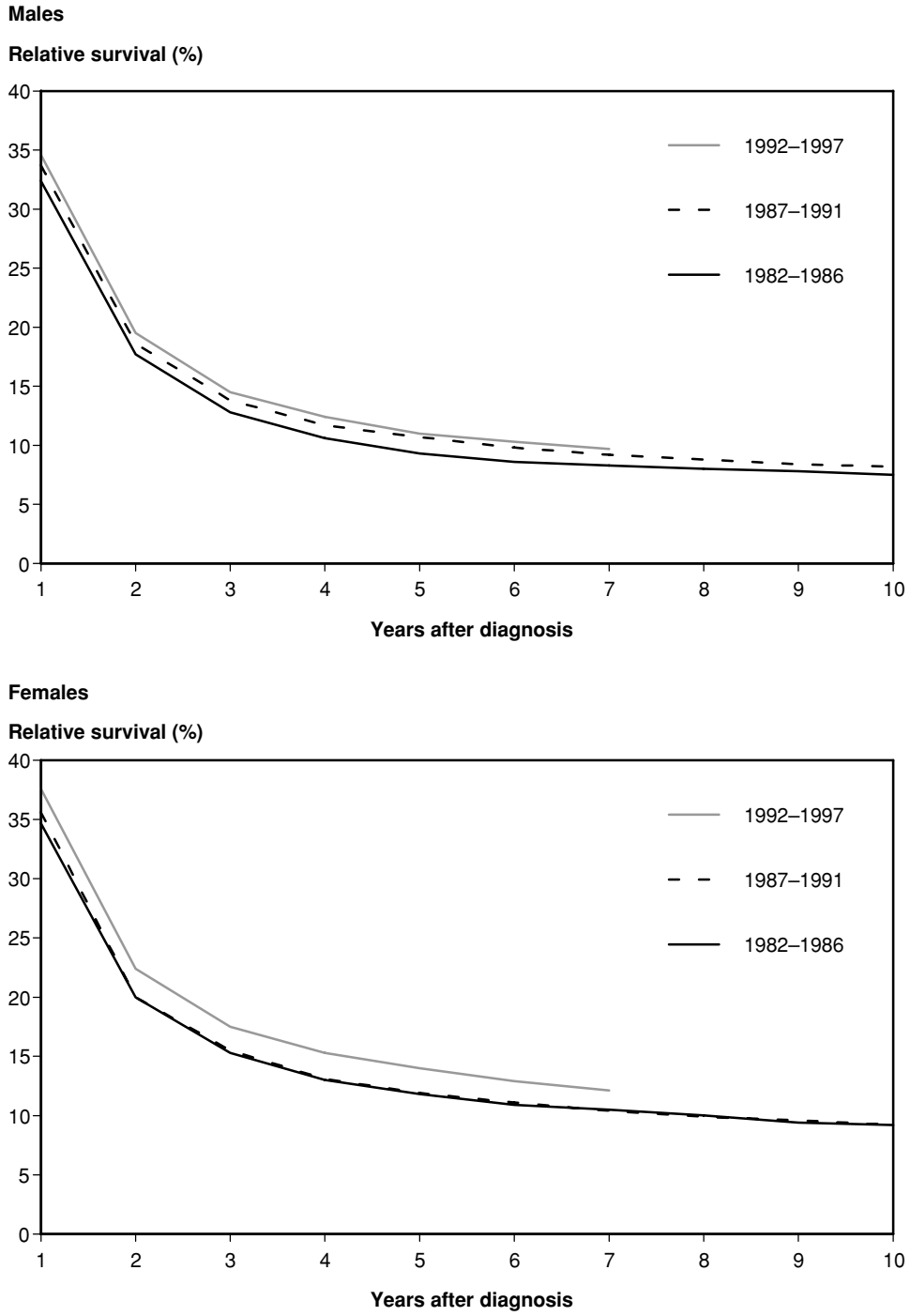
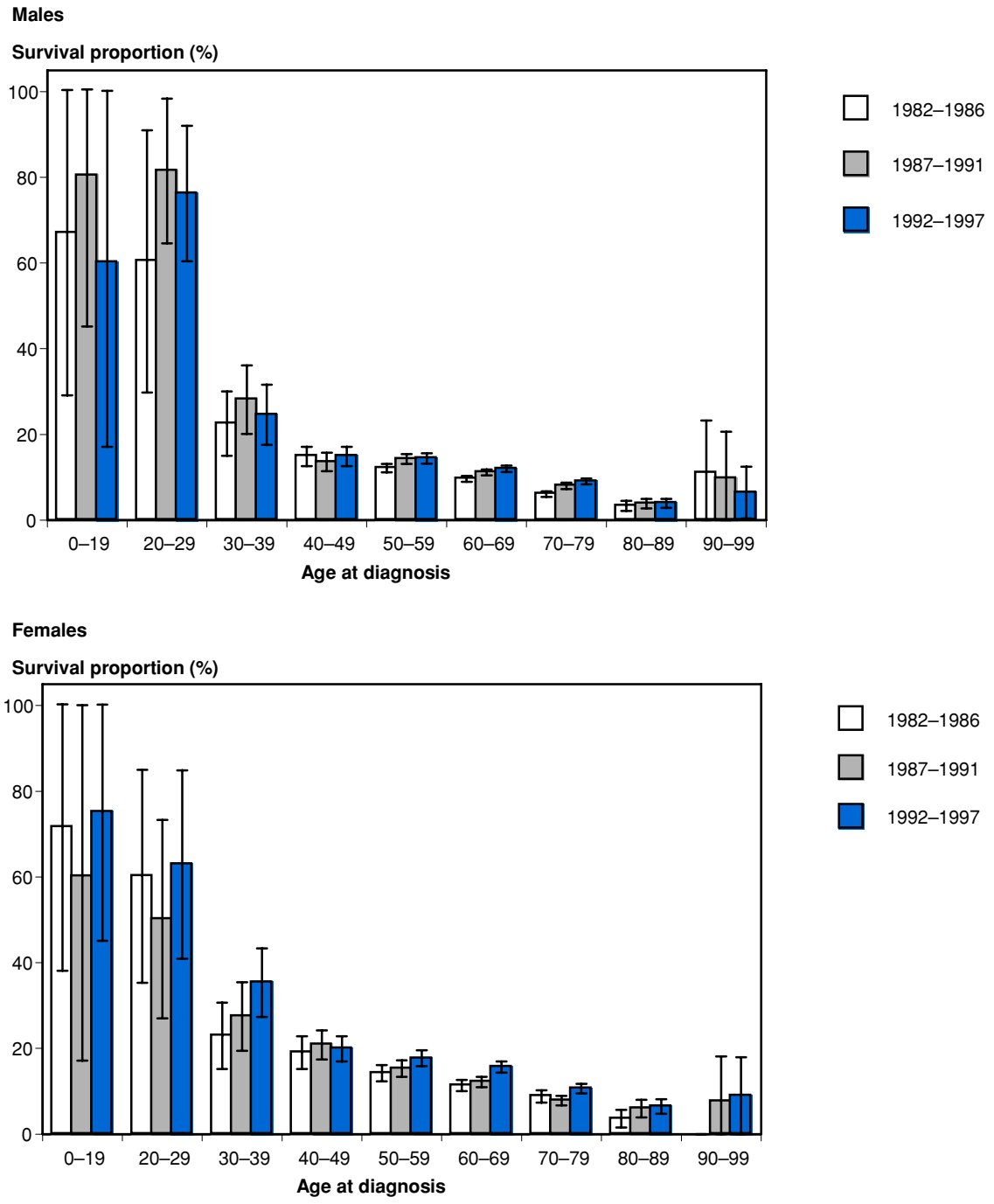


Figure 8.2: Cancer of the lung relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 8.3: Cancer of the lung five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

Small-cell carcinoma of the lung

Five-year relative survival after a diagnosis of small-cell carcinoma of the lung was very poor when compared with non-small-cell carcinoma of the lung. For the period 1992–1997,

one-year relative survival after diagnosis of small-cell carcinoma of the lung was 28.3% for males and 33.7% for females. Relative survival five years after diagnosis was only 4.8% in males and 5.4% in females (Figure 8.4; Tables 8.9 and 8.10).

For small-cell carcinomas of the lung diagnosed between 1992 and 1997, five-year relative survival was highest in the 30–39 age group for males and in the 50–59 age group for females at 9.5% and 9.8% respectively. As age increased from age group 50–59, five-year relative survival dropped steadily to 1.6% at age 80–89 years for both males and females (Tables 8.11 and 8.12).

Survival by subtypes

Non-small-cell carcinoma of the lung

Five-year relative survival after diagnosis of non-small-cell carcinoma of the lung was higher than for small-cell carcinoma of the lung. For the period 1992–1997, one-year relative survival for those diagnosed with non-small-cell carcinomas of the lung was about 35.6% for males and 38.4% for females. Five-year relative survival was 12.0% for males and 15.8% for females (Figure 8.4; Tables 8.13 and 8.14).

Five-year relative survival declined steadily as age increased. Both males and females aged 20–29 years had the highest five-year relative survival, at 81.8% and 62.9% respectively. This decreased to 4.1% for males and 7.0% for females aged 80-89 years (Tables 8.15 and 8.16).

Adenocarcinoma of the lung

Five-year relative survival after diagnosis of adenocarcinoma of the lung was higher when compared with relative survival after diagnosis of all non-small-cell carcinoma of the lung. One-year relative survival for those diagnosed with adenocarcinoma of the lung was 37.9% for males and 46.6% for females for the period 1992–1997. Five-year relative survival was 13.7% for males and 20.5% for females (Figure 8.4; Tables 8.17 and 8.18).

During the diagnosis period 1992–1997, five-year relative survival decreased steadily as age increased. The numbers of new cases and deaths were small for age groups under 30 years, making relative survival estimates for these age groups less robust. For those aged 30–39 years, five-year relative survival was 16.2% for males and 29.3% for females. Five-year relative survival decreased to 7.2% for males and 13.7% for females aged 80–89 years (Tables 8.19 and 8.20).

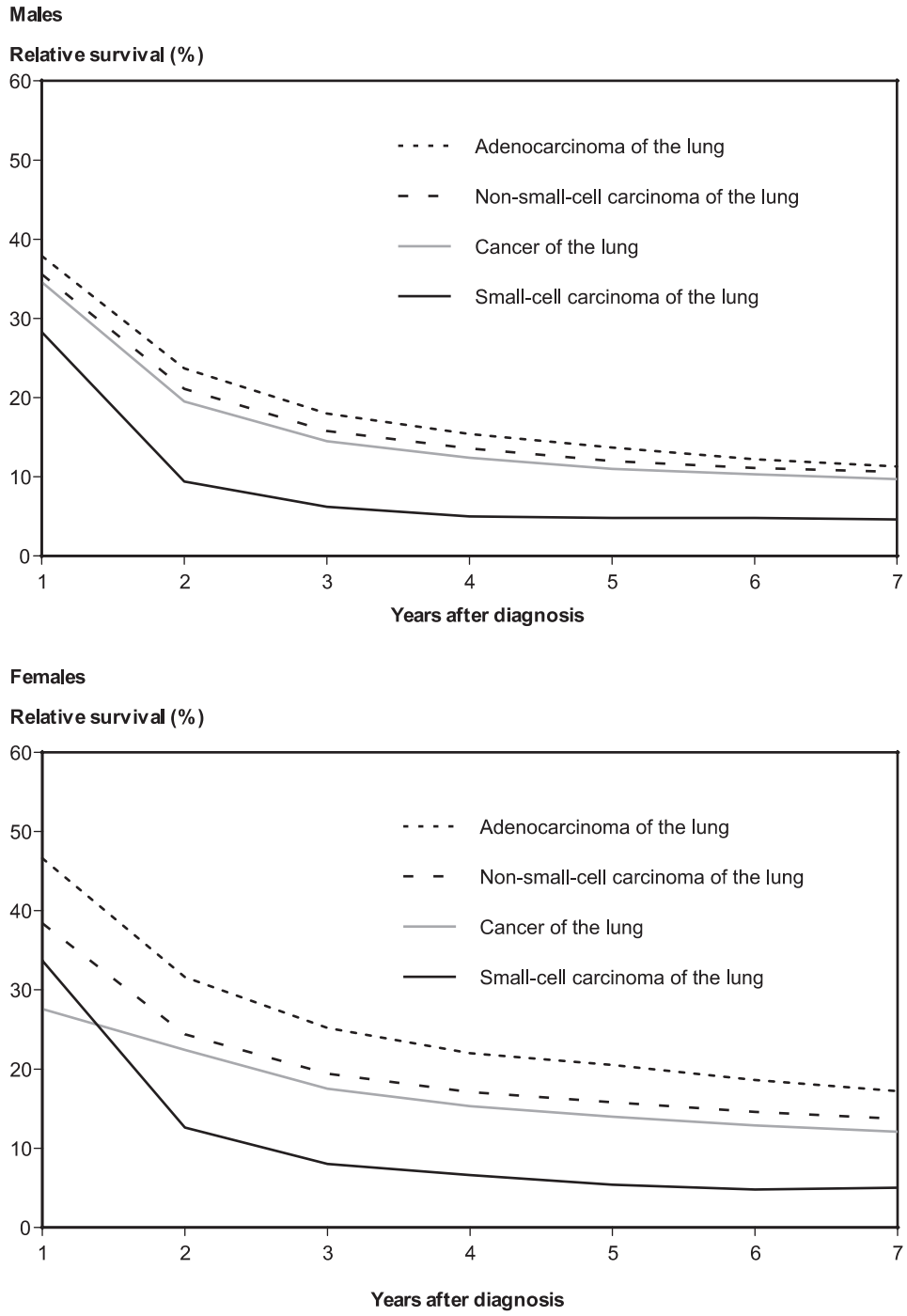


Figure 8.4: Cancer of the lung five-year relative survival proportions: by morphology, Australia, 1992–1997

9 Cancer of the skin—melanoma

Summary

Relative survival after diagnosis of melanoma of the skin is very high when compared with other cancer sites. For those cancers diagnosed in 1992–1997, relative survival one year after diagnosis of melanoma of the skin was 96.9% for males and 98.6% for females. Five years after diagnosis relative survival was 90.0% for males and 94.6% for females (Table 9.1). Relative survival ten years after diagnosis was 84.5% for males and 92.0% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 9.2; Tables 9.2 and 9.3).

Relative survival after a diagnosis of melanoma increased significantly between 1982–1986 and 1992–1997. One-year relative survival increased by 2.4 percentage points for males and 1.9 percentage points for females, and five-year relative survival increased 7.0 percentage points for males and 3.7 percentage points for females (Figure 9.2; Tables 9.2 and 9.3).

Relative survival after melanoma was consistently high for all age groups. Five-year relative survival was over 90% for males in all age groups under 50–59 years, and for females in all age groups under 70–79 years. There was a decline in the oldest age group, with five-year relative survival in the 90–99 age group 51.5% for males and 88.1% for females (Figure 9.3; Table 9.1).

For individual age groups, five-year relative survival increased significantly for males and females for most age groups between 1982–1986 and 1992–1997 (Figure 9.3; Tables 9.5 and 9.6).

Table 9.1: Melanoma of the skin: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	317	329	13	12	96.6	96.6
20–29 years	1,302	1,553	69	32	95.5	98.4
30–39 years	2,328	2,899	167	108	93.2	96.6
40–49 years	3,741	3,642	339	180	92.3	95.9
50–59 years	4,297	3,171	515	220	91.7	95.6
60–69 years	5,266	3,319	1,090	417	89.1	93.1
70–79 years	4,864	2,952	1,731	656	84.7	92.3
80–89 years	1,779	1,496	1,004	735	82.3	83.9
90–99 years	166	221	130	153	51.5	88.1
All ages	**24,060**	**19,582**	**5,058**	**2,513**	**90.0**	**94.6**

Incidence and mortality

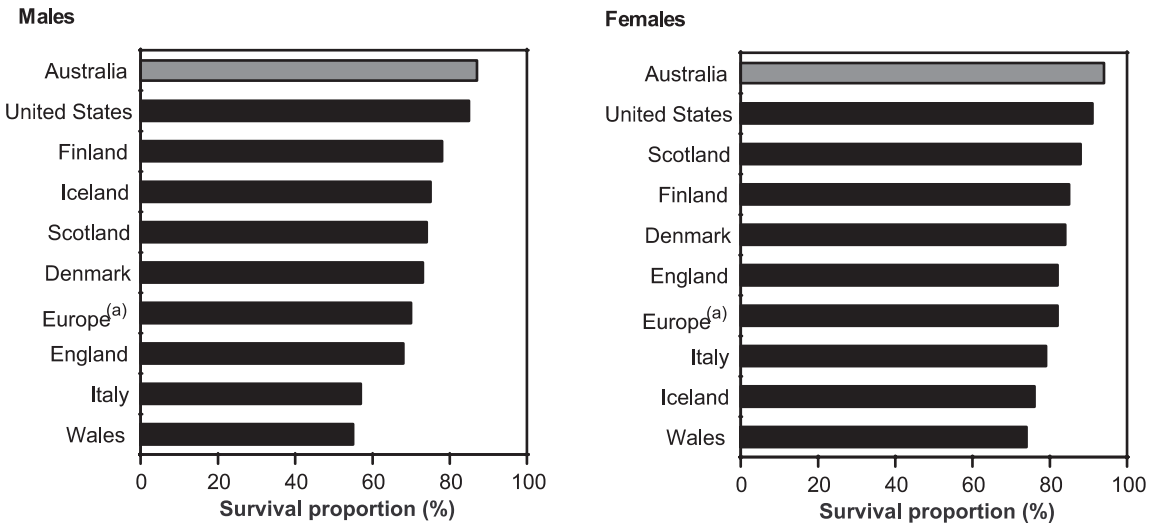
In 1997, there were 8,378 new cases of melanoma diagnosed. Of these, 4,658 were males and 3,720 were females.

In 1997, 580 males and 330 females died from melanoma. It is estimated that, in 1997, 6,700 years of life were lost in males and 4,400 years of life were lost in females before the age of 75 due to melanoma.

For the six-year period 1992–1997, age-standardised incidence rates for melanoma increased by 3.4% per annum for males and 2.6% per annum for females. Age-standardised mortality rates decreased slightly by 0.9% per annum for males and 1.1% per annum for females.

International comparisons

Australian males and females are ranked first for five-year relative survival after a diagnosis of melanoma of the skin when compared with the other countries for which relative survival information is available.



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 9.1: Melanoma of the skin five-year relative survival proportions: selected countries

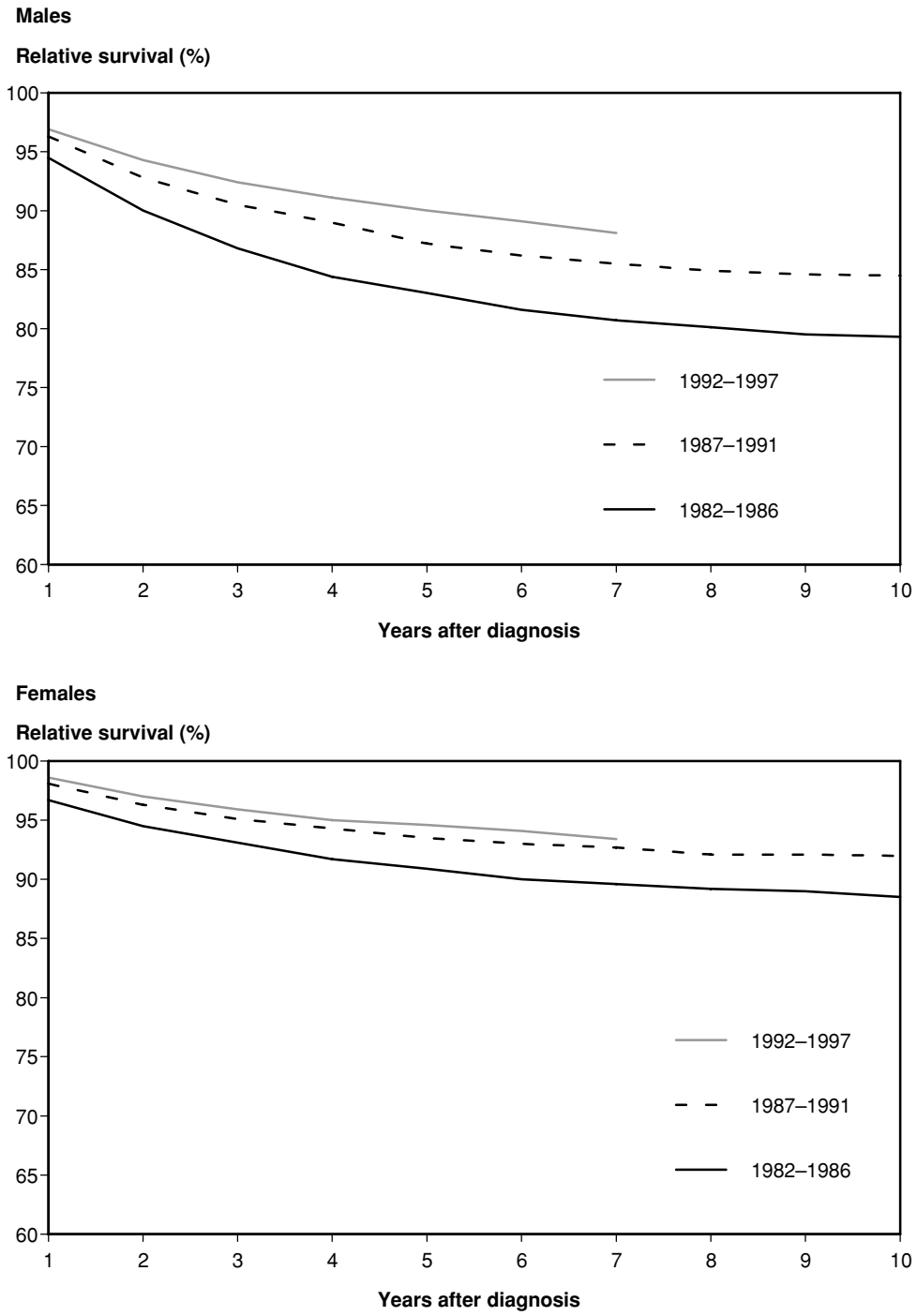
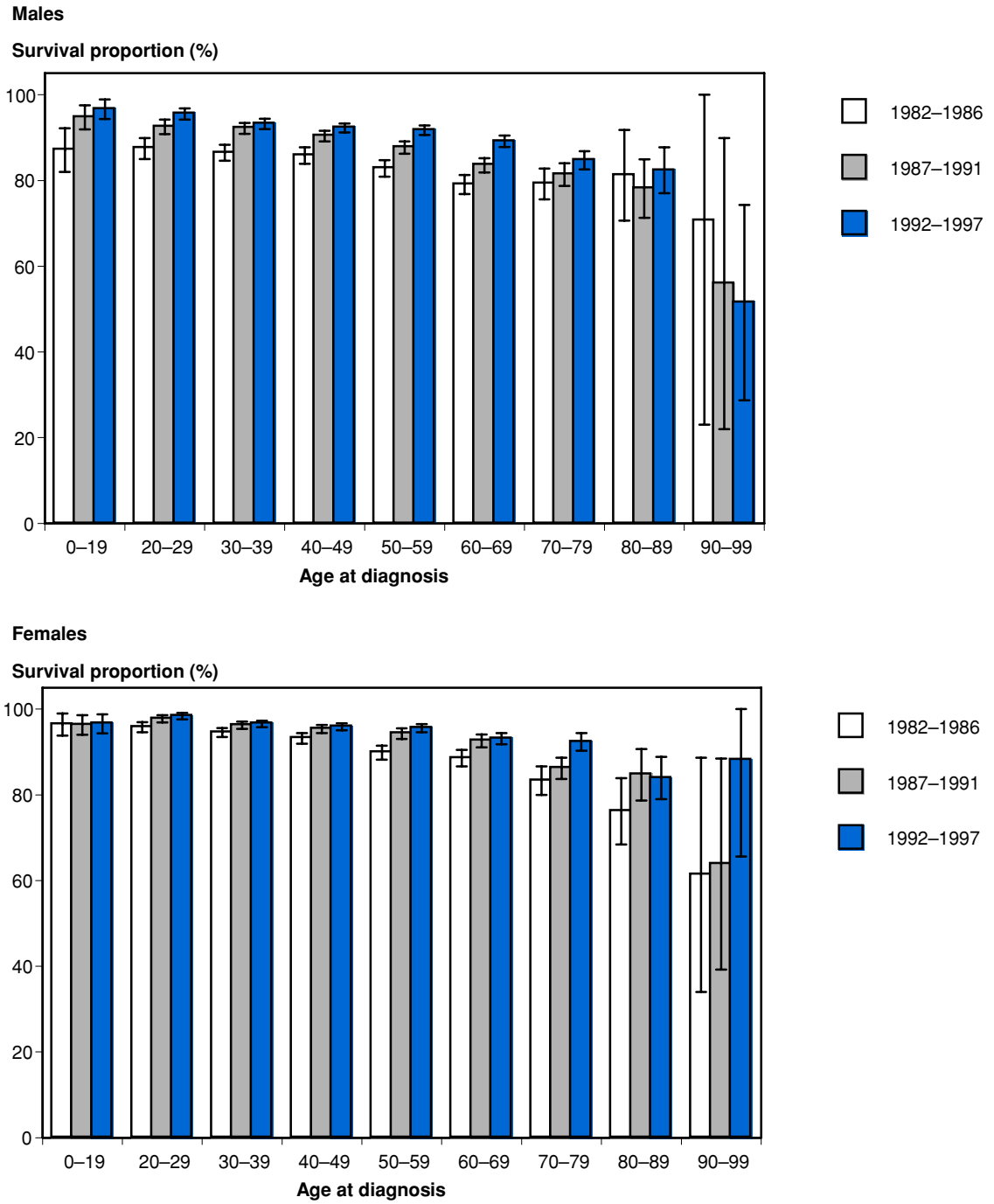


Figure 9.2: Melanoma of the skin relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 9.3: Melanoma of the skin five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

10 Cancer of the breast (female)

Summary

Relative survival after diagnosis of breast cancer in females is good when compared with other cancer sites. For the period 1992–1997, relative survival one year after diagnosis was 96.4%, and five years after diagnosis was 84.0% (Table 10.1). Relative survival ten years after diagnosis was 68.3% in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 10.2; Table 10.2).

Between 1982–1986 and 1992–1997, there was a significant increase in relative survival after diagnosis of breast cancer. One-year relative survival increased from 94.0% to 96.4% and five-year relative survival increased from 72.3% to 84.0% (Figure 10.2; Table 10.2).

There was no clear relationship between breast cancer five-year relative survival and age. Relative survival proportions ranged from 86.1% for those aged 60–69 years to 64.7% for those aged 90–99 years (Figure 10.3; Table 10.1).

For individual age groups, there was a significant increase in relative survival between 1982–1986 and 1992–1998 for age groups between 30–39 and 70–79 years. This increase ranged from 7.7 percentage points for females aged 30–39 years to 15.0 percentage points for females aged 50–59 years (Figure 10.3; Table 10.3).

Table 10.1: Cancer of the breast: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis, Australia, 1992–1997

Age	New cases	Deaths	5-year relative survival (%)
0–19 years	9	1	*
20–29 years	370	98	72.4
30–39 years	3,575	727	79.8
40–49 years	11,244	1,694	85.8
50–59 years	12,834	1,976	85.7
60–69 years	12,351	2,317	86.1
70–79 years	10,159	3,041	82.8
80–89 years	4,619	2,522	72.2
90–99 years	654	513	64.7
All ages	**55,815**	**12,889**	**84.0**

* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

Incidence and mortality

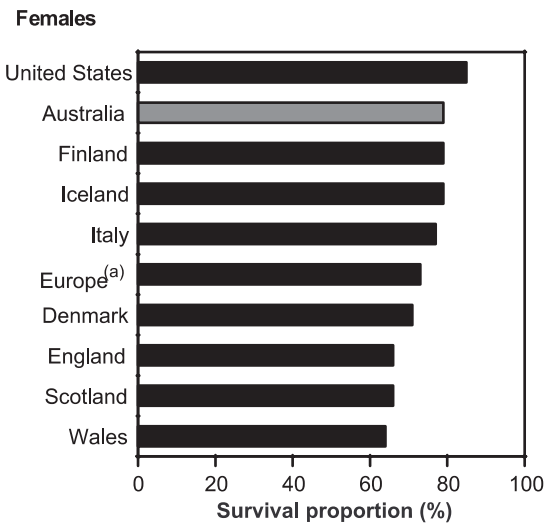
In 1997 there were 10,111 new cases of breast cancer diagnosed in Australia and 2,596 females died from breast cancer.

It is estimated that each year about 31,000 years of life are lost before the age of 75 due to breast cancer (about 9% of all premature death for females), making breast cancer a leading cause of premature death for females in Australia.

For the six-year period 1992–1997, age-standardised incidence rates for female cancer of the breast increased by 2.1%. Age-standardised mortality rates, however, decreased by approximately 1.3% per annum.

International comparisons

Breast cancer five-year relative survival in Australia was high (79%) when compared with other countries where relative survival information was available. The range of relative survival proportions for Western countries was high, from 64% to 85%, with Australia fourth behind the United States, Iceland and Finland (Figure 10.1; Table 10.4).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 10.1: Cancer of the breast five-year relative survival proportions: selected countries

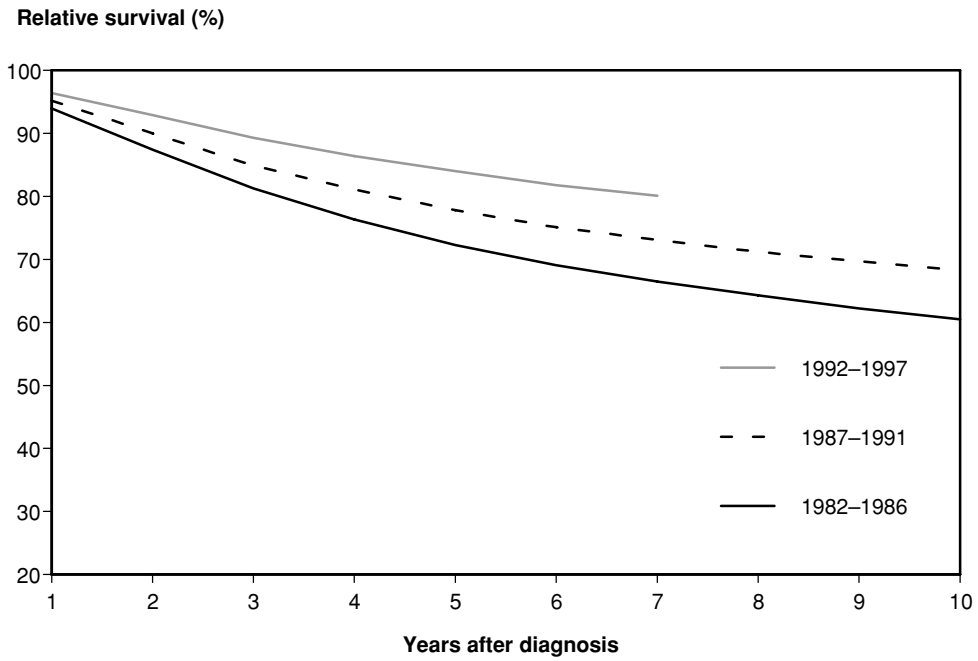
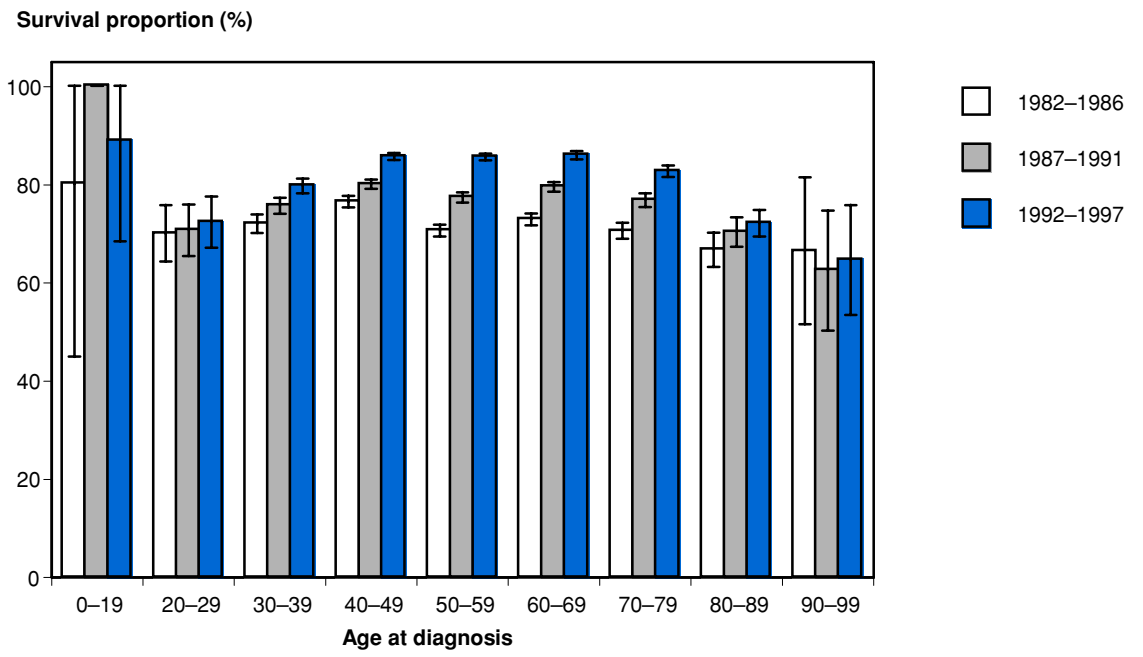


Figure 10.2: Cancer of the breast relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 10.3: Cancer of the breast five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

11 Cancer of the uterus

Summary

When compared with other cancer sites, relative survival after diagnosis of cancer of the uterus is high. For the period 1992–1997, relative survival one year after diagnosis of cancer of the uterus was 91.2% and five years after diagnosis was 81.4% (Table 11.1). Survival ten years after diagnosis was 76.4% in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 11.2; Table 11.3).

Relative survival after cancer of the uterus increased significantly between 1982–1986 and 1992–1997. One-year relative survival increased from 88.3% to 91.2% and five-year relative survival increased from 76.1% to 81.4% (Figure 11.2; Table 11.3).

Five-year relative survival after diagnosis of cancer of the uterus was quite high in most age groups. For those cancers diagnosed during 1992–1997, relative survival was above 80.0% for females aged under 60–69 years, declining to 63.0% in the 80–89 age group and 39.9% in the 90–99 age group (Figure 11.3; Table 11.1).

For individual age groups, five-year relative survival increased significantly between 1982–1986 and 1992–1997 for females aged 60–69 and 70–79 years. All other age groups showed no significant difference (Figure 11.3; Table 11.3).

Table 11.1: Cancer of the uterus: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis, Australia, 1992–1997

Age	New cases	Deaths	5-year relative survival (%)
0–19 years	4	1	*
20–29 years	35	2	97.3
30–39 years	181	18	92.2
40–49 years	760	87	89.7
50–59 years	1,747	245	88.3
60–69 years	2,285	486	83.0
70–79 years	1,916	737	72.9
80–89 years	822	500	63.0
90–99 years	94	78	39.9
All ages	**7,844**	**2,154**	**81.4**

* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

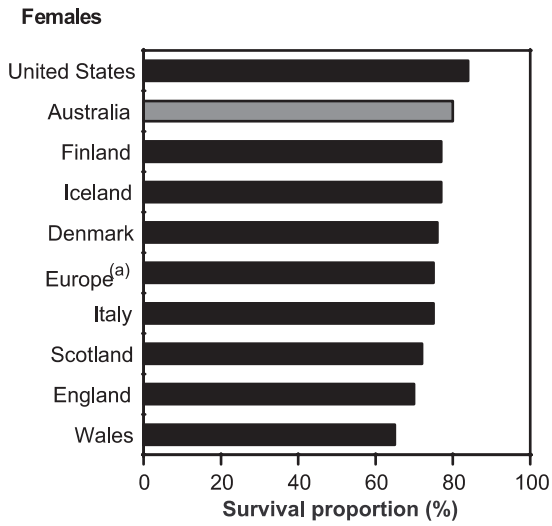
Incidence and mortality

In 1997, there were 1,394 new cases of cancer of the uterus diagnosed in Australia. It was also the cause of death for 271 females. It is estimated that in 1997 there were about 1,600 years of life lost before the age of 75 due to cancer of the uterus.

Age-standardised incidence rates for cancer of the uterus over the six-year period 1992–1997 increased by approximately 1.1% per annum. Age-standardised mortality rates also increased slightly over this period by about 0.6% per annum.

International comparisons

Five-year relative survival after diagnosis of cancer of the uterus in Australia is similar to other countries for which relative survival data were available. Five-year relative survival in these countries ranged between 65% and 85%. The United States had the highest five-year relative survival (85%), closely followed by Australia (80%) (Figure 11.1; Table 11.5).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 11.1: Cancer of the uterus five-year relative survival proportions: selected countries

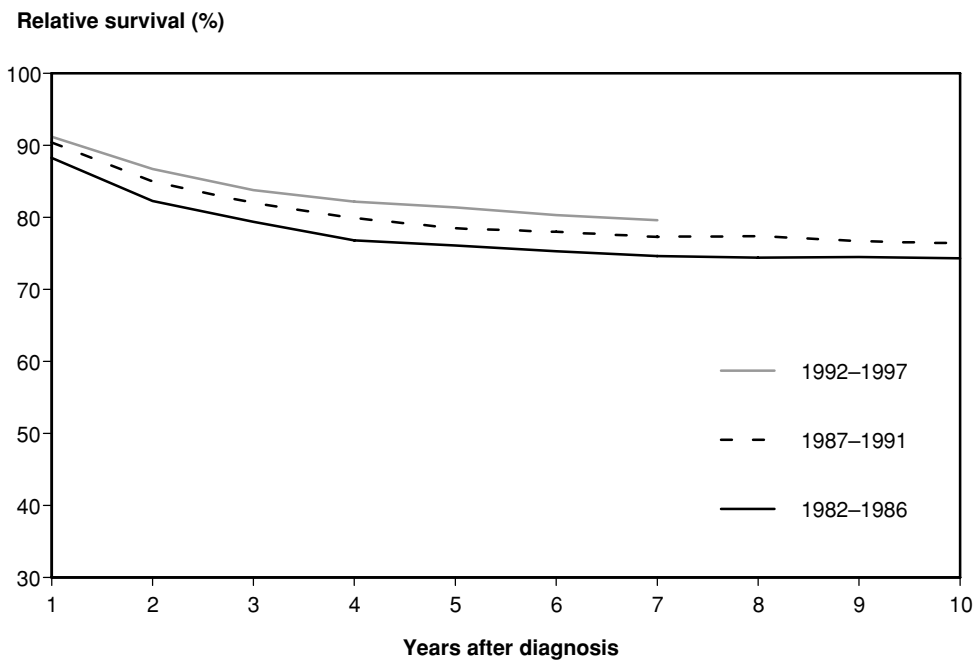
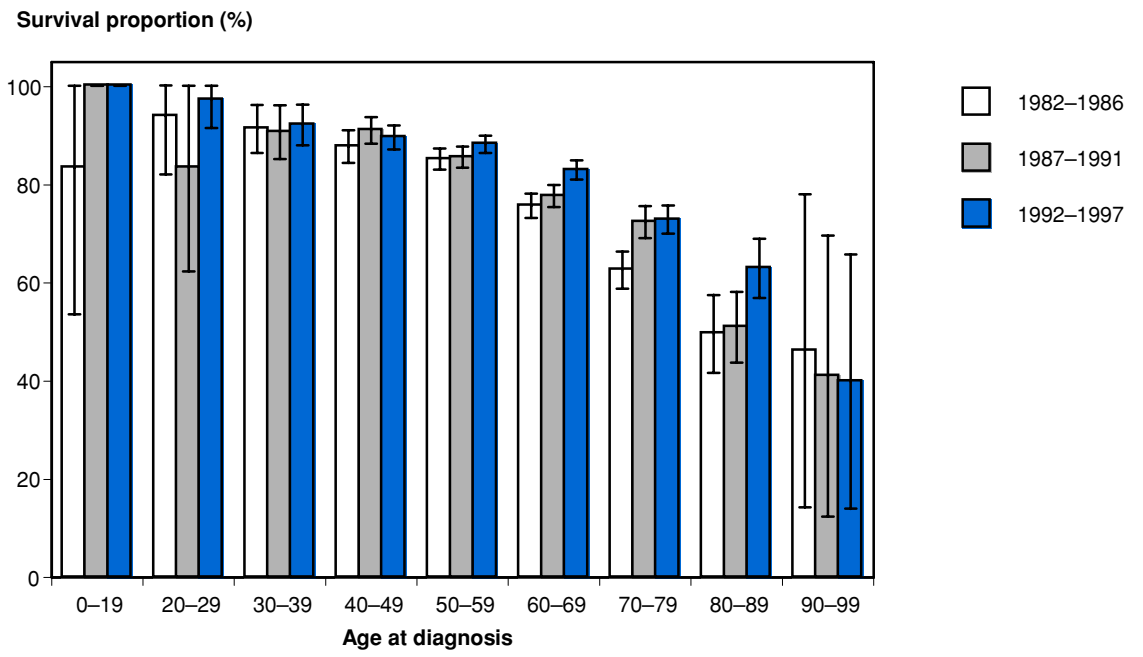


Figure 11.2: Cancer of the uterus relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 11.3: Cancer of the uterus five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

12 Cancer of the cervix

Summary

Relative survival after diagnosis of cancer of the cervix was high compared with most other cancer sites. For the period 1992–1997, relative survival one year after diagnosis of cancer of the cervix was 89.0% and after five years was 74.6% (Table 12.1). Relative survival ten years after diagnosis was 68.4% in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 12.2; Table 12.2).

Relative survival after a diagnosis of cancer of the cervix increased significantly between 1982–1986 and 1992–1997 for five-year relative survival, from 69.6% to 74.6% (Figure 12.2; Table 12.2).

Five-year relative survival after diagnosis of cancer of the cervix decreased as age increased. Five-year relative survival was highest for females aged 20–29 years, at 90.2%. This decreased steadily to 36.0% for females aged 80–89 years (Figure 12.3; Table 12.1).

For individual age groups, there was a significant increase in five-year relative survival between 1982–1986 and 1992–1997 for females aged 30–39, 40–49 and 60–69 years—by 5.1 percentage points, 6.0 percentage points and 7.2 percentage points, respectively (Figure 12.3; Table 12.3).

Table 12.1: Cancer of the cervix: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis, Australia, 1992–1997

Age	New cases	Deaths	5-year relative survival (%)
0–19 years	7	1	*
20–29 years	335	33	90.2
30–39 years	1,325	166	88.1
40–49 years	1,332	249	82.2
50–59 years	876	264	71.1
60–69 years	889	349	65.4
70–79 years	691	405	48.8
80–89 years	305	229	36.0
90–99 years	43	36	39.9
All ages	**5,803**	**1,732**	**74.6**

* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

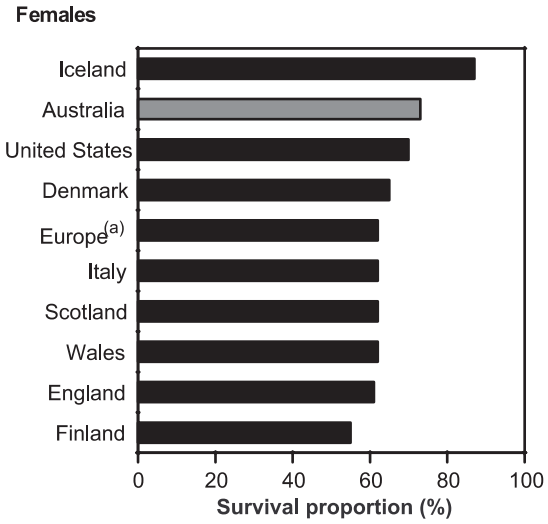
Incidence and mortality

In 1997, there were 795 new cases of cancer of the cervix diagnosed. There were 291 deaths in 1997 due to cancer of the cervix. It is estimated that in 1997 there were about 3,700 years of life lost in females before the age of 75 due to cancer of the cervix.

For the six-year period 1992–1997, age-standardised incidence and mortality rates for female cancer of the cervix decreased, with incidence falling by 6.3% per annum and mortality falling by 4.2% per annum.

International comparisons

Five-year relative survival after diagnosis of cancer of the cervix was high when compared with other countries for which relative survival data were available. During 1987–1991, relative survival in Australia was ranked second in this comparison after Iceland (14 percentage points lower). However, it was similar to that of the United States and slightly higher than that of the remaining countries which ranged between 55% and 65% (Figure 12.1; Table 12.4).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 12.1: Cancer of the cervix five-year relative survival proportions: selected countries

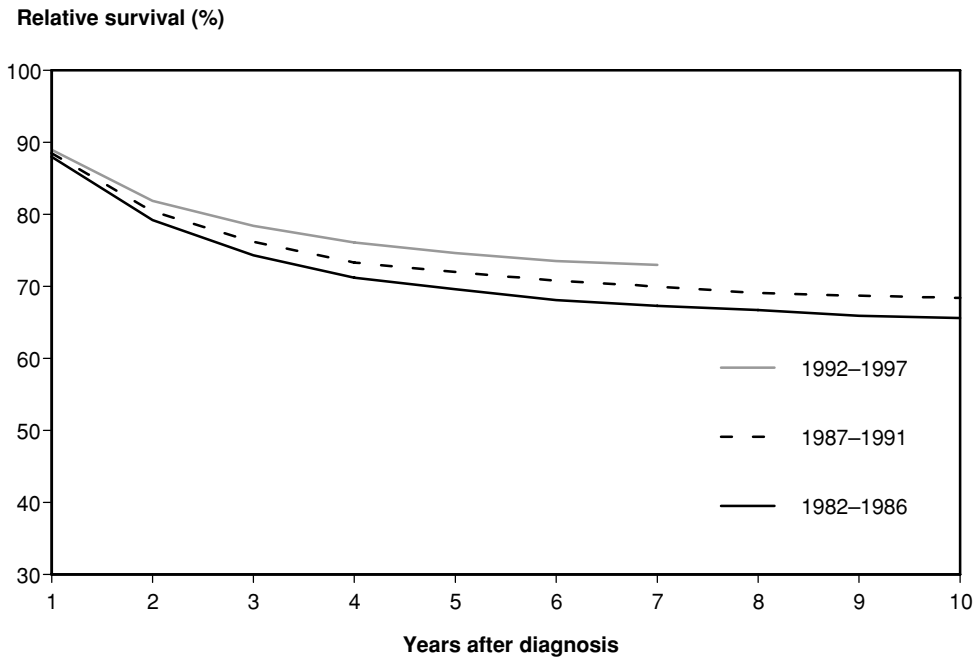
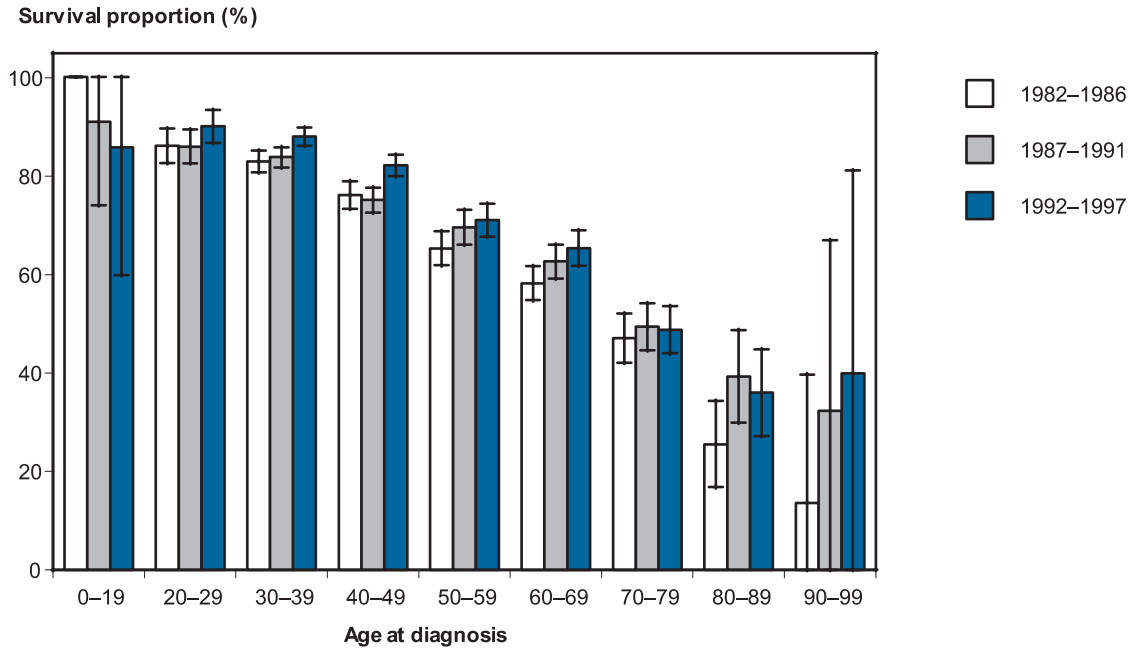


Figure 12.2: Cancer of the cervix relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 12.3: Cancer of the cervix five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

Relative survival by subtypes

Squamous cell carcinoma

Squamous cell carcinomas of the cervix diagnosed in 1992–1997 have a five-year relative survival proportion of 74.5%. This is similar to the cervical cancer relative survival proportion, for which five-year relative survival is 74.6%.

Five-year relative survival proportions from squamous cell carcinomas decreased as age at diagnosis increased. In 1992–1997, five-year relative survival was highest for females aged 20–29 at 90.8%. Relative survival fell to 38.4% for females aged 80–89 years (Table 12.5).

Adenocarcinoma

During 1992–1997, five-year relative survival after diagnosis of adenocarcinoma of the cervix was 76.4%. This was similar to that of cervical cancer and squamous cell carcinomas, where five-year relative survival was 74.6% and 74.5% respectively (Figure 12.4).

Five-year relative survival proportions for adenocarcinoma by age follow a similar pattern to that of squamous cell carcinomas. Five-year relative survival after diagnosis of adenocarcinoma was highest for females aged 20–29 years at 88.7%, decreasing to 43.4% for females aged 80–89 years (Table 12.6).

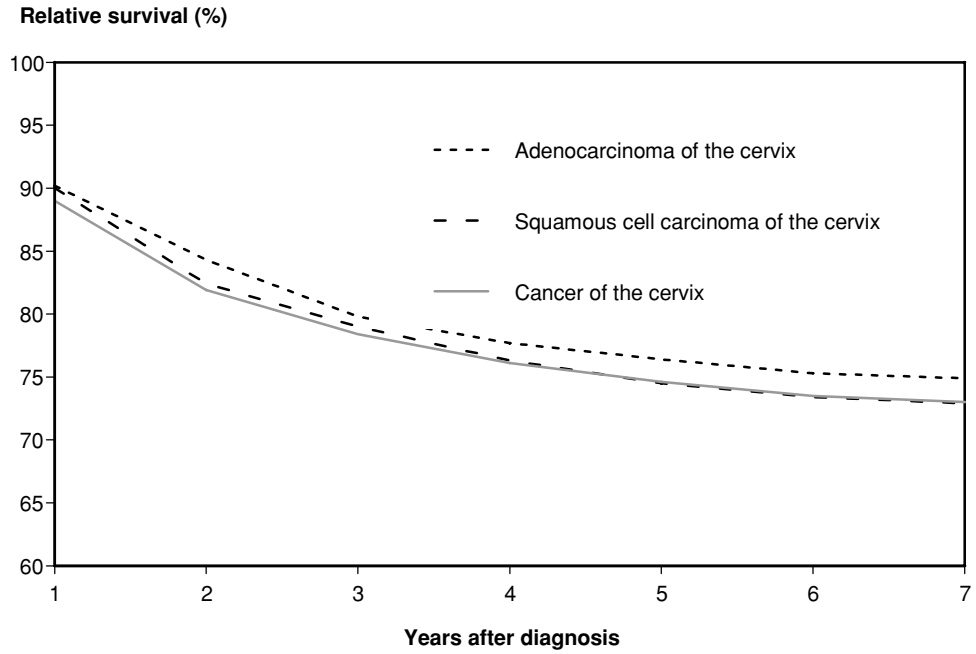


Figure 12.4: Cancer of the cervix relative survival proportions: morphology and period of diagnosis, Australia, 1992–1997

13 Cancer of the ovary

Summary

During 1992–1997, relative survival one year after diagnosis of cancer of the ovary was 72.9% and five years after diagnosis was 42.0% (Table 13.1). Relative survival ten years after diagnosis was 33.3% in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 13.2; Table 13.2).

Relative survival after diagnosis of cancer of the ovary increased significantly between 1982–1986 and 1992–1997. One-year relative survival increased by 8.8 percentage points, five-year relative survival increased by 7.6 percentage points, and seven-year relative survival increased by 6.6 percentage points (Figure 13.2; Table 13.2).

Five-year relative survival after a diagnosis of ovarian cancer was highest in the younger age groups and decreased as age increased. Five-year relative survival was highest for females aged 20–29 years, at 88.9%. Five-year relative survival decreased to 18.1% for females aged 80–89 years and zero for females aged 90–99 years (Figure 13.3; Table 13.1).

For individual age groups, five-year relative survival after diagnosis of cancer of the ovary increased between 1982–1986 and 1992–1997 for females aged from 40–49 years to 70–79 years (Figure 13.3; Table 13.3).

Table 13.1: Cancer of the ovary: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis, Australia, 1992–1997

Age	New cases	Deaths	5-year relative survival (%)
0–19 years	77	11	85.8
20–29 years	189	21	88.9
30–39 years	345	89	73.9
40–49 years	883	351	59.0
50–59 years	1,344	708	46.8
60–69 years	1,514	999	33.2
70–79 years	1,516	1,154	26.0
80–89 years	665	586	18.1
90–99 years	88	87	0.0
All ages	**6,621**	**4,006**	**42.0**

Incidence and mortality

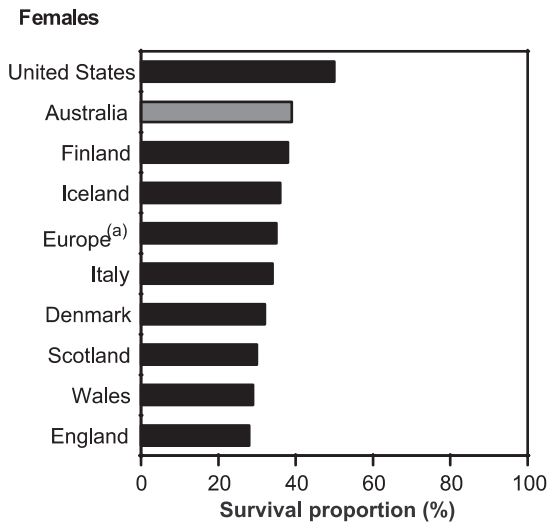
There were 1,150 new cases of cancer of the ovary diagnosed in 1997 and 740 deaths. It is estimated that in 1997 cancer of the ovary was responsible for about 6,200 years of life lost before the age of 75.

Age-standardised incidence and mortality rates for cancer of the ovary remained constant over the six-year period 1992–1997.

International comparisons

International comparison of ovarian cancer five-year relative survival is difficult because of differing coding practices between countries. 'Borderline' malignancies have been included as malignant ovarian neoplasms at different times by different countries (e.g. the United States SEER Program) (Parkin et al. 1992). This has led to higher relative survival estimates in countries such as the United States where 'borderline' ovarian malignancies have been included, when compared with countries such as Australia where they are excluded. Therefore, the following comparisons should be considered with caution.

Relative survival after a diagnosis of cancer of the ovary is low in other western countries for which relative survival data were available. The United States had the highest five-year relative survival proportions from cancer of the ovary—11 percentage points higher than that of Australia. The remaining countries all had similar relative survival proportions, ranging between 28% and 38% (Figure 13.1; Table 13.4).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 13.1: Cancer of the ovary five-year relative survival proportions: selected countries

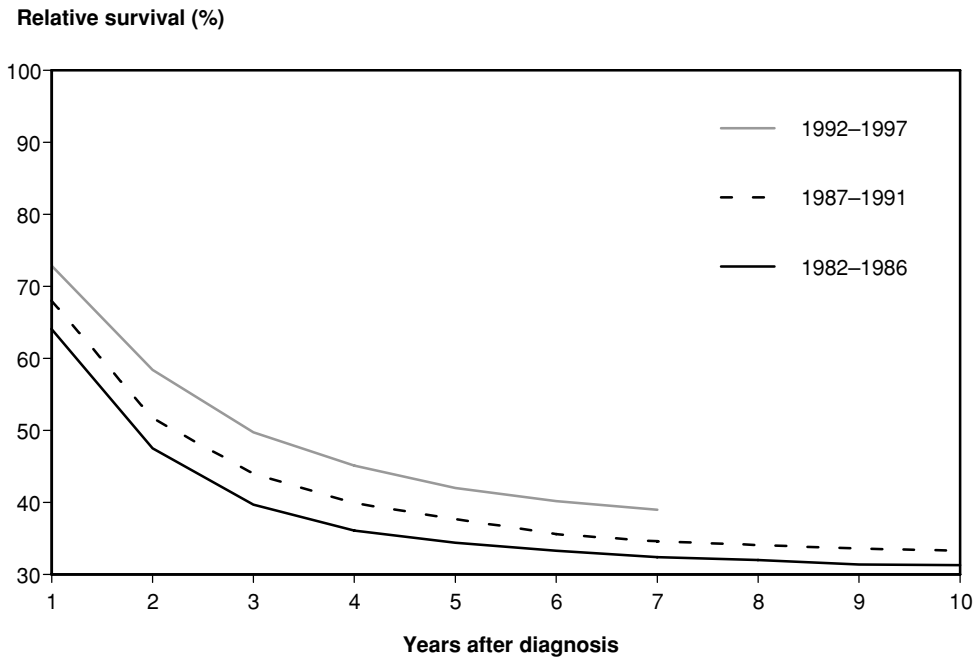
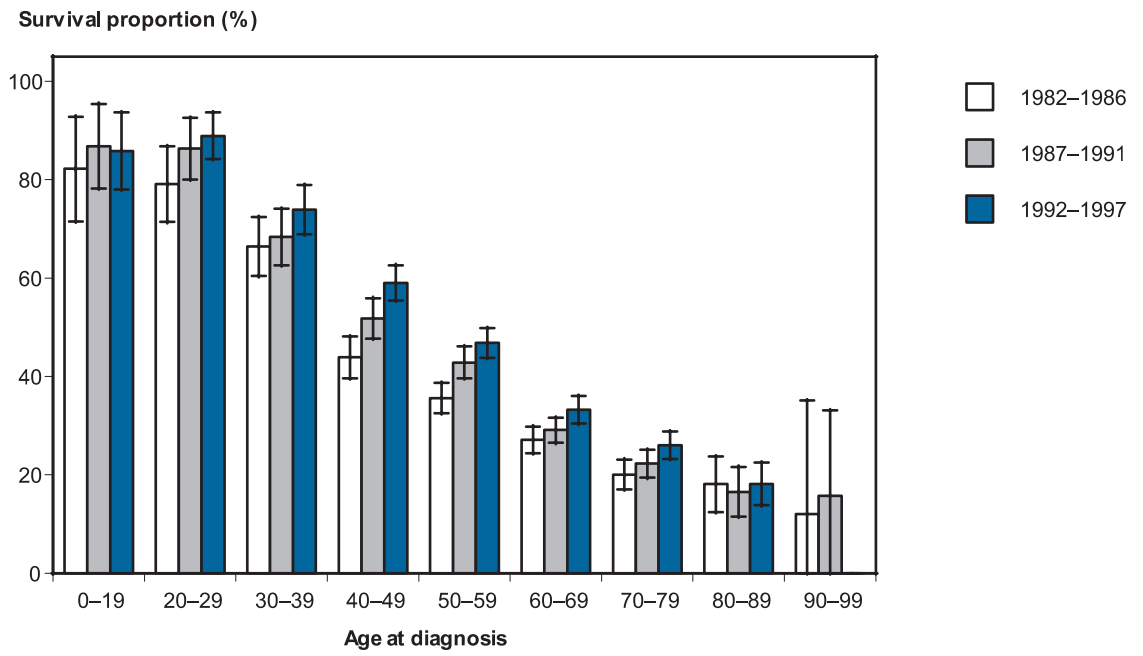


Figure 13.2: Cancer of the ovary relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 13.3: Cancer of the ovary five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

14 Cancer of the prostate

Summary

Compared with other cancers, relative survival after diagnosis of cancer of the prostate was high. In 1992–1997, relative survival one year after diagnosis of prostate cancer was 95.0% and five years after diagnosis was 82.7% (Table 14.1). Relative survival ten years after diagnosis was 49.5% in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 14.2; Table 14.2).

Between 1982–1986 and 1992–1997, relative survival after diagnosis of prostate cancer increased significantly. One-year relative survival increased from 87.6% to 95.0% and five-year relative survival increased from 59.3% to 82.7% (Figure 14.2; Table 14.2).

There was no clear relationship between prostate cancer five-year relative survival and age. Relative survival was highest for males aged 50–59 and 60–69 years, at 88.1% and 87.9% respectively (Figure 14.3; Table 14.1).

Five-year relative survival increased significantly between the diagnosis periods 1982–1986 and 1992–1997 for all age groups from 40–49 to 80–89 years (Figure 14.3; Table 14.3). A major factor influencing this increase in relative survival was the introduction and widespread use of PSA testing for prostate cancer in the 1990s. This resulted in a sharp rise in the numbers of new cases of prostate cancer detected.

Table 14.1: Cancer of the prostate: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis, Australia, 1992–1997

Age	New cases	Deaths	5-year relative survival (%)
0–19 years	2	1	*
20–29 years	1	1	*
30–39 years	8	2	*
40–49 years	422	91	78.0
50–59 years	5,162	776	88.1
60–69 years	20,559	4,565	87.9
70–79 years	25,560	10,053	81.6
80–89 years	10,394	6,874	67.0
90–99 years	947	833	39.4
All ages	**63,055**	**23,196**	**82.7**

* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

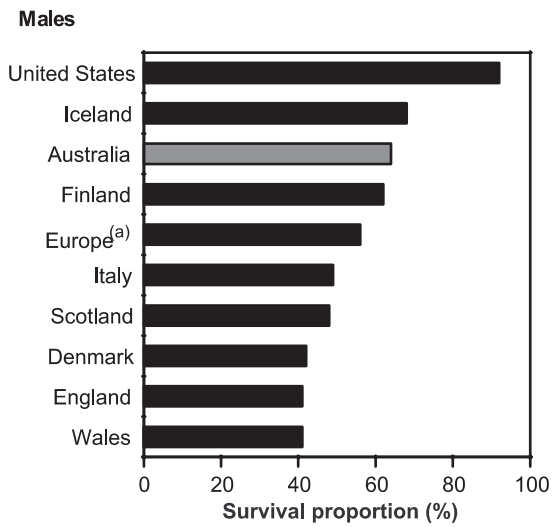
Incidence and mortality

During 1997, there were 9,736 new cases of prostate cancer diagnosed and prostate cancer was the cause of 2,449 deaths in 1997. It is estimated that during 1997 there were 6,000 years of life lost in males due to prostate cancer.

For the six-year period 1992–1997, age-standardised rates of males for incidence and mortality for prostate cancer decreased, with incidence falling by 1.1% per annum and mortality falling by 2.3% per annum.

International comparisons

The introduction of prostate-specific antigen testing (PSA) brings difficulties to the comparison of prostate cancer five-year relative survival between different populations. PSA artificially increases prostate cancer five-year relative survival (lead time bias) by extending the length of time between diagnosis (which is made earlier due to PSA) and the end of life which remains at the same point in time. PSA was introduced in the United States much earlier than in Australia, thus increasing United States relative survival estimates in comparison. Therefore, the following comparisons should be considered with caution. Five-year relative survival after diagnosis of prostate cancer in Australia is relatively high compared with other countries for which relative survival data are available. Australia is ranked third in this comparison behind the United States and Iceland (Figure 14.1; Table 14.4). Examination of relative survival time and proportions of those surviving in England and Wales and the United States showed similar improvements over time to those found in Australia, with five-year relative survival highest for males aged between 50 and 79 years (Ries et al. 1999; Coleman et al. 1999).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 14.1: Cancer of the prostate five-year relative survival proportions: selected countries

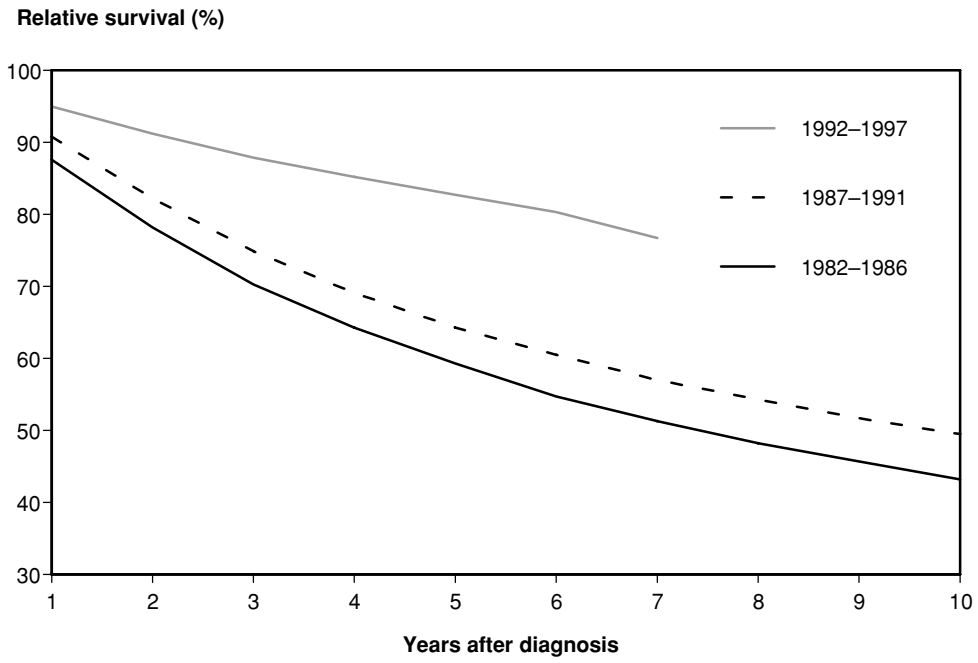
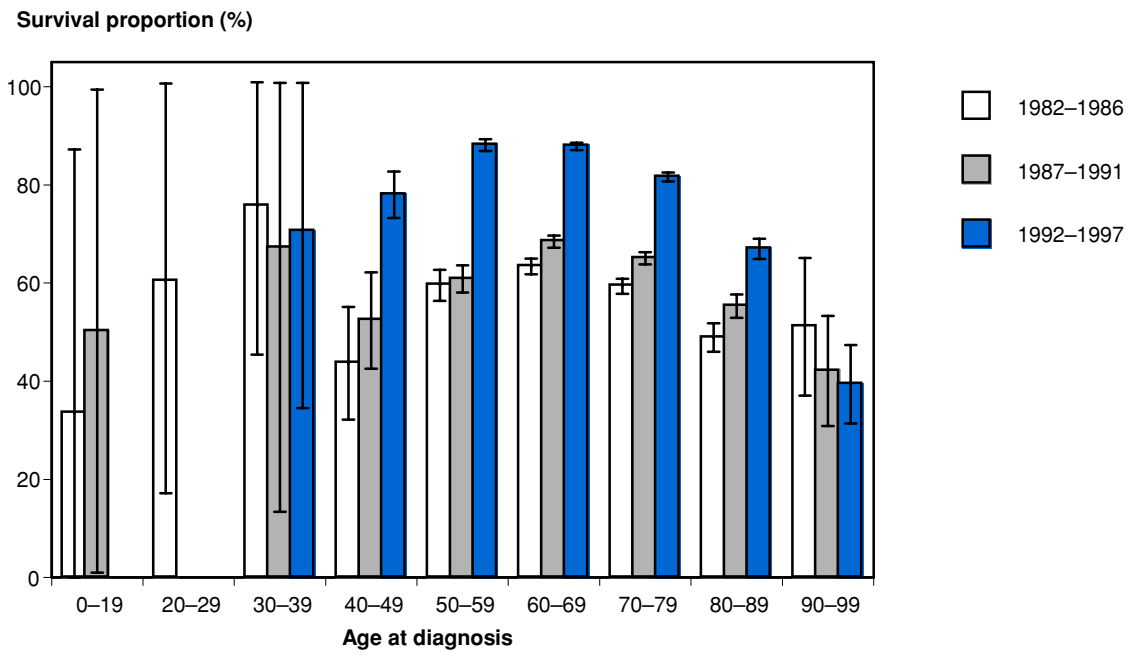


Figure 14.2: Cancer of the prostate relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 14.3: Cancer of the prostate five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

15 Cancer of the testis

Summary

The peak age group for new cases of cancer of the testis is 30–39 years, much younger than for most other cancers experienced by males. Relative survival is high for cancer of the testis when compared with other cancer sites. During 1992–1997, relative survival one year after diagnosis of cancer of the testis was 97.7% and after five years was 95.4%. Relative survival ten years after diagnosis was 94.5% in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 15.2; Table 15.2).

Between 1982–1986 and 1992–1997, relative survival after diagnosis of testicular cancer increased significantly. Relative survival one year after diagnosis increased from 95.6% to 97.7%, and five years after diagnosis increased from 91.1% to 95.4% (Figure 15.2; Table 15.2).

Five-year relative survival was 92.8% or above for all age groups under 60 years, with the highest relative survival proportion for males aged 40–49 years, at 97.6%. Five-year relative survival decreased as age increased from age 60, falling to 68.3% for males aged 70–99 years. (Figure 15.3; Table 15.1).

For males aged 40–49 years, five-year relative survival increased between 1982–1986 and 1992–1997, from 90.2% to 97.6% (Figure 15.3; Table 15.3).

Table 15.1: Cancer of the testis: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis, Australia, 1992–1997

Age	New cases	Deaths	5-year relative survival (%)
0–4 years	33	2	*
5–9 years	6	0	*
10–19 years	116	8	93.2
20–29 years	914	53	94.5
30–39 years	1,197	42	97.2
40–49 years	527	19	97.6
50–59 years	205	20	92.8
60–69 years	77	17	83.6
70–99 years	55	26	68.3
All ages	**3,130**	**187**	**95.4**

* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

Incidence and mortality

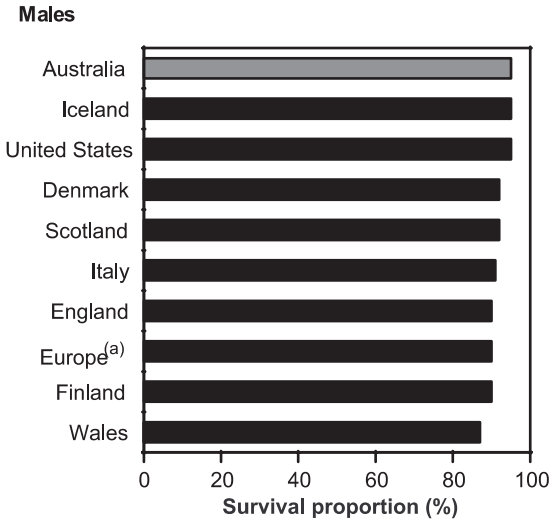
Cancer of the testis is a relatively rare cancer. In 1997, there were 564 new cases of cancer of the testis diagnosed. Testicular cancer was the cause of 23 deaths and it is estimated that each year there are about 800 years of life lost before the age of 75 due to cancer of the testis.

For the six-year period 1992–1997, age-standardised incidence and mortality rates for cancer of the testis increased, with incidence increasing by 2.0% per annum and mortality by 2.7% per annum.

International comparisons

Five-year relative survival after diagnosis of cancer of the testis in Australia was as high as the best of the other countries for which relative survival data are available. In these countries, five-year relative survival was highest in Australia (95%), the United States and Iceland (Figure 15.3; Table 15.4).

Examination of relative survival by age group for the United States, England and Wales showed similar decreases in relative survival proportions as age increased from 39 years. However, in England and Wales the decreases were not as marked for males aged 40–49 and 50–59 (Ries et al. 1999; Coleman et al. 1999).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 15.1: Cancer of the testis five-year relative survival proportions: selected countries

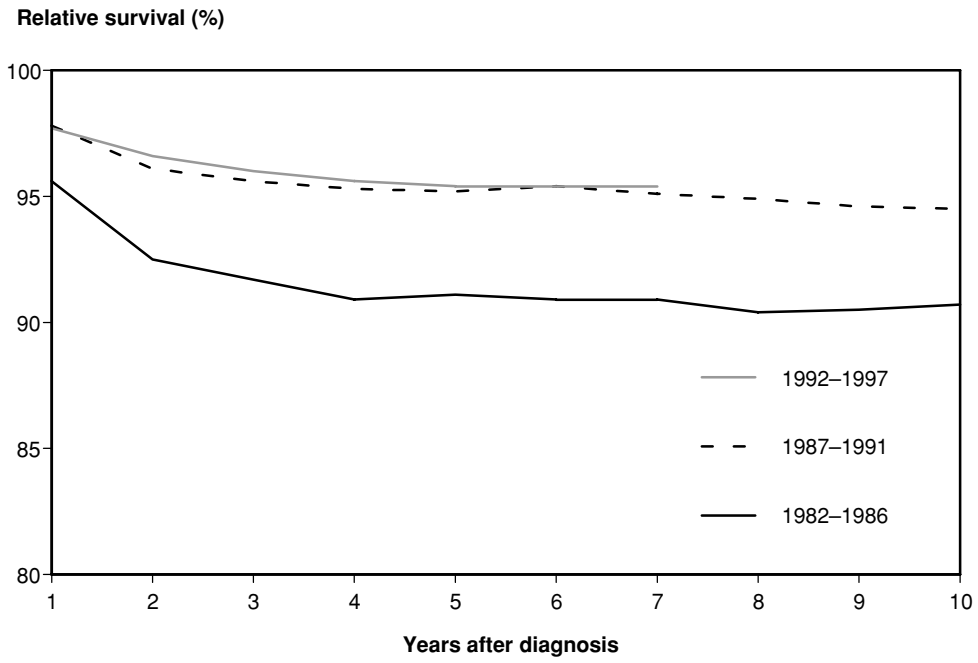
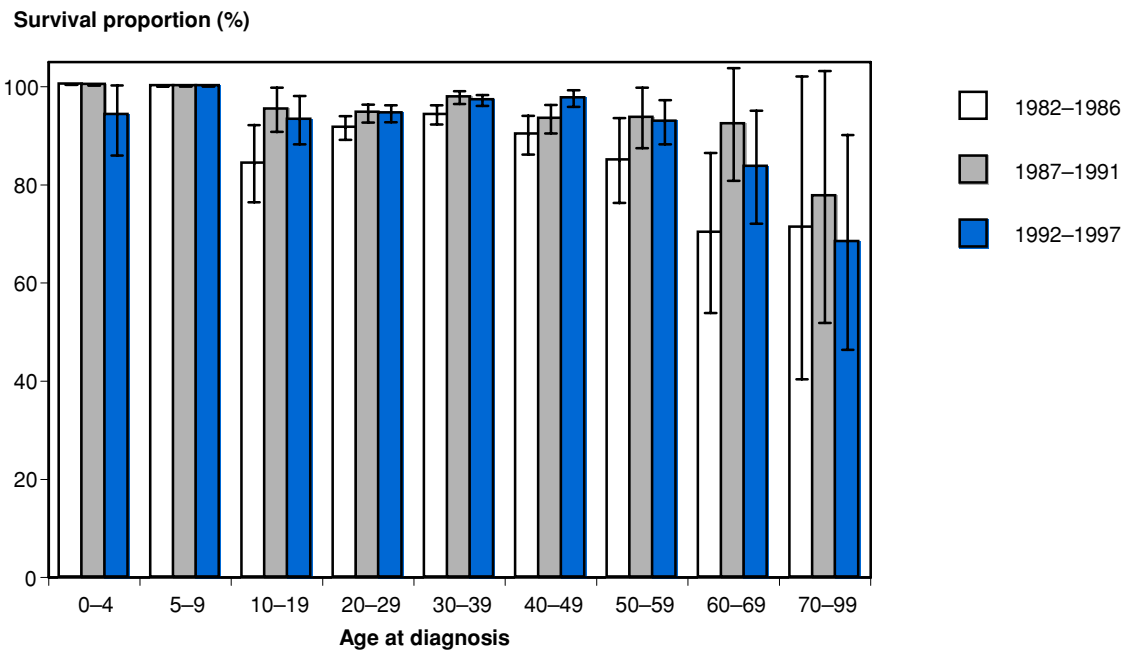


Figure 15.2: Cancer of the testis relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 15.3: Cancer of the testis five-year relative survival proportions: age at diagnosis and period of diagnosis Australia

16 Cancer of the bladder

Summary

When compared with other cancer sites, relative survival after diagnosis of bladder cancer is good. During the 1992–1997 period, one-year relative survival after diagnosis with bladder cancer was 86.9% for males and 78.2% for females and five-year relative survival after diagnosis was 70.8% for males and 64.7% for females (Table 16.1). Survival ten years after diagnosis was 65.8% for males and 62.0% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 16.2; Tables 16.2 and 16.3).

Between 1982–1986 and 1992–1997, there were no statistically significant changes in relative survival after diagnosis of bladder cancer for males or females (Figure 16.2; Tables 16.2 and 16.3).

As age at diagnosis increased, five-year relative survival decreased. Five-year relative survival was highest for males aged 20–29 years (98.6%) and decreased to 54.3% for males aged 80–89 years. For females, the numbers of new cases and deaths were small for age groups below 30 years, making survival estimates for these age groups less robust. Five-year relative survival for females aged 40–49 years was 88.1% and decreased to 49.8% for females aged 80–89 years (Figure 16.3; Table 16.1).

For individual age groups, there were no significant increases in relative survival for any age group between 1982–1986 and 1992–1997 (Figure 16.3; Tables 16.5 and 16.6).

Table 16.1: Cancer of the bladder: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	15	9	4	1	73.0	*
20–29 years	51	14	1	0	*	*
30–39 years	124	64	11	9	90.7	87.4
40–49 years	460	145	74	18	85.4	88.1
50–59 years	1,306	326	281	75	82.0	78.5
60–69 years	3,103	898	1,028	322	74.9	69.9
70–79 years	4,018	1,271	2,006	622	65.1	59.0
80–89 years	1,973	829	1,408	570	54.3	49.8
90–99 years	219	158	191	135	34.8	36.4
All ages	**11,269**	**3,714**	**5,004**	**1,752**	**70.8**	**64.7**

* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

Incidence and mortality

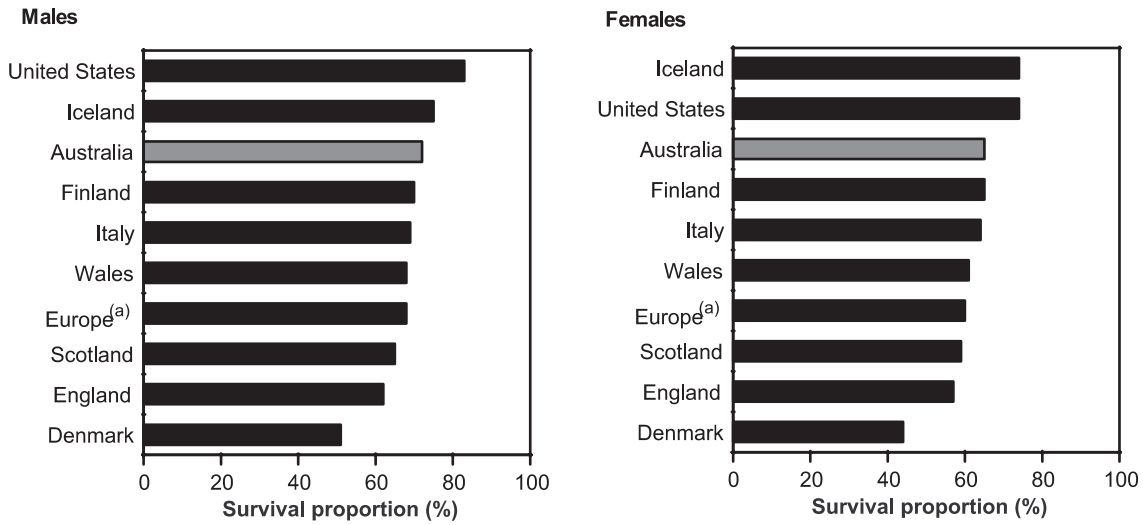
During 1997, there were 2,693 new cases of cancer of the bladder which represented 4.6% of all new cases of male cancers and 1.9% of all new cases of females cancers in 1997.

Bladder cancer was the cause of 807 deaths in 1997, with 554 male deaths and 253 female deaths. It is estimated that there were about 2,400 years of life lost due to bladder cancer in males, and 800 years of life lost in females during 1997.

For the six-year period 1992–1997, age-standardised incidence rates for bladder cancer increased by 0.3% per annum for males and 1.8% per annum for females. Age-standardised mortality for bladder cancer decreased by 1.1% for both males and females during this period.

International comparisons

International comparison of bladder cancer survival is difficult because of differing coding practices between countries. For instance, it has been reported that the United States bladder cancer incidence estimates (compiled by the United States SEER Program) combine in situ and invasive bladder cancers (Parkin et al. 1992). This has the effect of inflating United States bladder cancer five-year relative survival when compared with estimates from countries where in situ bladder cancers are not included with invasive bladder cancers, such as in Australia. Therefore, the following comparisons should be considered with caution. Five-year relative survival for males and females diagnosed in Australia during 1987–1992 was lower than for the United States and Iceland (Figure 16.1; Table 16.8). However, Australian proportions were similar to those in the Scandinavian countries and higher than those in countries such as Scotland, England and Denmark.



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999, Berrino et al. 1999.

Figure 16.1: Cancer of the bladder five-year relative survival proportions: selected countries

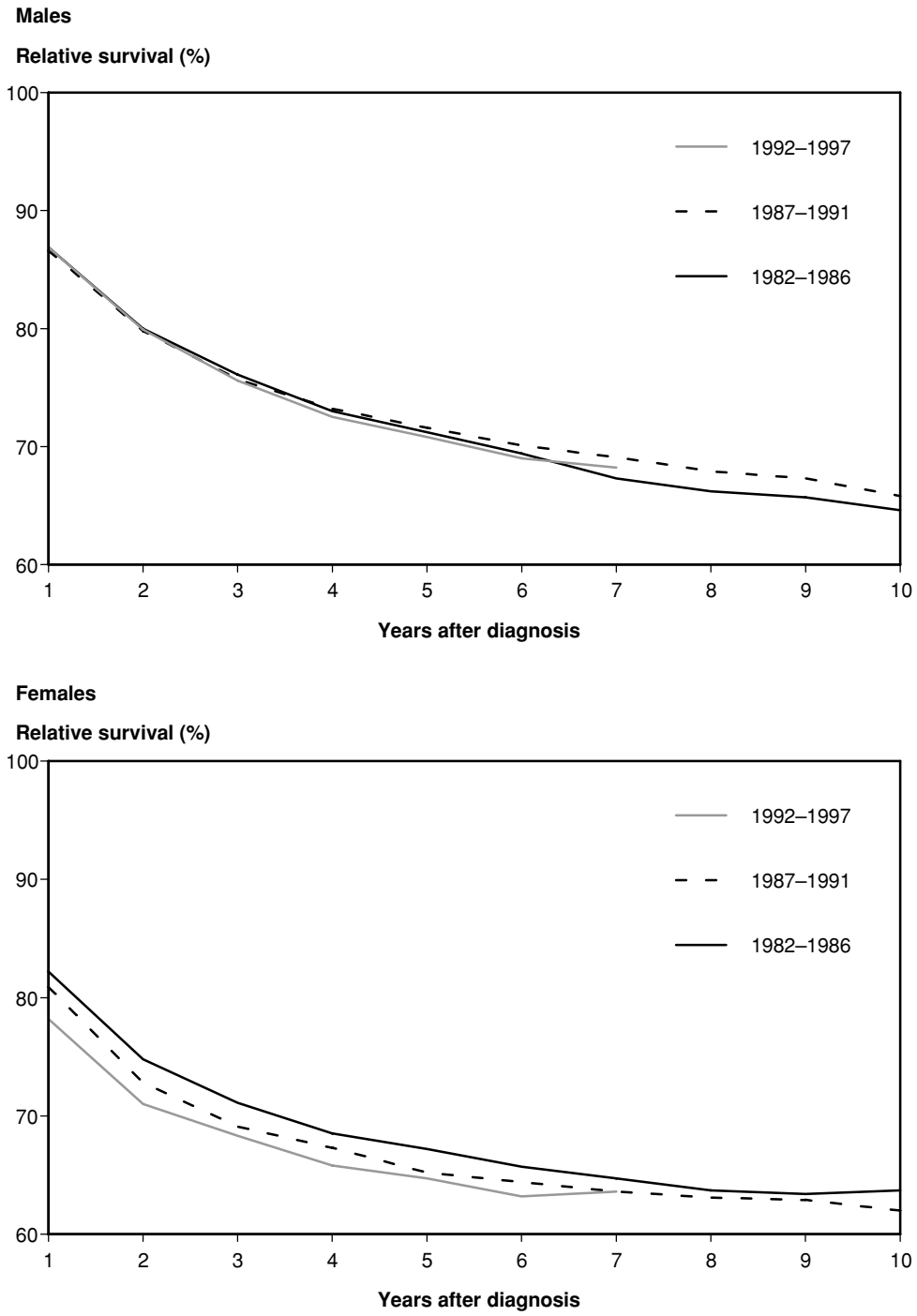
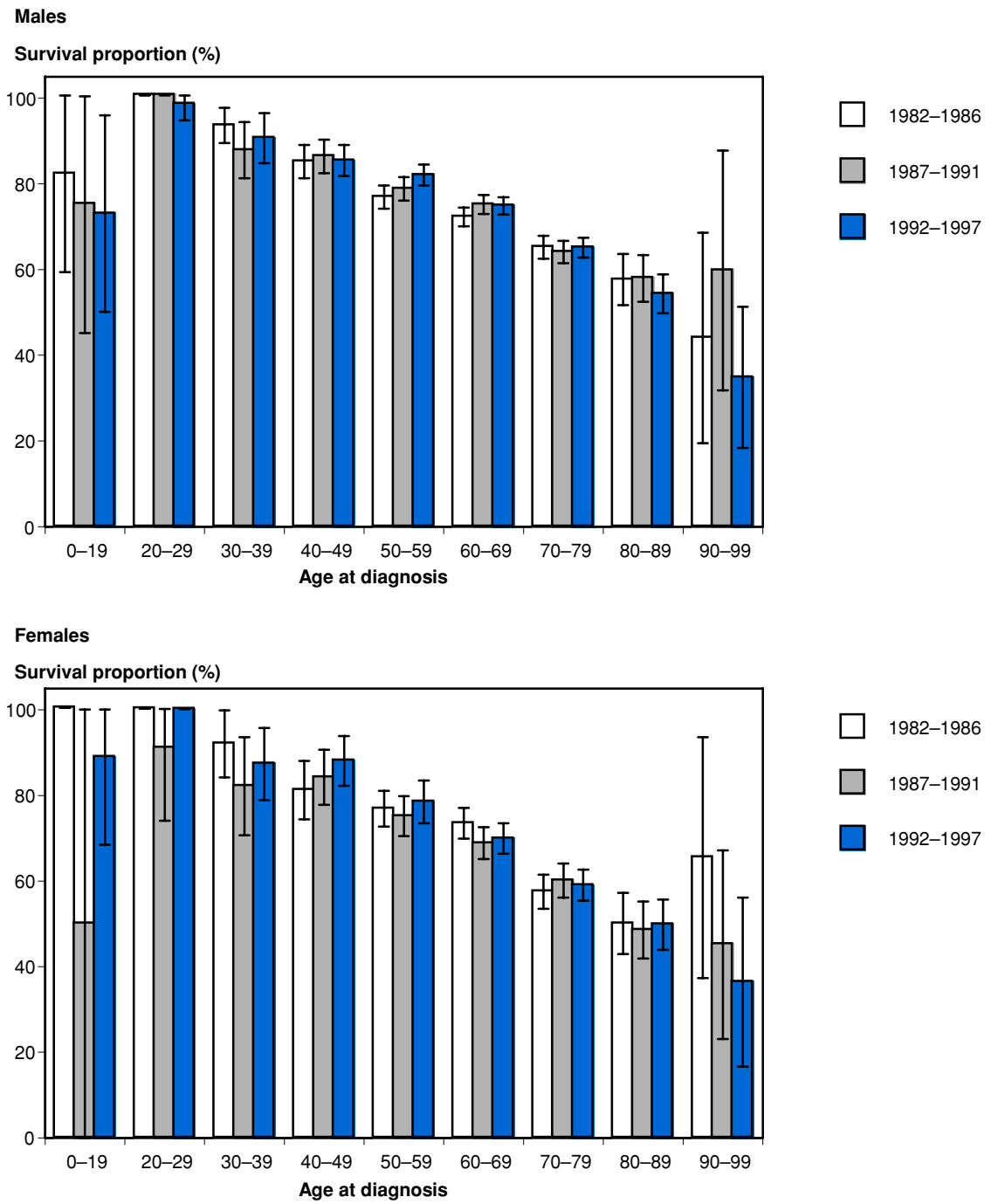


Figure 16.2: Cancer of the bladder relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 16.3: Cancer of the bladder five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

17 Cancer of the kidney

Summary

During 1992–1997, one-year relative survival after diagnosis of cancer of the kidney was 77.2% for males and 73.5% for females, and five-year relative survival was 59.9% for males and 57.5% for females (Table 17.1). Relative survival ten years after diagnosis was 47.7% for males and 46.2% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 17.2; Tables 17.2 and 17.3).

Between 1982–1986 and 1992–1997, kidney cancer relative survival increased significantly. Five-year relative survival increased from 50.8% to 59.9% for males and increased from 49.4% to 57.5%for females. There was no significant change one year after diagnosis for males whereas for females, relative survival after one year increased from 67.4% to 73.5% (Figure 17.2; Tables 17.2 and 17.3).

As age at diagnosis increased, five-year relative survival decreased. Relative survival was highest for males and females diagnosed at age 0–19 years—82.2% for males and 85.1% for females. Relative survival fell more rapidly from age 50–59 years for both males and females, from 67.0% for males aged 50–59 years to 44.1% for males aged 80–89 years. For females, relative survival decreased from 72.4% for females aged 50–59 years to 30.3% for females aged 80–89 years (Figure 17.3; Table 17.1).

For individual age groups, five-year relative survival increased significantly between 1982–1986 and 1992–1997 for males aged from 50–59 to 70–79 years and females aged from 40–49 to 60–69 years (Figure 17.3; Tables 17.5 and 17.6).

Table 17.1: Cancer of the kidney: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	102	106	17	14	82.2	85.1
20–29 years	29	23	6	5	81.2	75.4
30–39 years	178	118	41	22	78.3	82.2
40–49 years	638	362	184	82	71.9	77.7
50–59 years	1,207	640	423	195	67.0	72.4
60–69 years	1,984	1,111	943	514	58.2	58.7
70–79 years	1,894	1,404	1,143	837	50.4	46.6
80–89 years	641	632	496	500	44.1	30.3
90–99 years	45	70	36	65	65.4	20.8
All ages	**6,718**	**4,466**	**3,289**	**2,234**	**59.9**	**57.5**

Incidence and mortality

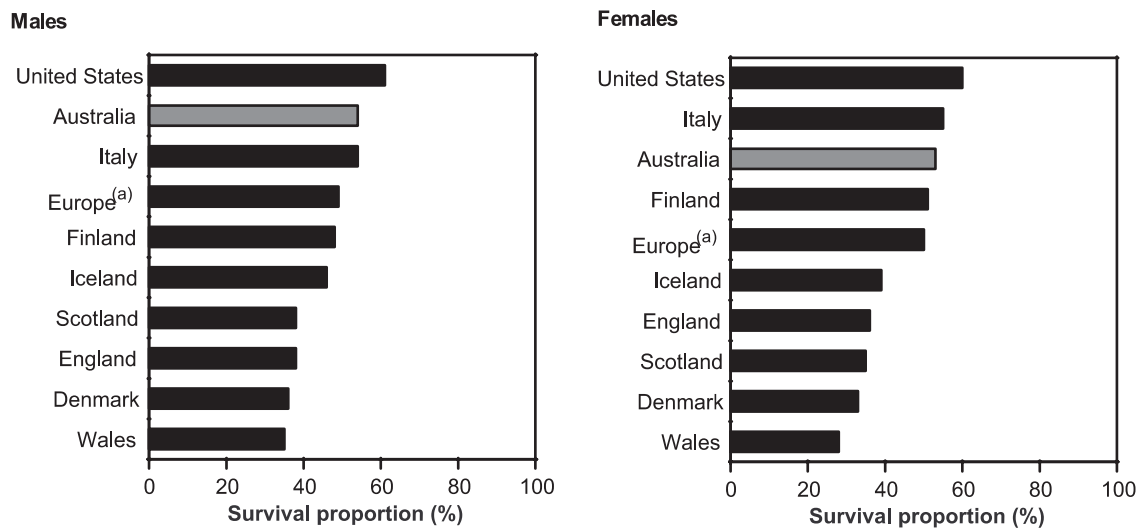
During 1997, there were 2,049 new cases of cancer of the kidney diagnosed. Of these, 1,230 were males and 819 were females. In 1997, 467 males and 329 females died from cancer of the kidney. It is estimated that there were about 3,900 years of life lost due to cancer of the kidney in males, and 1,500 years of life lost in females during 1997.

For the six-year period 1992–1997, age-standardised rates of males for incidence and mortality for cancer of the kidney increased, with incidence rising by 1.4% per annum and mortality rising by 0.5 percentage points per annum. For females, age-standardised rates for incidence decreased slightly by 0.3 percentage points per annum and mortality decreased by 1.5% per annum.

International comparisons

International comparison of kidney cancer five-year relative survival is difficult because of different definitions between countries. Multifocal tumours of the kidney (more than one primary tumour originating in the same primary site, in this case the kidney) are counted as a single cancer in Australia. However, in some countries multifocal tumours of the kidney are counted as more than one cancer (Parkin et al. 1994). Therefore, the following comparisons should be considered with caution.

Five-year relative survival proportions in males and females diagnosed in Australia during 1987–1992 were lower than those of the United States and similar to those of Italy (Figure 17.1; Table 17.8).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al 1999; Berrino et al. 1999.

Figure 17.1: Cancer of the kidney five-year relative survival proportions: selected countries

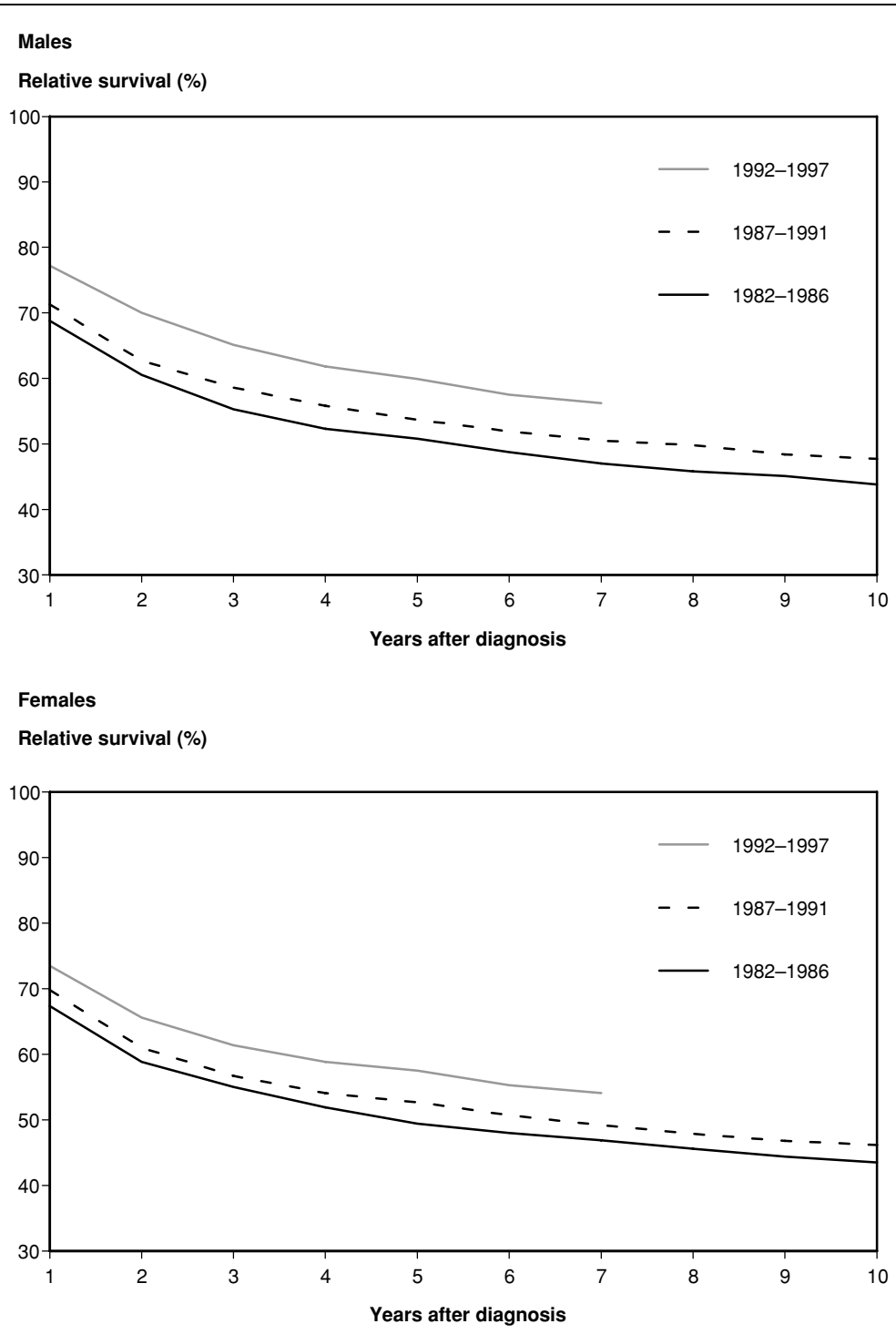
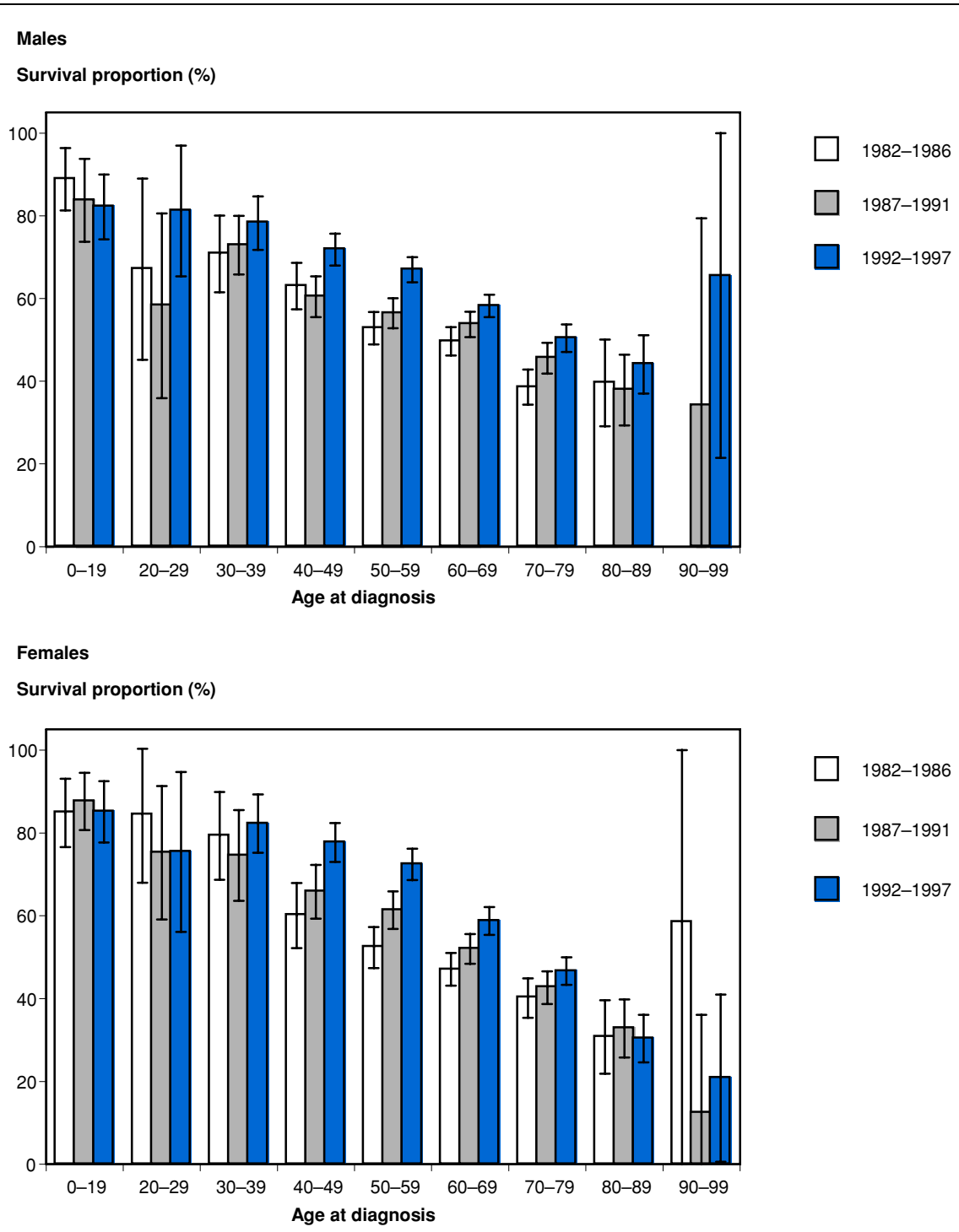


Figure 17.2: Cancer of the kidney relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 17.3: Cancer of the kidney five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

Relative survival by subtypes

Transitional cell carcinoma of the kidney

Relative survival after diagnosis of transitional cell carcinoma of the kidney was slightly lower than for cancer of the kidney in general. For the period 1992–1997, relative survival one year after diagnosis was 77.7% for males and 68.9% for females. Relative survival decreased to 55.0% five years after diagnosis for males and 41.6% for females (Figure 17.4; Tables 17.9 and 17.10).

The numbers of new cases and deaths were small for males aged below 40 years and for females aged below 30 years, making survival estimates for these age-groups less robust. For those diagnosed between 1992–1997, five-year relative survival tended to decrease as age increased (Tables 17.11 and 17.12).

Renal cell carcinoma of the kidney

Relative survival after diagnosis of renal cell carcinoma of the kidney was slightly higher than for transitional cell carcinoma of the kidney and cancer of the kidney in general. For the period 1992–1997, one-year relative survival for those diagnosed with renal cell carcinoma of the kidney was 80.3% for males and 79.0% for females. Five-year relative survival was 63.6% for males and 66.3% for females (Figure 17.4; Tables 17.13 and 17.14).

Five-year relative survival for those diagnosed between 1992–1997 tended to decrease as age at diagnosis increased (Tables 17.15 and 17.16).

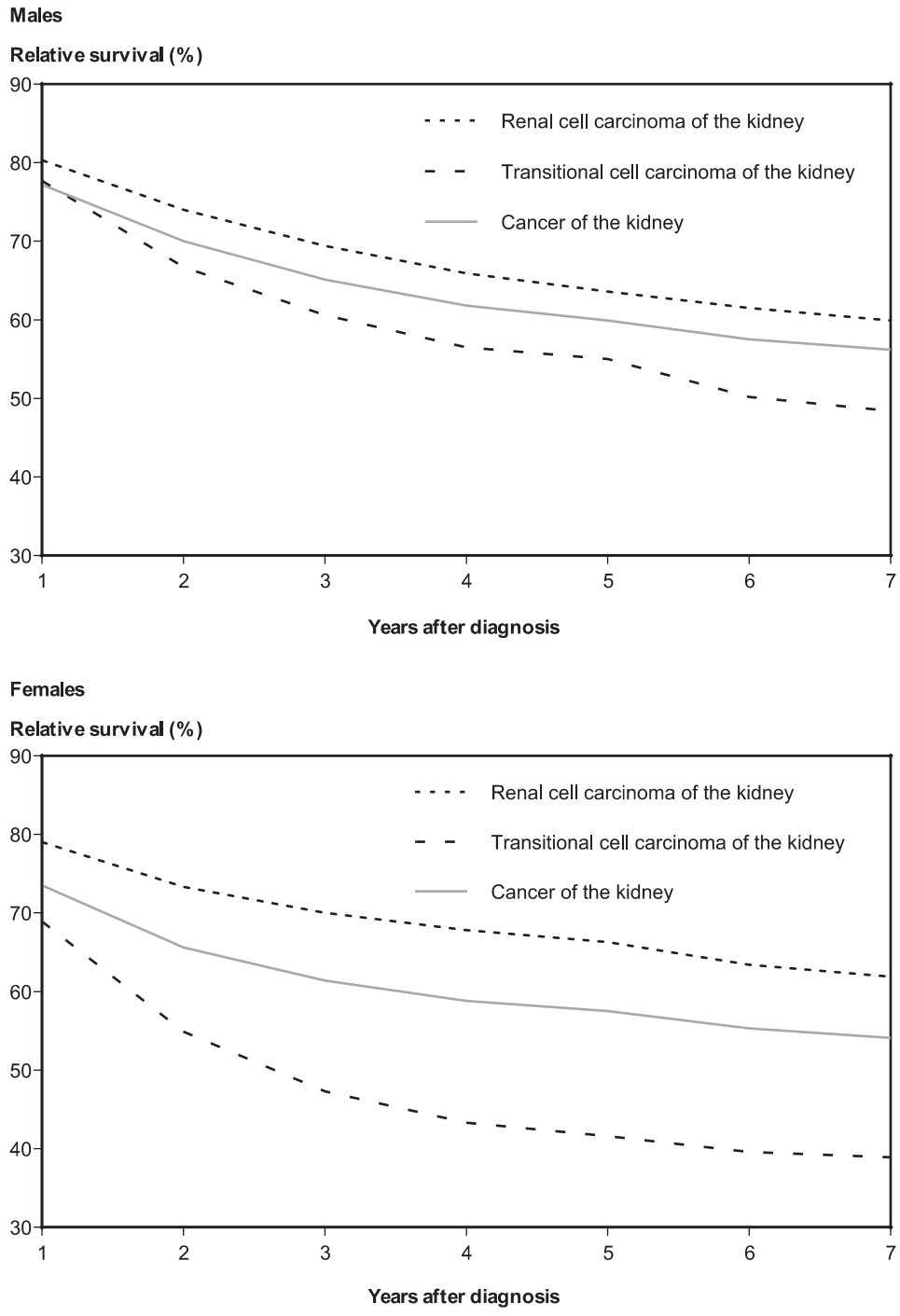


Figure 17.4: Cancer of the kidney relative survival proportions: morphology and period of diagnosis, Australia, 1992–1997

18 Cancer of the brain

Summary

Relative survival after diagnosis of cancer of the brain is poor when compared with other cancers. During 1992–1997, relative survival one year after diagnosis was 42.2% for males and 41.1% for females. The five-year relative survival proportion after diagnosis of brain cancer was 23.8% for both males and females (Table 18.1). Ten-year relative survival was 21.4% for males and 21.9% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 18.2; Tables 18.2 and 18.3).

Relative survival after diagnosis remained fairly consistent between the periods 1982–1986 and 1992–1997, with no statistically significant trends for either males or females.

Five-year relative survival was highest for males and females aged less than 40 years. Within this group, relative survival proportions were highest for males and females aged 10–19 years—74.2% and 70.9%, respectively. As age increased from 40 years, five-year relative survival declined rapidly, to 3.5% for males and 4.4% for females aged 70–99 years (Figure 18.3; Table 18.1).

For individual age groups, there were no statistically significant changes in five-year relative survival between 1982–1986 and 1992–1997 (Figure 18.3; Tables 18.5, 18.6).

Table 18.1: Cancer of the brain: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–4 years	140	108	64	52	54.4	51.1
5–9 years	94	94	27	41	70.6	54.5
10–19 years	186	139	49	40	74.2	70.9
20–29 years	248	171	103	59	54.0	64.4
30–39 years	343	219	158	96	52.5	53.6
40–49 years	478	333	339	226	27.5	30.4
50–59 years	694	421	613	369	12.2	12.9
60–69 years	918	632	876	593	5.4	6.2
70–99 years	972	879	946	850	3.5	4.4
All ages	**4,073**	**2,996**	**3,175**	**2,326**	**23.8**	**23.8**

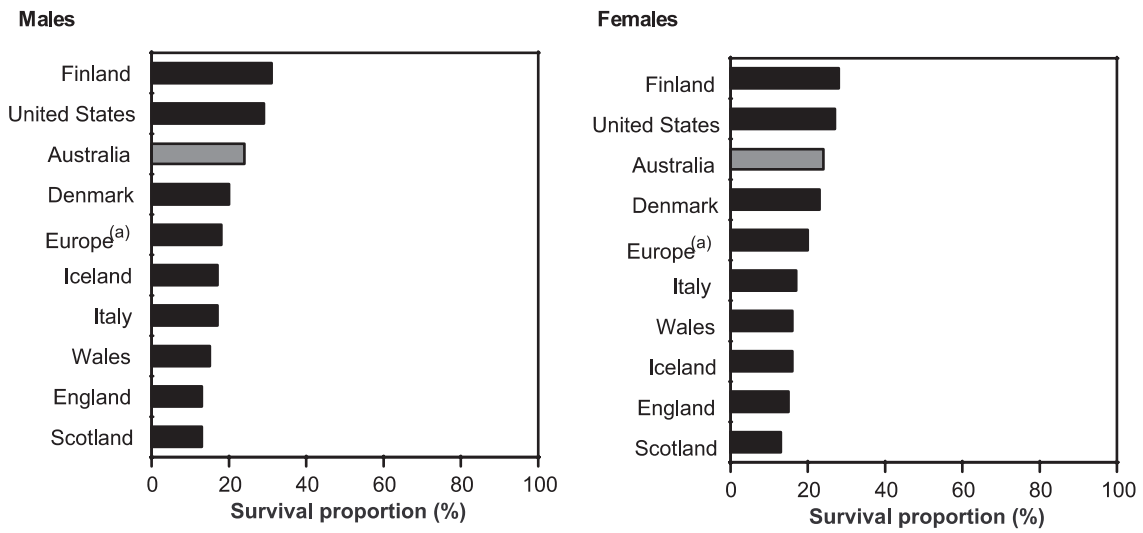
Incidence and mortality

In 1997, there were 1,224 new cases of brain cancer diagnosed—712 were in males and 512 were in females. Cancer of the brain was responsible for 1,034 deaths. Of these 592 were of males and 442 were of females. It is estimated that 9,400 years of life were lost before the age of 75 in males and 7,400 in females due to brain cancer.

For the five-year period 1993–1997, age-standardised incidence and mortality rates for brain cancer in males increased slightly, with incidence increasing by 0.2% per annum and mortality increasing by 0.3% per annum. For females, age-standardised incidence and mortality rates decreased, with incidence decreasing by 1.5% per annum, and mortality decreasing by 0.7% per annum.

International comparisons

Five-year relative survival after diagnosis of cancer of the brain is relatively good in Australia, compared with the selected countries for which relative survival information was available. Compared with the selected countries, five-year relative survival after diagnosis of brain cancer in Australia was lower than in Finland and the United States, and higher than in Denmark, Iceland, England, Wales and Scotland (Figure 18.1; Table 18.8). International comparison of five-year relative survival was similar for females, except five-year relative survival was slightly higher for females in Australia than in the United States.



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 18.1: Cancer of the brain five-year relative survival proportions: selected countries

Examination of five-year relative survival by age group for the United States and England and Wales showed similar consistent decreases in relative survival proportions as age increased (Ries et al. 1999; Coleman et al. 1999).

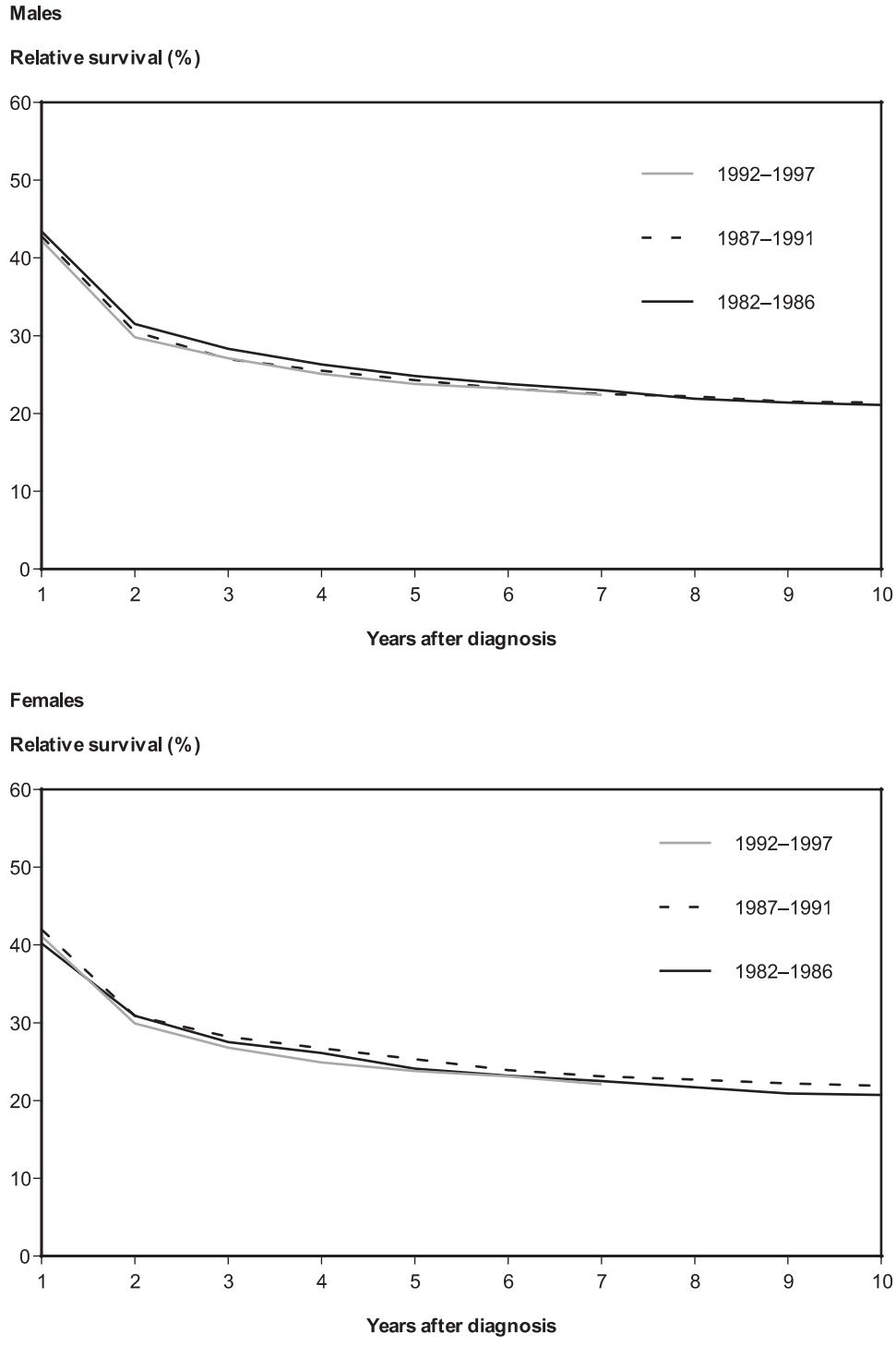
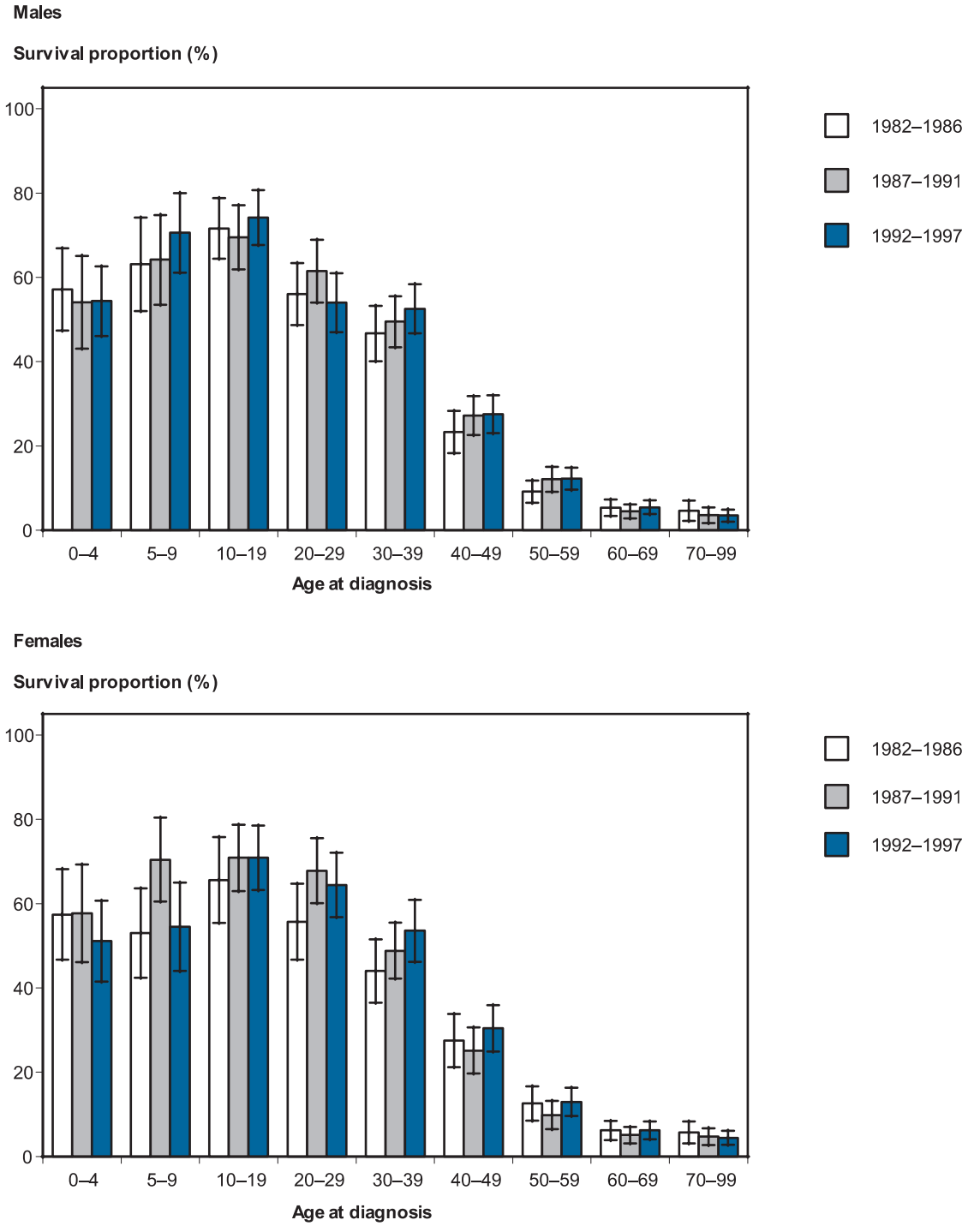


Figure 18.2: Cancer of the brain relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 18.3: Cancer of the brain five-year relative survival proportions: age at diagnosis and period of diagnosis, Australia

19 Cancer of the thyroid

Summary

Relative survival after diagnosis of thyroid cancer is high, when compared with other cancer sites. During 1992–1997, relative survival one year after diagnosis of cancer of the thyroid was 91.2% for males and 96.4% for females. Five-year relative survival was 87.9% for males and 95.6% for females (Table 19.1). Survival ten years after diagnosis was 79.8% for males and 92.2% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 19.2; Tables 19.2 and 19.3).

Between 1982–1986 and 1992–1997, relative survival for females increased significantly with five-year relative survival increasing from 87.8% to 95.6%. For males the only significant increase was for relative survival three years after diagnosis, from 83.2% to 89.6% (Figure 19.2; Tables 19.2 and 19.3).

Five-year relative survival after a diagnosis of thyroid cancer was highest in the younger age groups and decreased as age increased. For females the numbers of new cases and deaths were small for age groups below 30 years, making survival estimates for these age groups less robust. Five-year relative survival was highest for males and females aged 30–39 years—98.6% and 99.3%, respectively. This decreased to 65.4% for males and 65.1% for females aged 80–89 years (Figure 19.3; Table 19.1).

For individual age groups, five-year relative survival increased significantly between 1982–1986 and 1992–1997 for males aged 40–49 years only. Five-year relative survival increased for females aged 40–49 years, 60–69 years, 70–79 years and 80–89 years (Figure 19.3; Tables 19.5 and 19.6).

Table 19.1: Cancer of the thyroid: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	31	74	1	1	*	*
20–29 years	99	451	3	1	*	*
30–39 years	203	808	4	10	98.6	99.3
40–49 years	247	815	14	15	95.6	98.8
50–59 years	189	501	33	26	86.5	97.2
60–69 years	207	391	59	58	76.4	89.6
70–79 years	147	269	71	97	66.9	76.4
80–89 years	55	112	35	68	65.4	65.1
90–99 years	5	14	5	11	*	68.7
All ages	**1,183**	**3,435**	**225**	**287**	**87.9**	**95.6**

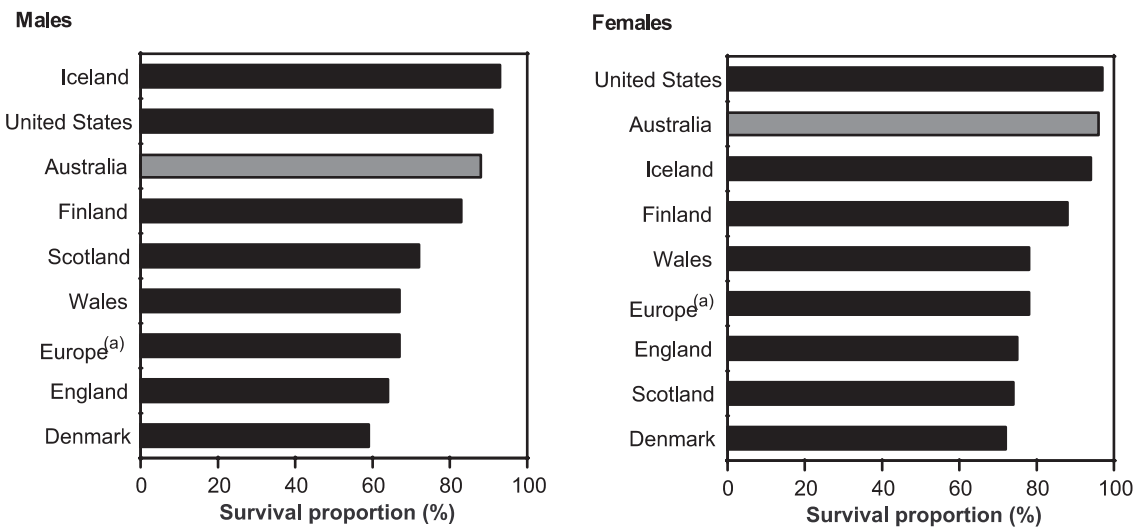
* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

Incidence and mortality

Cancer of the thyroid is a relatively uncommon cancer. During 1997, there were 859 new cases diagnosed. Of these, 228 were males and 631 were females. Thyroid cancer was the cause of 71 deaths in 1997—34 males and 37 females. It is estimated that there were 268 years of life lost due to thyroid cancer in males, and 248 years of life lost in females during 1997. For the six-year period 1992–1997, the age-standardised incidence rates for thyroid cancer increased by 6.0% and 3.8% per annum for males and females respectively. However, despite an increase in incidence, age-standardised mortality rates for thyroid cancer decreased by 4.6% per annum for males and 6.2% per annum for females.

International comparisons

Five-year relative survival after diagnosis of thyroid cancer in Australia is relatively high compared with relative survival after thyroid cancer in selected countries for which relative survival data were available. Five-year thyroid cancer relative survival proportions in Australia during 1987–1992 were lower than in Iceland for males, but not for females. Australian relative survival proportions were also lower than those in the United States for both males and females (Figure 19.3; Table 19.8). Australian proportions were higher than those in countries such as Wales, Scotland, England, Denmark and Finland. The change in relative survival pattern over the diagnosis period is consistent with those found in England and Wales; however, the United States rates show consistent but not significant improvement. Examination of five-year relative survival by age group for the United States, England and Wales showed similar consistent decreases in relative survival rates as age increased (Ries et al. 1999; Coleman et al. 1999).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 19.1: Cancer of the thyroid five-year relative survival proportions: selected countries

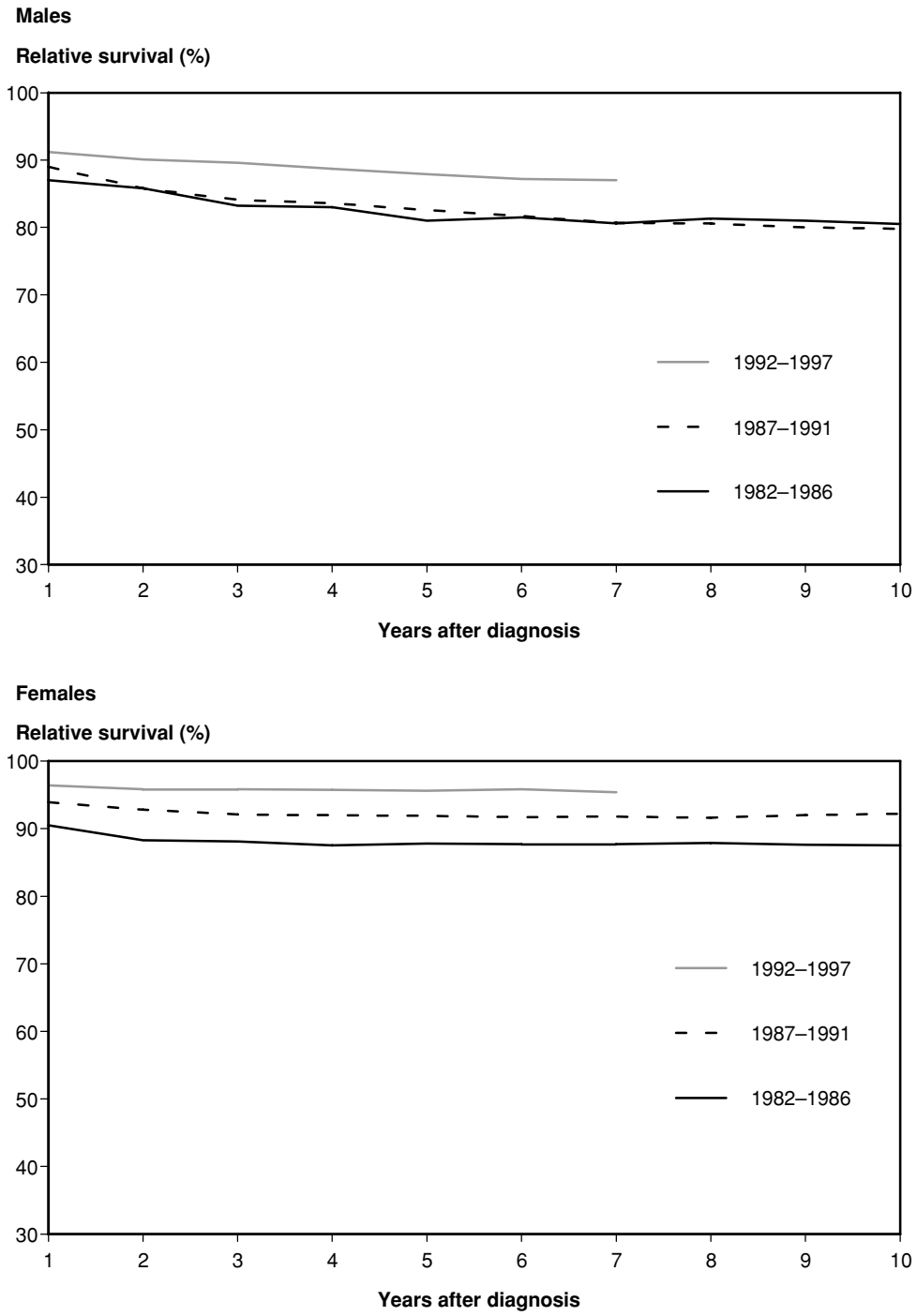
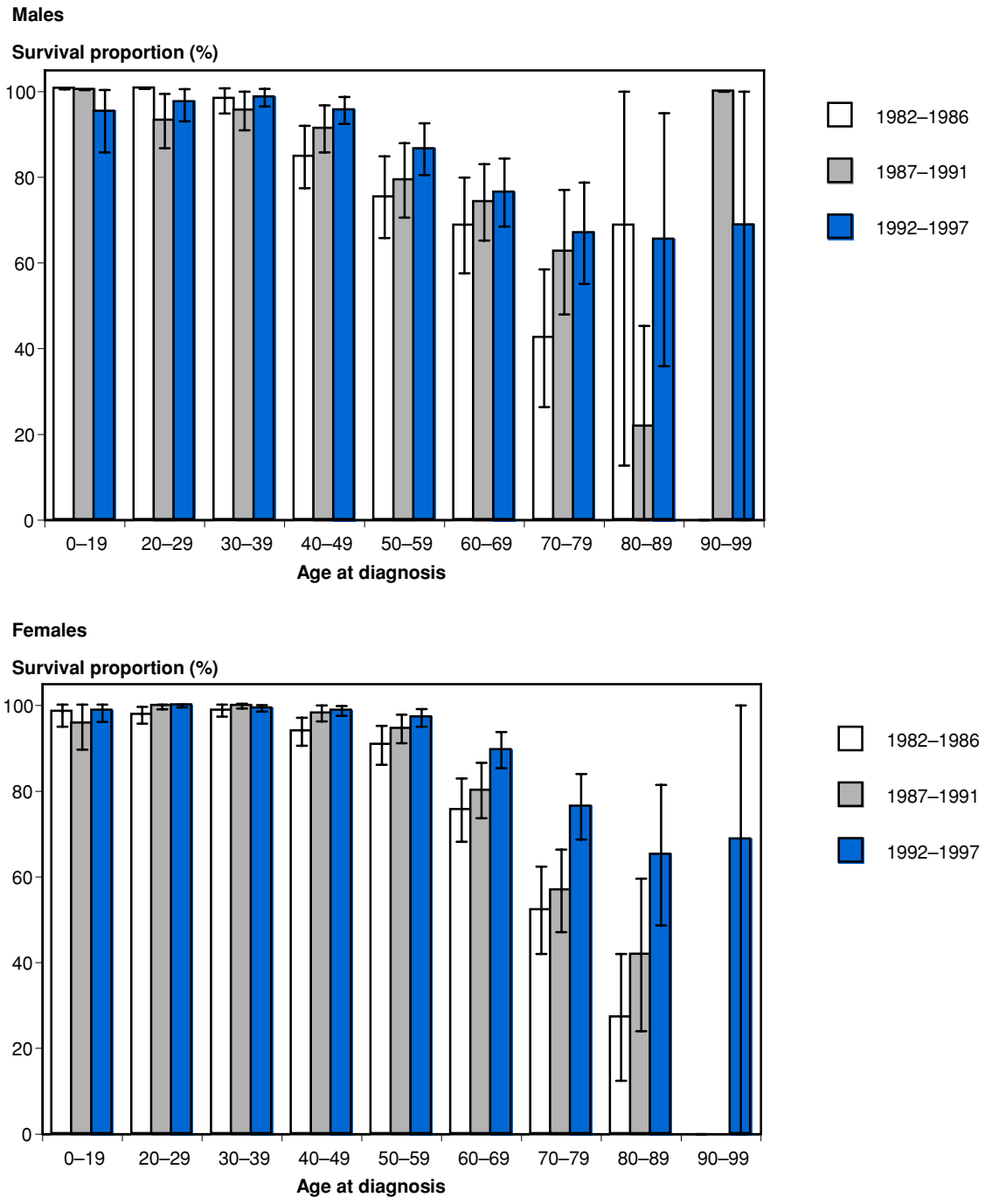


Figure 19.2: Cancer of the thyroid relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 19.3: Cancer of the thyroid five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

20 Cancer of unknown primary site

Summary

Relative survival after diagnosis of cancer of unknown primary site is poor when compared with that of other cancer sites. During 1992–1997, relative survival one year after diagnosis was 23.3% for males and 22.5% for females. Five-year relative survival was 13.4% for males and 11.5% for females (Table 20.1). Relative survival ten years after diagnosis was 12.8% for males and 10.7% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 20.1; Tables 20.2 and 20.3).

Between 1982–1986 and 1992–1997, short-term relative survival in males (up to four years after diagnosis) increased significantly, with relative survival one year after diagnosis increasing from 21.1% to 23.3%. There were no significant changes in long-term relative survival for males. For females, there were no significant changes in relative survival between 1982–1986 and 1992–1997 (Figure 20.1; Tables 20.2 and 20.3).

As age at diagnosis increased, five-year relative survival decreased. In 1992–1997, relative survival was highest for males and females diagnosed between ages 0 and 19 years at 47.2%, and 68.7%, respectively. This declined to 9.9% for males and 5.7% for females aged 80–89 years (Figure 20.2; Table 20.1).

Five-year relative survival increased significantly between 1982–1986 and 1992–1997 for males aged 40–49 years and 60–69 years, by 10.2 percentage points and 3.2 percentage points, respectively. For females, five-year relative survival increased significantly for those aged 60–69 years by 4.1 percentage points (Figure 20.2; Tables 20.5 and 20.6).

Table 20.1: Cancer of unknown primary site: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	27	22	14	7	47.2	68.7
20–29 years	45	34	23	24	46.8	29.5
30–39 years	144	174	97	126	32.2	26.6
40–49 years	481	390	365	313	23.9	19.7
50–59 years	1,104	751	924	623	16.7	15.8
60–69 years	2,480	1,629	2,195	1,424	12.2	12.7
70–79 years	2,919	2,457	2,699	2,264	9.9	9.0
80–89 years	1,574	2,105	1,485	2,026	9.9	5.7
90–99 years	192	433	189	423	4.9	7.5
All ages	**8,966**	**7,995**	**7,991**	**7,230**	**13.4**	**11.5**

Incidence and mortality

During 1997, there were 3,139 new cases of cancer of unknown primary site diagnosed. Of these, 1,665 were males and 1,474 were females. Cancer of unknown primary site was the cause of 2,255 deaths in 1997, with 1,171 deaths in males and 1,084 deaths in females. It is estimated that there were about 8,000 years of life lost due to cancer of unknown primary site in males and 5,900 in females during 1997.

For the six-year period 1992–1997, age-standardised incidence rates for cancer of unknown primary site decreased by 1.3% per annum for males and 1.6% per annum for females. Age-standardised mortality rates for cancer of unknown primary site decreased by 0.7% per annum for males and 1.0% for females.

International comparisons

There were no international comparisons available for cancer of unknown primary site.

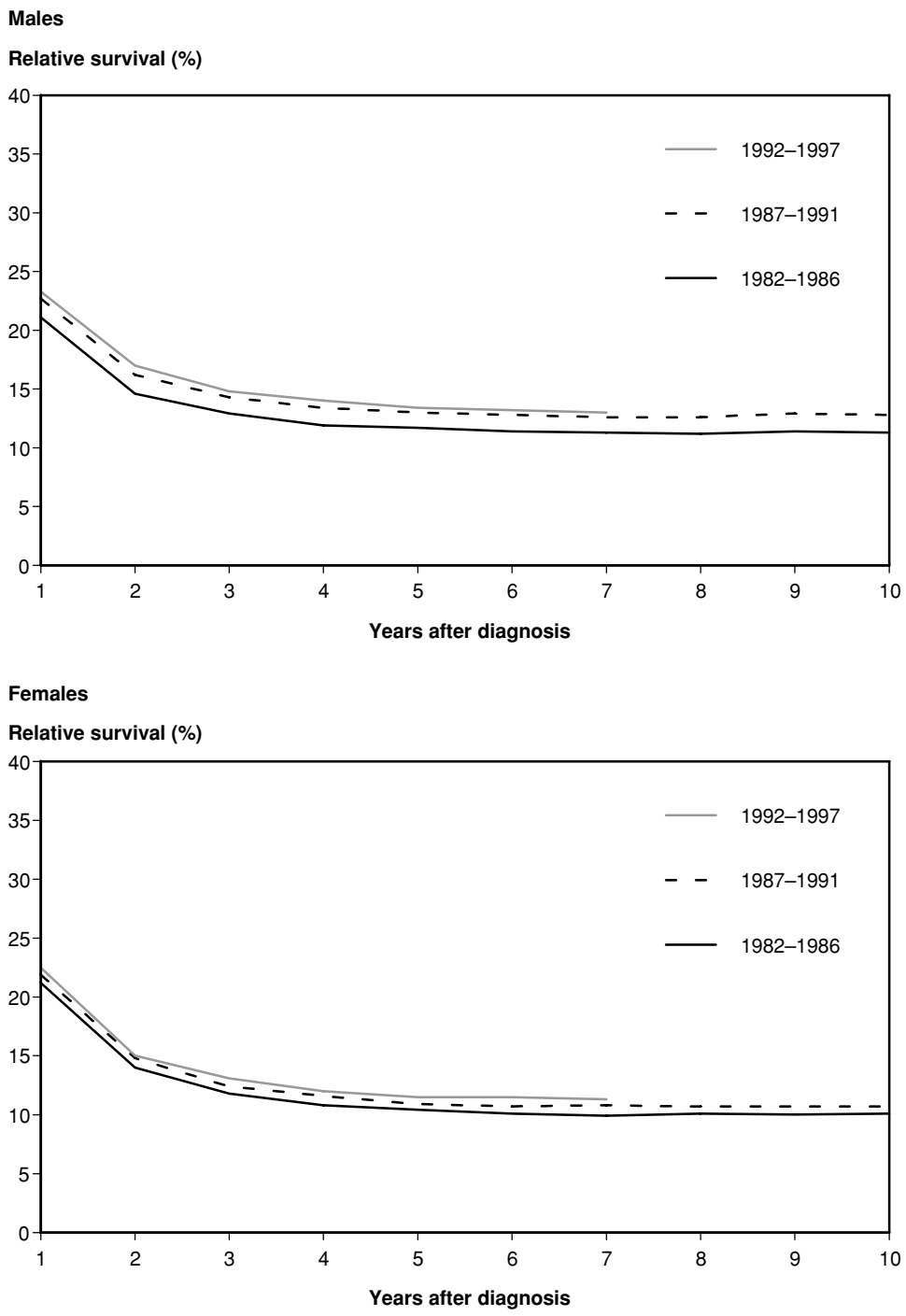
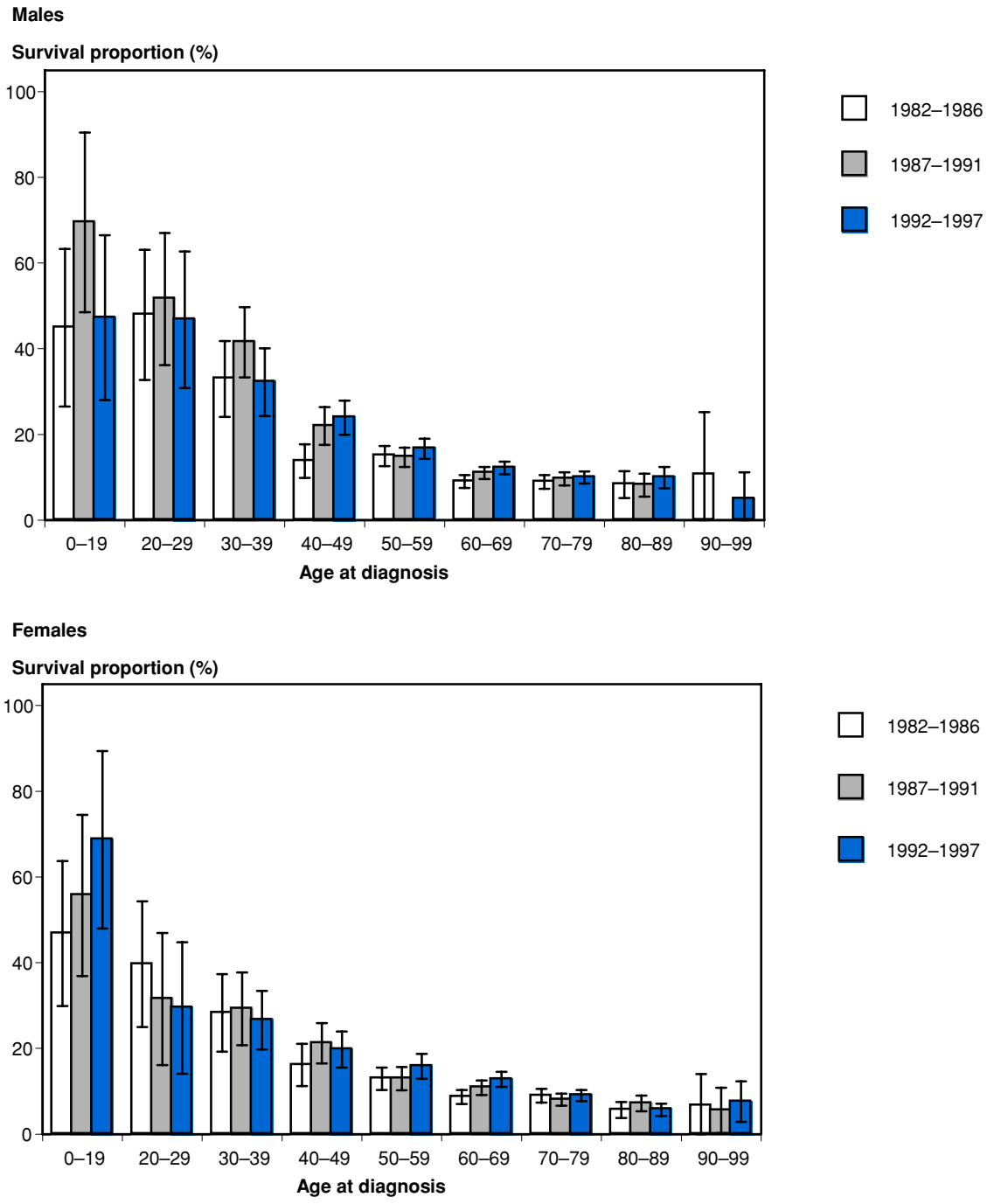


Figure 20.1: Cancer of unknown primary site relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 20.2: Cancer of unknown primary site five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

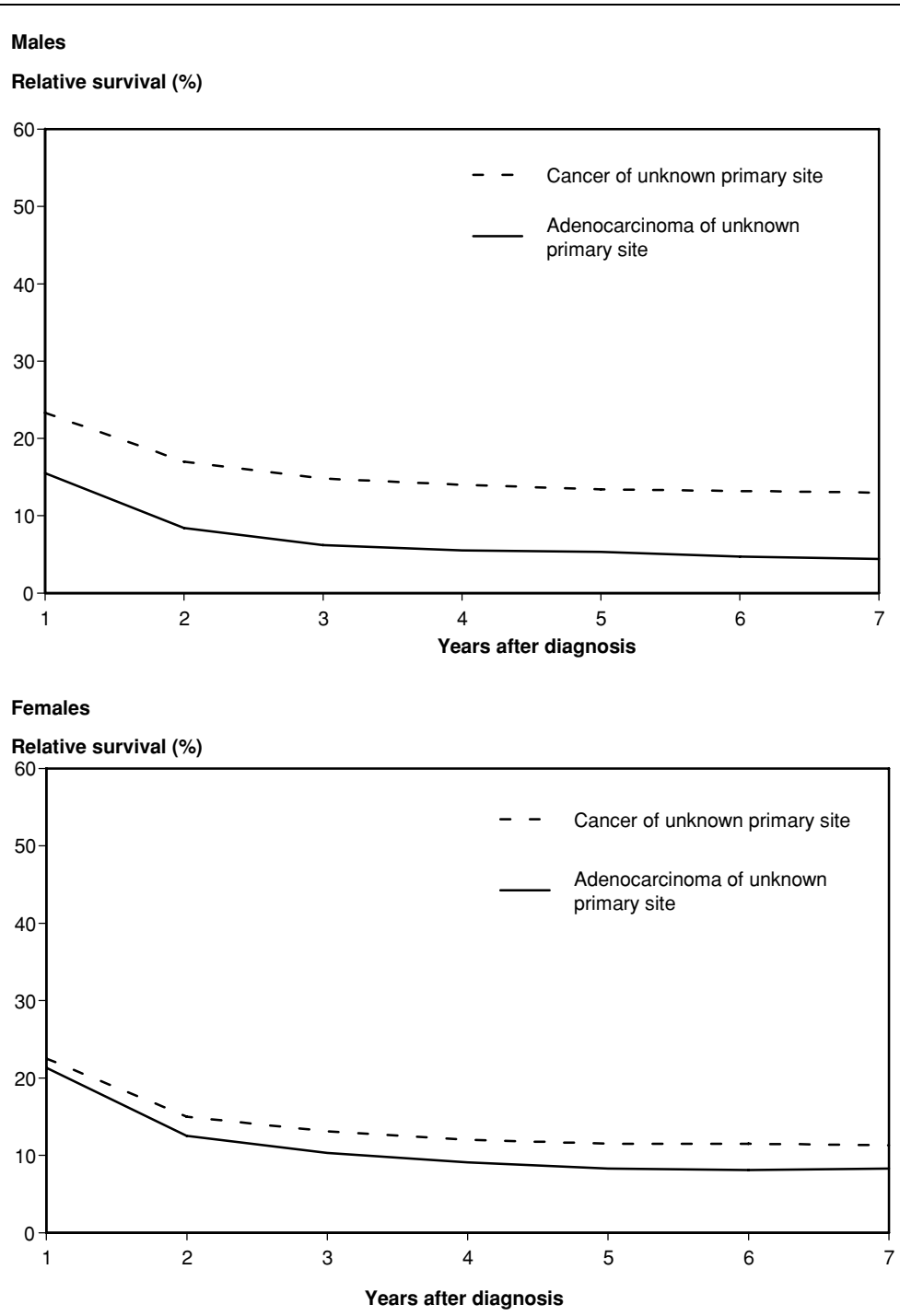


Figure 20.3: Cancer of unknown primary site, adenocarcinoma: relative survival proportions by morphology and period of diagnosis, Australia, 1992–1997

Relative survival by subtypes

Adenocarcinoma of unknown primary site

In 1992–1997, five-year relative survival after diagnosis of adenocarcinoma of unknown primary site was 5.3% for males and 8.3% for females. This was significantly lower than relative survival after diagnosis of all cancers of unknown primary site (Figure 20.3; Tables 20.8 and 20.9).

Five-year relative survival tended to be higher for those diagnosed in the younger age groups (Tables 20.10 and 20.11).

21 Hodgkin's disease

Summary

When compared with other cancer sites, relative survival after diagnosis of Hodgkin's disease is high. During 1992–1997, relative survival one year after diagnosis was 92.0% for males and 93.1% for females. Five-year relative survival was 82.6% for males and 84.4% for females (Table 21.1). Survival ten years after diagnosis was 74.2% for males and 77.3% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 21.2; Tables 21.2 and 21.3).

Between 1982–1986 and 1992–1997, Hodgkin's disease relative survival increased significantly. Five-year relative survival increased from 74.1% to 82.6% for males and from 73.8% to 84.4% for females. There was no significant change one year after diagnosis for males, whereas for females, relative survival after one year increased from 87.0% to 93.1% (Figure 21.2; Tables 21.2 and 21.3).

Five-year relative survival was higher for those diagnosed before 30 years of age. Relative survival was highest for males aged 5–9 years (96.1%) and for females aged 10–19 years (95.6%). As age increased, relative survival decreased. Relative survival for males aged 60–69 years was 21.8% and for females aged 60–69 years was 23.4% (Figure 21.3; Table 21.1).

For individual age groups, there were no significant changes between 1982–1986 and 1992–1997 in five-year relative survival for most age groups. However, there was a significant increase in relative survival for males aged 0–4 years and 5–9 years (Figure 21.3; Tables 21.5 and 21.6).

Table 21.1: Hodgkin's disease: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–4 years	184	151	12	8	95.7	95.1
5–9 years	265	274	14	21	96.1	92.4
10–19 years	211	189	28	7	87.9	95.6
20–29 years	169	90	19	13	88.5	86.6
30–39 years	107	65	34	17	68.5	77.9
40–49 years	134	93	68	39	56.3	62.0
50–59 years	94	93	59	55	51.1	52.6
60–69 years	32	40	28	33	21.8	23.4
70–99 years	2	1	2	0	*	*
All ages	**1,198**	**996**	**264**	**193**	**82.6**	**84.4**

* Interpretation difficult due to statistical instability. The instability in this age/sex/site group may be due to the survival model's handling a combination of small number of cases/deaths and or unstable background survival patterns resulting in invalid estimates. These results are therefore not presented here.

Incidence and mortality

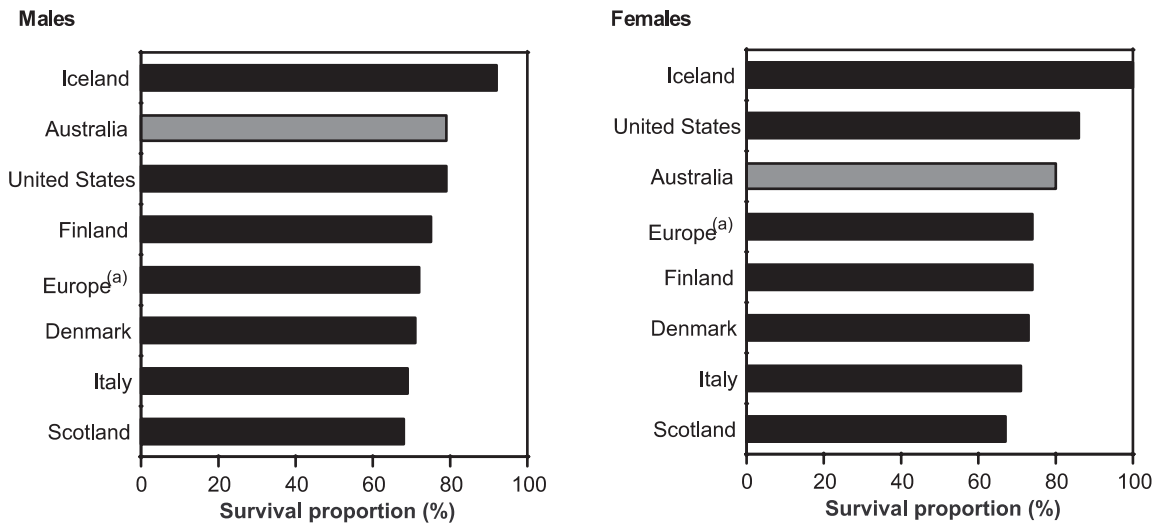
Hodgkin's disease is a relatively uncommon cancer, and in 1997 there were 400 new cases diagnosed—209 males and 191 females. In the same year Hodgkin's disease was responsible for 49 deaths in males and 24 deaths in females. It is estimated that in 1997 about 800 years of life were lost before the age of 75 in males and 200 in females due to Hodgkin's disease.

For the six-year period 1992–1997, age-standardised incidence rates for Hodgkin's disease increased slightly—by 0.7% per annum for males and 0.5% per annum for females. Age-standardised mortality rates decreased by 4.3% per annum for males and 7.9% per annum for females.

International comparisons

Relative survival after diagnosis of Hodgkin's disease is relatively good in Australia, compared with countries for which relative survival information was available. Relative survival for males in Australia was lower than in Iceland, similar to the United States and Finland and higher than in Europe, Denmark, Italy and Scotland. For females in Australia, five-year relative survival was lower than in Iceland and the United States and higher than in Finland, Europe, Denmark, Italy and Scotland (Figure 21.1; Table 21.8).

Examination of relative survival by age group for the United States, England and Wales showed similar consistent decreases in relative survival rates as age increased. However, relative survival for those diagnosed after age 50 years tended to be lower in Australia (Ries et al. 1999; Coleman et al. 1999).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 21.1: Hodgkin's disease five-year relative survival proportions: selected countries

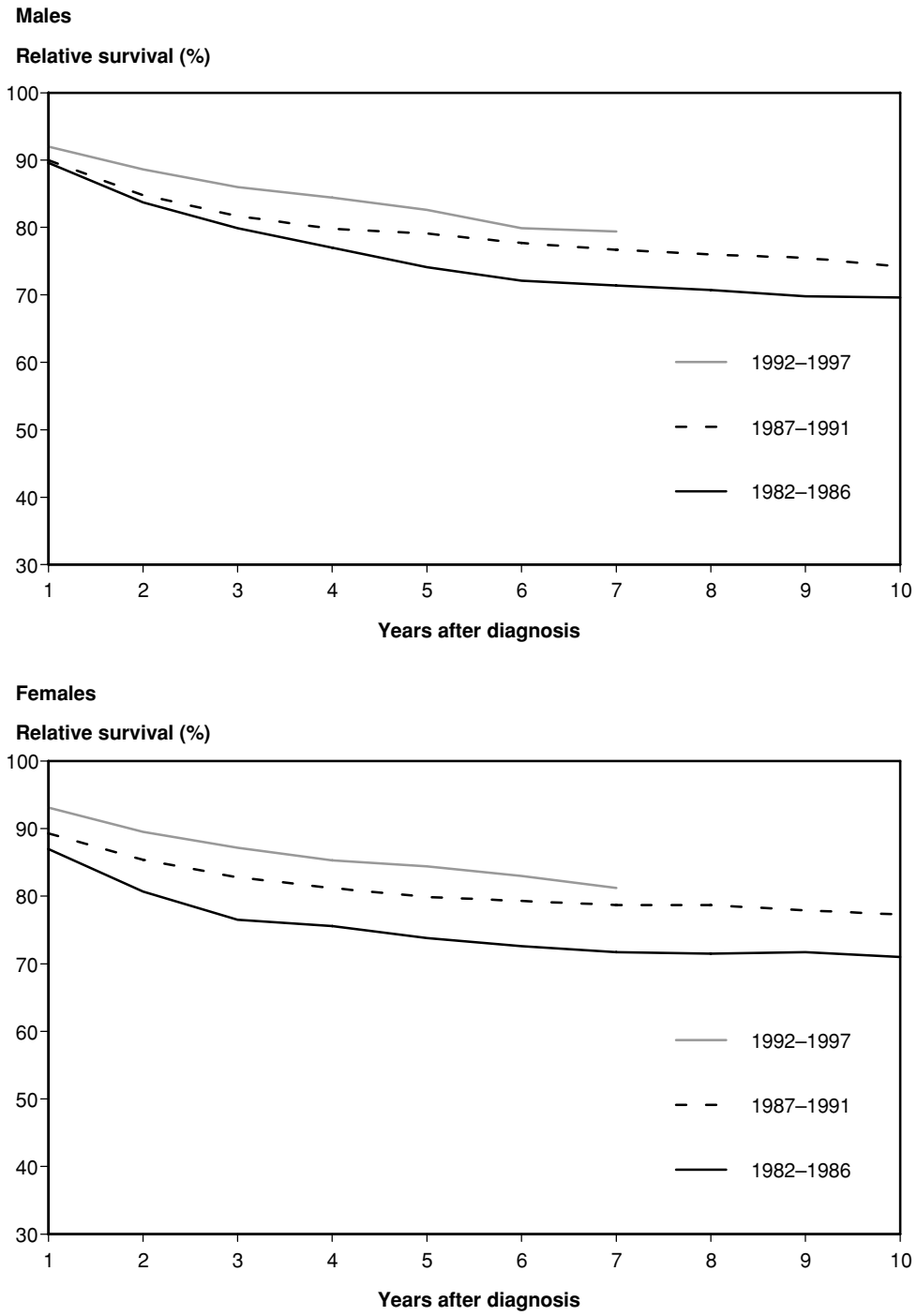
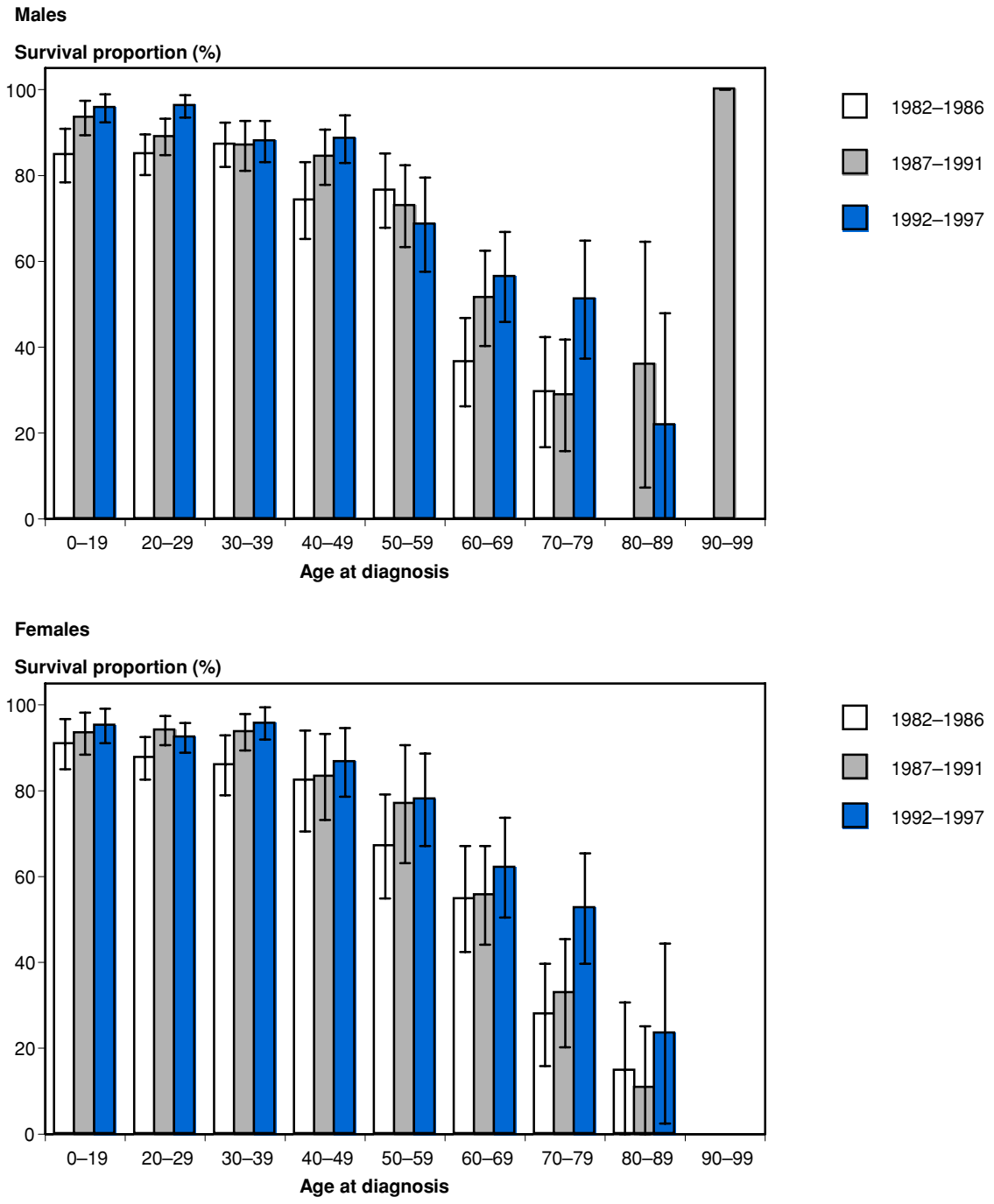


Figure 21.2: Hodgkin's disease relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 21.3: Hodgkin's disease five-year relative survival proportions: age at diagnosis and period of diagnosis, Australia

22 Non-Hodgkin's lymphoma

Summary

For the period 1992–1997, relative survival one year after diagnosis of non-Hodgkin's lymphoma was 73.4% for males and 74.5% for females. Five-year relative survival was 54.6% for males and 55.8% for females (Table 22.1). Survival ten years after diagnosis was 44.0% for males and 45.0% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 22.2; Tables 22.2 and 22.3).

No significant changes were detected in one-year relative survival proportions between 1987–1991 and 1992–1997. However, there was a significant increase of 5.0 percentage points in five-year relative survival for males, and a significant increase of 5.9 percentage points in five-year relative survival for females (Figure 22.2; Tables 22.2 and 22.3).

Five-year relative survival was higher for those diagnosed in the younger age groups. Five-year relative survival proportions were highest for those aged 0–19 years—76.5% for males and 79.5% for females. As age at diagnosis increased, relative survival proportions decreased, falling to 55.3% for males and 54.7% for females aged 60–69 years. For those aged 80–89 years, five-year relative survival was 29.7% for males and 32.8% for females (Figure 22.3; Table 22.1).

For individual age groups, there was a significant increase in five-year relative survival between 1982–1986 and 1992–1997 for males aged from 50–59 to 70–79 years and for females aged 40–49 and 70–79 years (Figure 22.3; Tables 22.5 and 22.6).

Table 22.1: Non-Hodgkin's lymphoma: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–19 years	152	69	33	14	76.5	79.5
20–29 years	147	99	60	28	60.8	72.8
30–39 years	357	172	152	57	59.8	75.3
40–49 years	478	351	226	113	62.3	75.9
50–59 years	790	553	340	238	61.6	65.8
60–69 years	1,145	852	619	438	55.3	54.7
70–79 years	1,235	1,128	864	704	43.6	45.3
80–89 years	512	618	437	490	29.7	32.8
90–99 years	36	77	34	69	19.0	12.0
All ages	**4,852**	**3,919**	**2,765**	**2,151**	**54.6**	**55.8**

Incidence and mortality

There were 3,149 new cases of non-Hodgkin's lymphoma diagnosed in 1997. Of these, 1,700 were males and 1,449 were females.

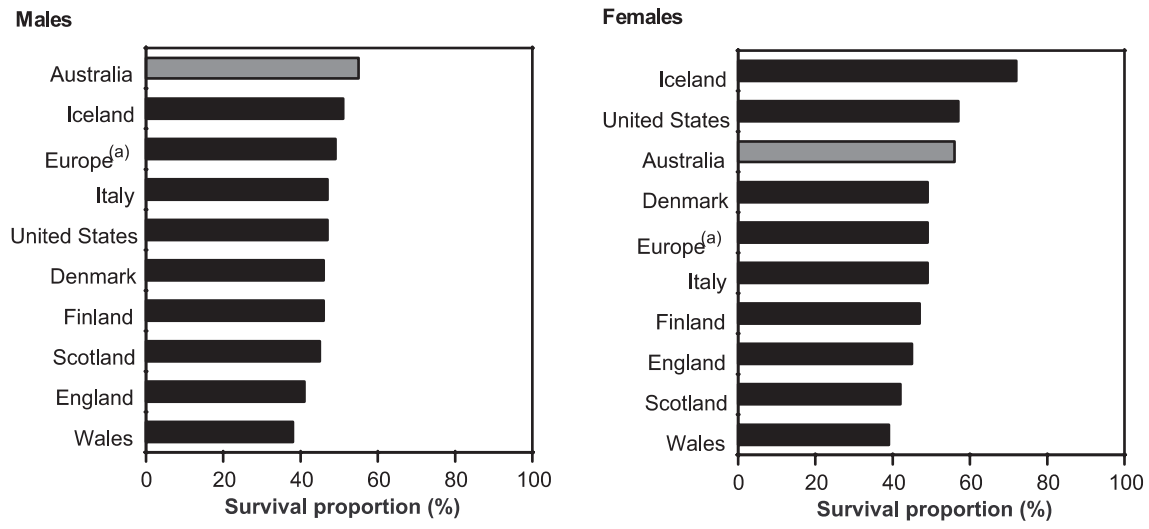
There were 1,540 deaths from non-Hodgkin's lymphoma in 1997—815 males and 725 females. It is estimated that in 1997 about 7,900 years of life were lost before the age of 75 in males and 5,000 in females due to non-Hodgkin's lymphoma.

For the six-year period 1992–1997, age-standardised incidence rates for non-Hodgkin's lymphoma in males increased by 0.3% per annum while age-standardised death rates declined by 0.4% per annum. For females, both age-standardised incidence and mortality rates increased over this period by 2.0% and 1.6% per annum respectively.

International comparison

Survival after non-Hodgkin's lymphoma is relatively good in Australia compared with countries for which survival data are available. Australian males had the highest five-year relative survival of the selected countries, which ranged from 55% in Australia to 38% in Wales. For Australian females, the five-year relative survival proportion was 56% which was lower than in Iceland (72%), similar to the United States (57%), and higher than all other selected countries (Figure 22.1; Table 22.8).

An examination of five-year relative survival by age group for the United States, England and Wales showed consistent decreases similar to Australia in survival rates as age increased. However, survival for those diagnosed after age 50 tended to be lower in Australia (Ries et al. 1999; Coleman et al. 1999).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 22.1: Non-Hodgkin's lymphoma five-year relative survival proportions: selected countries

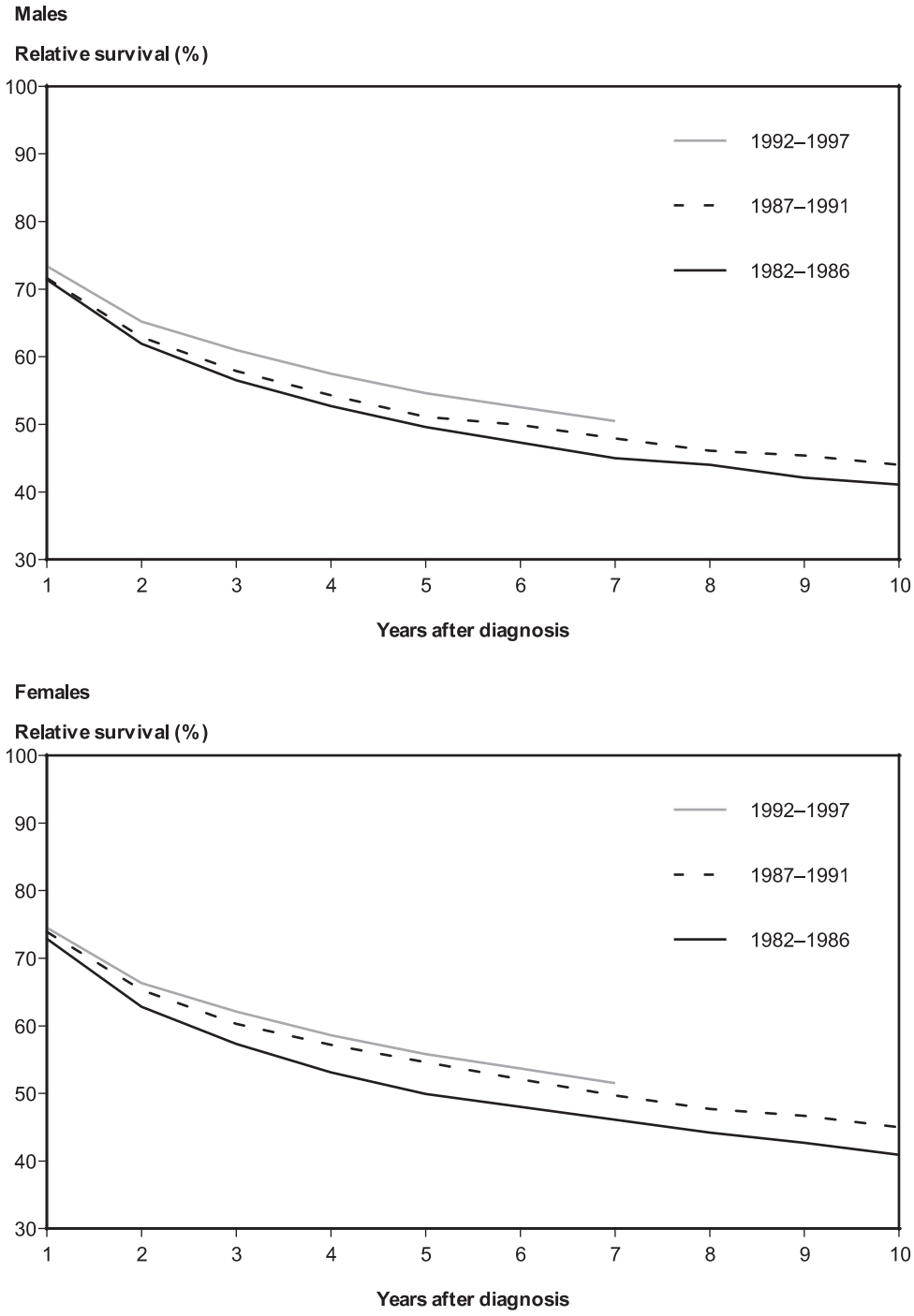
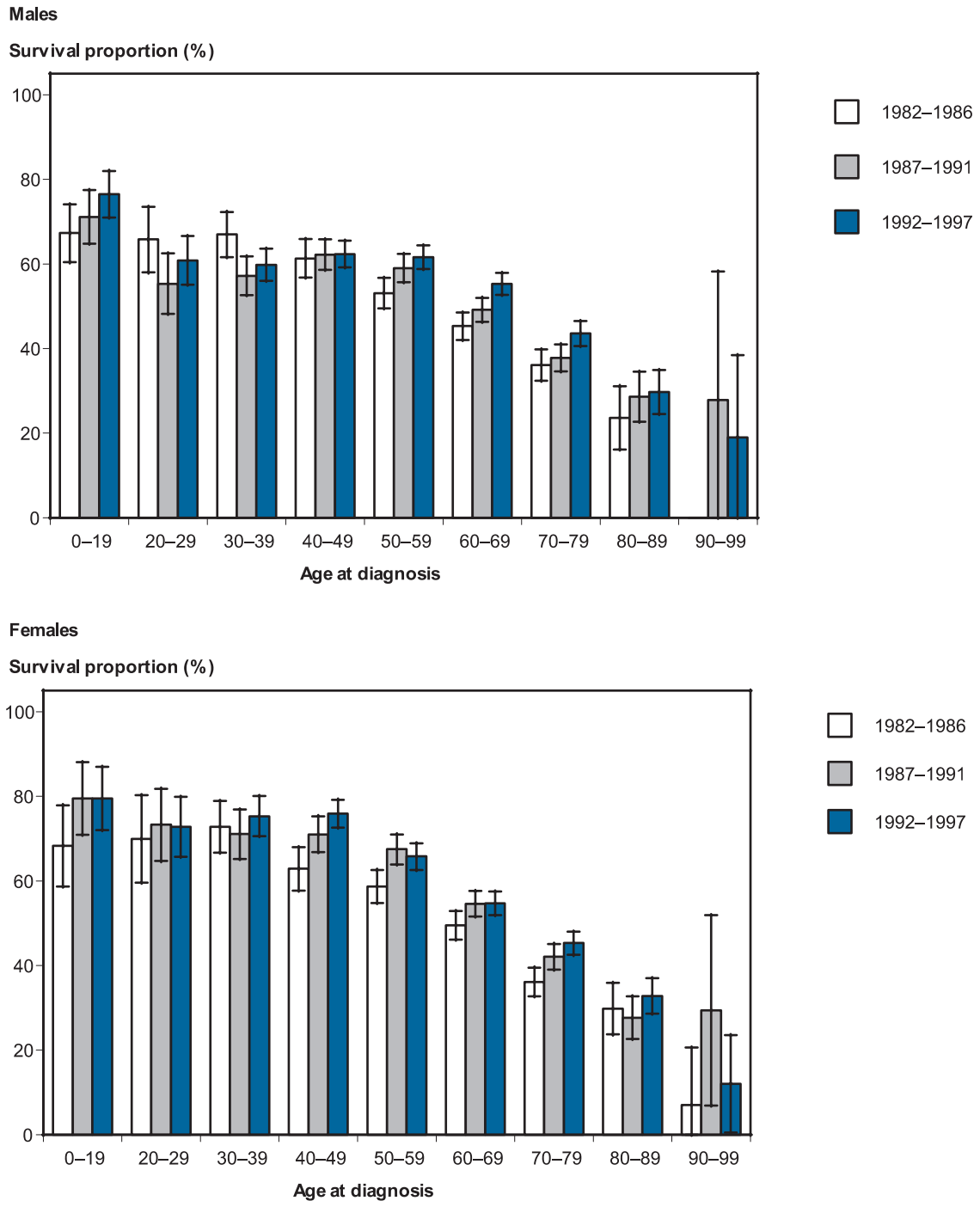


Figure 22.2: Non-Hodgkin's lymphoma relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 22.3: Non-Hodgkin's lymphoma five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

23 Leukaemia

Summary

Relative survival after diagnosis of leukaemia is poor when compared with relative survival of other cancer sites. Relative survival one year after diagnosis of leukaemia was 65.7% for males and 62.9% for females. Five-year relative survival was 41.2% for males and 43.2% for females (Table 23.1). Survival ten years after diagnosis was 34.1% for males and 35.9% for females in 1987–1991, the most recent period for which ten-year relative survival data are available (Figure 23.2; Tables 23.2 and 23.3).

There was no significant difference in relative survival for males between 1982–1986 and 1992–1997. For females, there was an increase in five-, six- and seven-year relative survival, with relative survival five years after diagnosis increasing by 3.8 percentage points (Figure 23.2; Tables 23.2 and 23.3).

Leukaemia affects a larger proportion of children than older age groups compared with other cancers. Five-year relative survival in 1992–1997 was highest for children aged 0–4 years and 5–9 years, at 71.8% for males and 76.2% for females. As age increased, relative survival decreased to 25.7% for males and 29.3% for females aged 70–99 years (Figure 23.3; Table 23.1).

For individual age groups, there was a significant increase in relative survival between 1982–1986 and 1992–1997 for males aged 30–39 years (by 13.9 percentage points) and males aged 40–49 years (by 19.3 percentage points). There was a significant increase in relative survival five years after diagnosis for females aged 20–29 years (17.2 percentage points), 30–39 years (21.7 percentage points) and 40–49 years (18.0 percentage points) (Figure 23.3; Tables 23.5 and 23.6).

Table 23.1: Leukaemia: number of new cases and deaths, and five-year relative survival proportions, by age at diagnosis and sex, Australia, 1992–1997

	New cases		Deaths		5-year relative survival (%)	
Age	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
0–4 years	309	281	86	62	71.8	76.2
5–9 years	179	127	51	31	69.2	75.7
10–19 years	241	161	114	65	51.8	56.2
20–29 years	211	177	108	82	47.3	52.9
30–39 years	288	214	150	103	48.7	49.6
40–49 years	430	336	190	177	54.6	47.0
50–59 years	773	490	392	246	51.0	49.2
60–69 years	1,382	842	918	484	38.0	44.3
70–99 years	2,833	2,363	2,325	1,871	25.7	29.3
All ages	**6,646**	**4,991**	**4,334**	**3,121**	**41.2**	**43.2**

Incidence and mortality

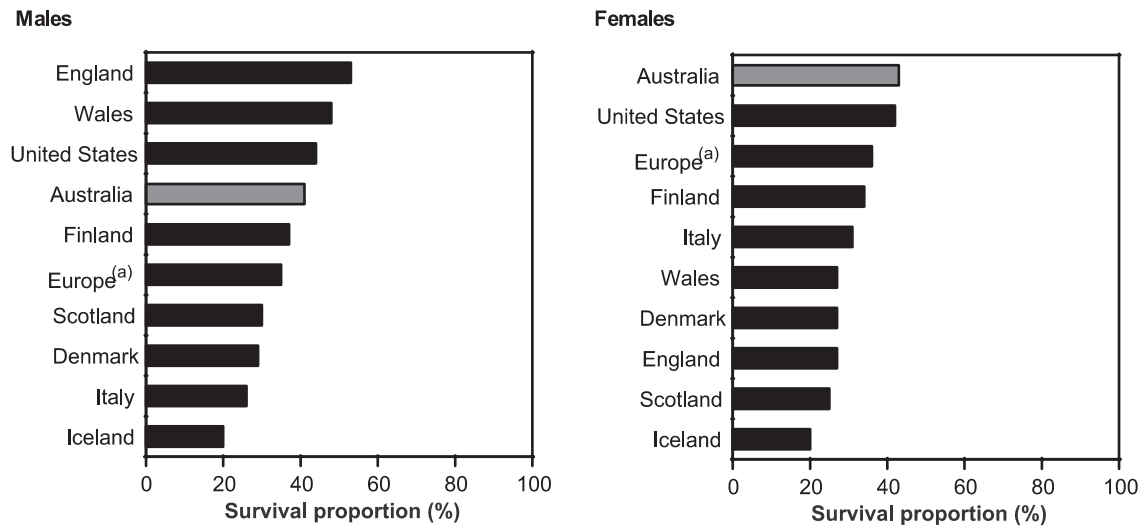
In 1997, there were 2,026 new cases of leukaemia diagnosed—1,175 were males and 851 were females. Leukaemia was responsible for 1,214 deaths in 1997—592 males and 442 females. It is estimated that about 8,000 years of life were lost before the age of 75 in males and 5,800 in females due to leukaemia.

For the five-year period 1992–1997, age-standardised incidence and mortality rates for leukaemia in males decreased—incidence decreasing by 1.6% per annum and mortality by 3.2% per annum. For females, age-standardised incidence and mortality rates also decreased, although by a smaller percentage—with incidence decreasing by 0.5% per annum and mortality decreasing by 1.7% per annum.

International comparisons

Five-year relative survival data were available only for the selected countries listed in Figure 23.1. Five-year relative survival after diagnosis of leukaemia in Australia for males was similar to that in the United States, and lower than in England and Wales. Australia and the United States also had similar five-year relative survival for females, and Australia had relative survival proportions higher than Iceland, Scotland, England, Wales and the European weighted average (Figure 23.3; Table 23.8).

Examination of relative survival by age group for the United States, England and Wales showed similar consistent decreases in five-year relative survival proportions as age increased (Ries et al. 1999; Coleman et al. 1999).



(a) Weighted average.

Note: The survival period varies among countries, but is broadly within the 1987–1991 period.

Sources: Ries et al. 1999; Coleman et al. 1999; Berrino et al. 1999.

Figure 23.1: Leukaemia five-year relative survival proportions: selected countries

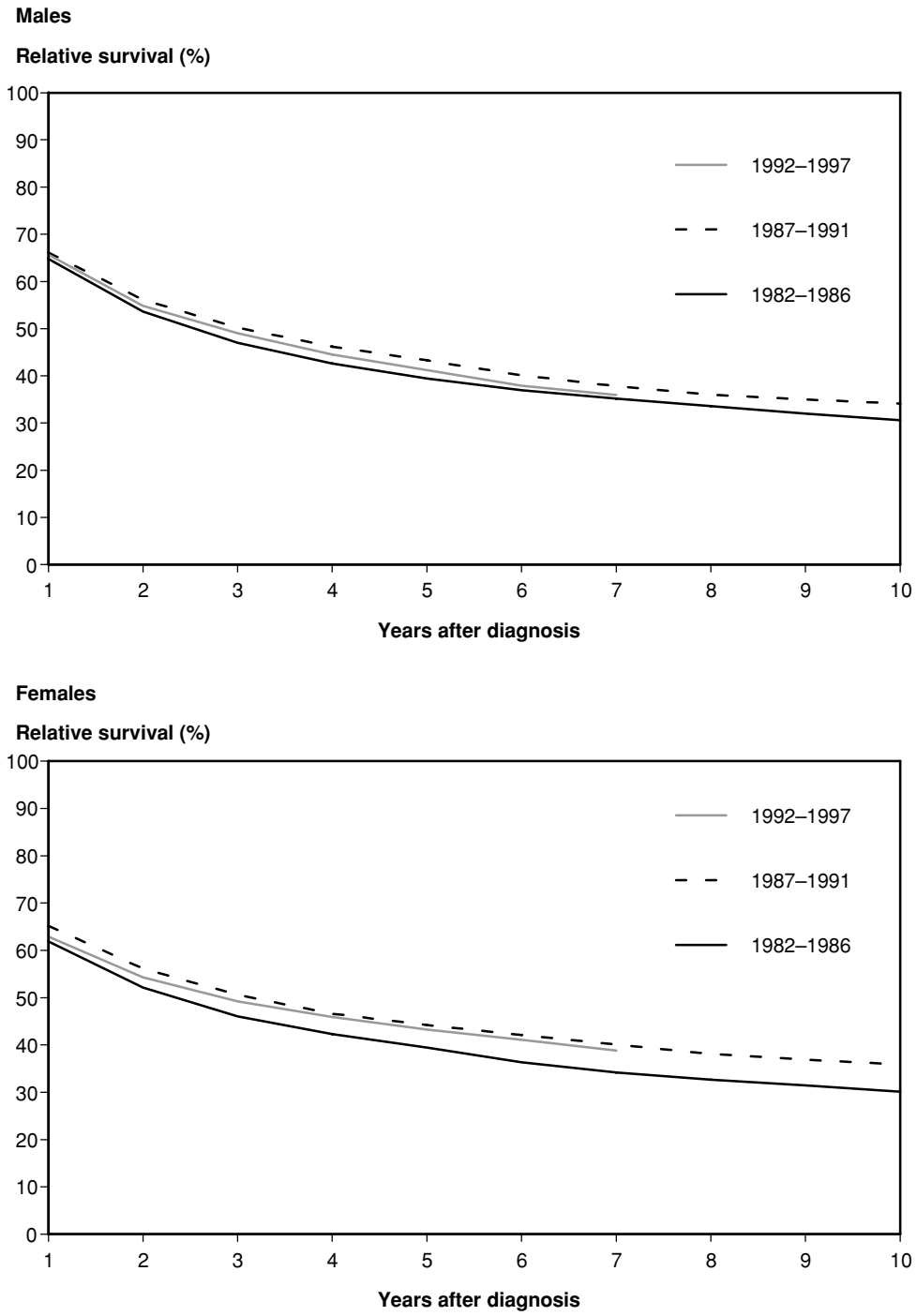
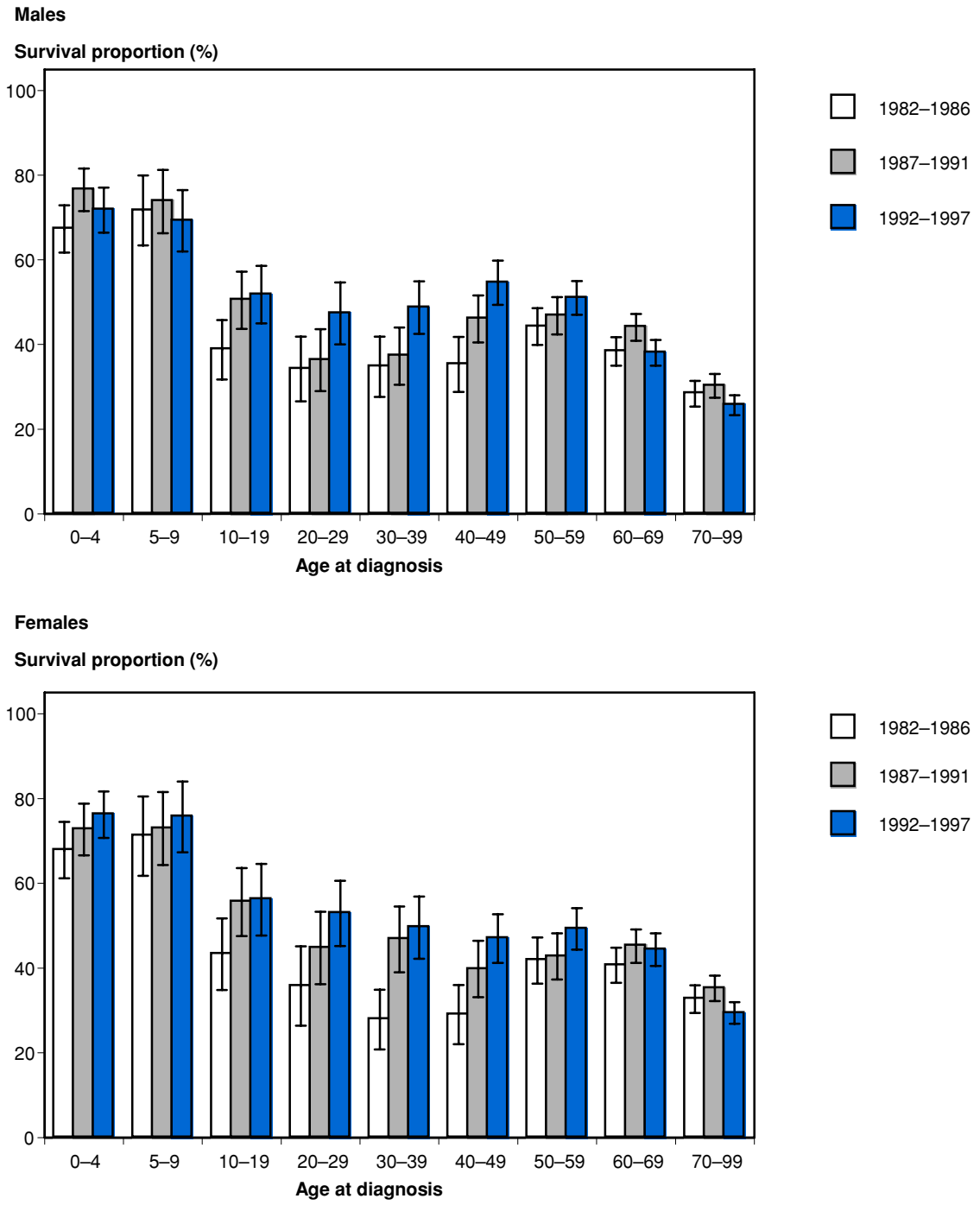


Figure 23.2: Leukaemia relative survival proportions: period of diagnosis, Australia



Note: 95% confidence intervals are shown for each age group.

Figure 23.3: Leukaemia five-year relative survival proportions: age at diagnosis by period of diagnosis, Australia

Leukaemia subtypes

Four subtypes of leukaemia were examined in further detail—acute lymphatic leukaemia, acute myeloid leukaemia, chronic lymphatic leukaemia and chronic myeloid leukaemia. There were significant differences in five-year relative survival between each of the four leukaemia subtypes (Figure 23.4).

Acute lymphatic leukaemia

During 1992–1997, acute lymphatic leukaemia had five-year relative survival proportions of 54.6% for males and 59.1% for females. This was higher than five-year relative survival after diagnosis of leukaemia, at 41.2% for males and 43.2% for females.

Five-year relative survival after diagnosis of acute lymphatic leukaemia decreased as age increased. The relative survival proportions were highest for males aged 0–4 years and females aged 5–9 years—78.1% and 83.7% respectively. This then declined to 3.9% and 20.7% for males and females aged 60–69 years.

Acute myeloid leukaemia

During 1992–1997, acute myeloid leukaemia had the lowest five-year relative survival proportions of the four leukaemia types at 16.1% for males and 18.8% for females. It was also lower than five-year relative survival proportions for leukaemia, at 41.2% for males and 43.2% for females.

Five-year relative survival was highest for males and females aged less than 40 years. Within this group, relative survival proportions were highest for males aged 10–19 years and for females aged 0–4 years—54.8% and 56.5%, respectively. As age increased from 40 years, five-year relative survival declined, to 2.8% for males and 2.0% for females aged 70–99 years.

Chronic lymphatic leukaemia

During 1992–1997, chronic lymphatic leukaemia had the highest five-year relative survival proportions of the four leukaemia types, at 64.8% for males and 70.5% for females. It was also higher than five-year relative survival proportions for leukaemia, at 41.2% for males and 43.2% for females.

The numbers of new cases and deaths were small for males aged under 30 years and for females aged under 40 years, making relative survival estimates for these age groups less robust. For those diagnosed in the diagnostic period 1992–1997, five-year relative survival tended to decrease as age increased.

Chronic myeloid leukaemia

During 1992–1997, chronic myeloid leukaemia had five-year relative survival proportions of 35.8% for males and 39.9% for females. This is similar to five-year relative survival proportions for leukaemia, at 41.2% for males and 43.2% for females.

Five-year relative survival proportions were highest for males aged 30–39 and for females aged 0–4 years at 61.3% and 71.6% respectively. Relative survival decreases in the older age groups to 22.8% and 27.9% for males and females aged 70–99 years.

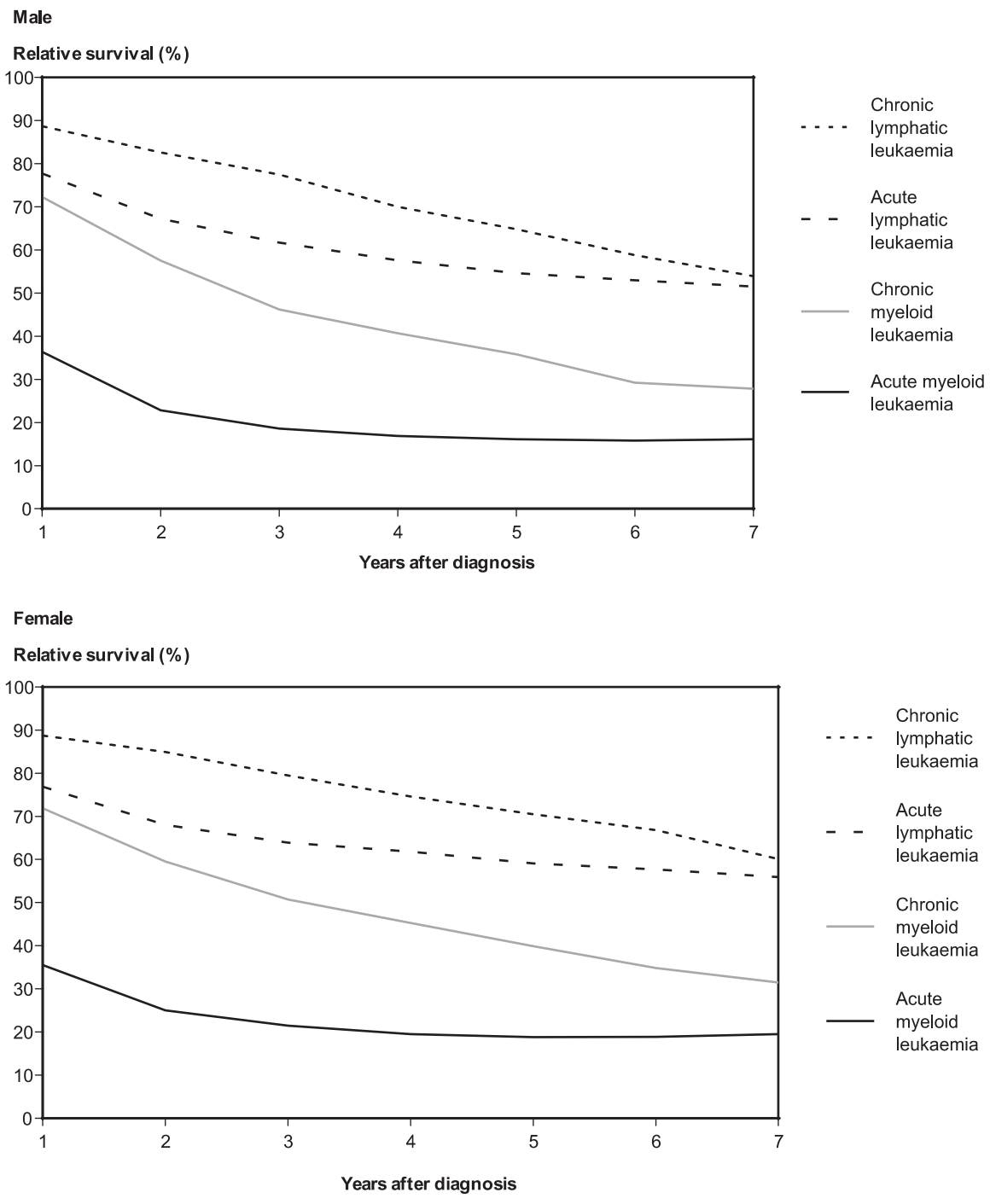


Figure 23.4: Leukaemia type and period of diagnosis, Australia, 1992–1997

Appendix 1: Methods

Objective

This analysis provides estimates of relative survival after people are diagnosed with cancer. The analysis provides estimates by age at diagnosis, year of diagnosis and five-year period during which diagnosis took place.

The analysis covers all new cases of cancer diagnosed in Australian residents between 1982 and 1997. In determining survival, the cancer cases have been matched against deaths from all causes registered in Australia from 1982 to 1999.

Relative survival analysis

Relative survival and cause-specific survival are two methods used to estimate the probability of surviving a specific disease (Estève et al. 1994). Cause-specific survival is used when cause of death is known with certainty. However, cause of death is not always easy to determine. Further, for most cancer patients, the risk of dying from other causes is not negligible and should be adjusted for when analysing their survival experience (Ederer et al. 1961). In contrast to cause-specific survival, relative survival does not require knowledge of the cause of death. For this national cancer survival project, not all causes of death were known with certainty. However, the fact of death was known and therefore relative survival methods were appropriate. Another important reason for using relative survival is that many morbid conditions contribute to a specific cause. For example, suicide may be the cause of death but may have been committed because of depression resulting from a diagnosis of cancer. Relative survival allows for the contribution of cancer to other causes even when a specific underlying cause is known.

Relative survival is defined as the ratio of the observed survival rate for a given cohort of patients to the expected survival rate (Ederer et al. 1961). The expected survival rate is the rate that the patient group should have experienced based on the life table of the general population from which they were diagnosed (Estève et al. 1990). A relative survival of less than 100% implies that the cohort survived for less time than would be expected for the general population. A relative survival of 100% implies that survival in the cohort is no different from that in the general population. A relative survival of greater than 100% generally arises from clinical trials where one cohort is provided with a superior treatment and thus outlives its comparison cohort. It can also arise when there is poor follow-up of cases and not all observed deaths in the cohort are recorded. A relative survival proportion greater than 100% in the confidence intervals generally happens when there are small numbers in the population being analysed, generating larger variances and increasing the size of the confidence intervals.

For example, in the general population during 1992–1997, the expected proportion of males aged 60–69 years who survive for the next five years is 90.6%. The observed survival rate after five years for males diagnosed with lung cancer at age 60–69 is 10.8%. The five-year relative survival proportion for males diagnosed with lung cancer at age 60–69 is the ratio of these two percentages (10.8/90.6), that is 0.119, or 11.9% (Table 8.1).

The relative survival analysis in this report was undertaken using the SAS statistical software functions as developed by the Mayo Foundation in 1994 (Therneau 1994). This code was developed by Terry Therneau using SAS Version 8.1. Staff in the Queensland Cancer Registry further adapted and developed the code for local use (Baade 2000b). AIHW staff then further developed the code to handle national-level data. The resultant program calculates expected survival using the life table method and estimates relative survival using a Cox proportional hazards regression (Estève et al. 1990).

Results using this method will produce estimates which will be slightly different from those produced by other cancer registries. Other registries used different relative survival packages—New South Wales and Western Australian cancer registries used the RELSURV package as developed by Hédelin (1995), and the South Australia cancer registry used the SURV2 package as developed by Voutilainen et al. (1998). The results will also be slightly different to those produced by the AIHW in an earlier *report—Breast Cancer Survival in Australian Women 1982–1994* (AIHW 1998) which also used RELSURV to produce its estimates.

Confidentiality

Strict confidentiality and privacy provisions apply to the National Cancer Statistics Clearing House (NCSCH) and the National Death Index (NDI). Restrictions on the use and release of information are included in State and Territory legislation controlling the operation of the Registries of Births, Deaths and Marriages and the cancer registries. Within the Australian Institute of Health and Welfare the data are protected under the *Australian Institute of Health and Welfare Act 1987*. The *Privacy Act 1988*, the Australian Public Service Regulations and the *Commonwealth Crimes Act 1914* also control the release of information by AIHW staff. Further, the AIHW maintains a secure physical and computer environment.

Applications to access data in either the NCSCH or the NDI must have AIHW Ethics Committee approval and strict controls are applied to the information provided. Ethics approval was sought and obtained for the survival analysis reported here.

Data sources

National Cancer Statistics Clearing House (NCSCH)

Each year the NCSCH receives from the eight State and Territory cancer registries data on cancer diagnosed in residents of Australia. This started with cases first diagnosed in 1982. The data provided to the NCSCH enable record linkage to be performed and the analysis of cancer by site and histology.

Data used in the relative survival analysis were for the period 1 January 1982 to 31 December 1997.

National Death Index (NDI)

The NDI is a database maintained by the AIHW. It contains data on all deaths that have occurred in Australia since 1980. It is continually being updated and is current to mid-2001

(at the time this report was written). The data contained in the NDI come from State and Territory Registrars of Births, Deaths and Marriages.

As part of normal NCSCH operating practices, the NCSCH is regularly linked to the NDI. This linkage is undertaken to assist State and Territory cancer registries to identify deaths occurring interstate or that were not notified to the cancer register.

Note that although the NDI is current to mid-2001, follow-up cancer survival analysis finished at 31 December 1999. This cut-off date provided at least two years of follow-up for the persons diagnosed with cancer during 1997.

Life tables

Life tables by sex and single-year ages (0–99 years) were obtained from the Australian Bureau of Statistics for Australia, for each of the States and Territories and for regions (RRMA) for each year from 1982 to 1997. The method used to calculate the life tables is outlined by the Australian Government Actuary (1999) in *Australian Life Tables 1995–1997*. The total number of deaths that occurred in each year by individual age (0 to 99) and sex were then linked to the respective populations to determine hazard rates.

Hazard rates

Estimation of relative survival requires hazard rates by single-year ages for each year of follow-up. These hazard rates, λ_x, were calculated from life table information using the formula:

$$\lambda_x = -\ln(1 - q_x)$$

where q_x is the probability of dying between exact ages *x* and *x + 1* and is calculated using the following standard approximation:

$$q_x = \frac{M_x}{(1 + M_x(1 - a_x))}$$

where M_x is the age-specific death rate of persons aged *x*

a_x is the assumed fraction of a year lived by those who die during the year.

The following assumptions were made for a_x:

- a_0 = 0.9 because deaths among the very young in Australia tend to be concentrated early in the first year of life
- a_1 — a_{99} = 0.5 because those who die in the year will live, on average, half of a year during that year.

Confidence intervals

Where indicators include a comparison between time periods and age groups, rates are presented with a 95% confidence interval. This is because the observed value of a rate may vary due to chance even where there is no variation in the underlying value of the rate. The 95% confidence interval represents a range over which variation in the observed rate is consistent with this chance variation. These confidence intervals can be used as an

approximate test of whether changes in a particular rate are consistent with chance variation. Where the confidence intervals do not overlap, the difference in rates is greater than that which could be explained by chance. Where the intervals do overlap, then differences in the rates may be due to chance, and thus not statistically significant.

For example, the one-year relative survival proportion for lung cancer during the period 1982–1986 for males was 36.7% with a confidence interval of 36.0% to 37.4%. The corresponding proportion for 1992–1997 was 39.0% with a confidence interval of 38.4% to 39.6%. These two intervals do not overlap, so the difference between the 1982–1986 and 1992–1997 proportions is larger than would be expected 95% of the time and is classified as statistically significant. However, as many confidence intervals have been estimated, some classified as significant will, in fact, be due to chance.

Data processes

Calculation of relative survival involves the matching of cancer incidence and mortality data. The process required is described below.

Cancer incidence data from 1 January 1982 to 31 December 1997 were extracted from the NCSCH for all States and Territories. The mortality data from 1 January 1982 to 31 December 1999 were extracted from the NDI.

Preliminary analysis of the data extracted from the NCSCH indicated that the particulars referring to incidence were complete. However, the information relating to death, from cancer or any other cause, could be and on occasion was incomplete. Information on deaths in the NCSCH can be incomplete for the following reasons:

- At the time of providing data to the NCSCH, a State or Territory cancer registry may not have been notified of all deaths that have occurred in people on the register (e.g. deaths occurring interstate).
- At the time of providing data to the NCSCH, a State or Territory cancer registry may not have been able to process and update all deaths information available to it.

To establish a comprehensive data collection for cancer incidence and mortality, cancer registries were asked to:

- provide updated incidence and mortality files where possible
- examine information on deaths identified by the AIHW in its matching of cancer cases held in the NCSCH with all information on deaths held in the NDI (see below).

NCSCH and NDI matching

The AIHW used probabilistic matching to identify potential deaths from any cause among persons diagnosed with cancer using the software package AUTOMATCH to link the death records (NDI) with the cancer records (NCSCH). This was done using identifiable information (mainly name and date of birth) held in the NDI and the NCSCH. The matching algorithms allocated scores to each matching pair, with higher scores reflecting a greater probability of a correct match and lower scores a less likely match. Output files containing potential matches and their scores were sent to State and Territory cancer registries for review. The information on these files related to the name, date of birth, age at diagnosis, date of diagnosis, date of death, State or Territory of death, cancer incidence and death registration numbers, a matching score, and cause of death.

Inevitably there were variations in case details on the output files, e.g. missing middle names, variation in name spelling, and date of birth differences. Further, date of birth was not always available on the NDI as this information was not collected by the Registrars of Births, Deaths and Marriages in some jurisdictions over specific periods (Table A1.1). In this situation, an estimated year of birth, based on a computation of the difference between the age at death and the year of death, was available. This calculation could, however, result in the estimated year of birth being up to one year out in either direction. This lack of precision for some jurisdictions reduces the certainty of the match between cancer and death records. Nationally, date of birth information was available from 1996; however, most States and Territories had complete date of birth information by the early 1990s.

Table A1.1: National Death Index: availability of date of birth data by State and Territory

State/Territory	Date of birth not available	Date of birth available
New South Wales	1980–1991	1992–1999
Victoria	1980–1988	1989–1999
Queensland	1980–1995	1995–1999
Western Australia	Nil[(a)]	1980–1999
South Australia	Nil[(a)]	1980–1999
Tasmania	1980–1994	1995–1999
Australian Capital Territory	1980–1992	1993–1999
Northern Territory	1982–1990	1991–1999

(a) There are a few death registrations where date of birth was unavailable. These are spread across the whole period.

Each State and Territory cancer registry resolved possible matches according to local rules for accepting a cancer death notification. These rules are described in detail below. In general, cancer registries undertook validation checks on potential matches. These validation checks included checking their own database for the case, reviewing case file notes, and contacting hospitals, pathologists and specialists. The number of potential matches that were eventually accepted as matches varied by State and Territory. This variation was partly due to:

- the number of persons with cancer in each State and Territory
- the length of time since the State or Territory cancer registry last updated its register with information on deaths
- the length of time since the NCSCH data were last linked to the NDI to assist the cancer registries with death clearance.

Some of the deaths identified by matching the NCSCH data to the NDI were already known to the cancer registries but had not been reported to the NCSCH. These deaths were subsequently added to the NCSCH. Other deaths were unknown to the cancer registries and were subsequently added to the relevant cancer registry's records and incorporated in the NCSCH. In some instances, cancer registries exchanged information about persons who were diagnosed in one jurisdiction and who died in another.

Cancer registries' practices in resolving matches between the NCSCH and the NDI

Each cancer registry appointed an experienced officer(s) to resolve proposed matches of NDI deaths with cancer cases. Although there were some local variations to this practice, the essential elements of the matching criteria are summarised here.

Officers either electronically or manually examined the cancer cases and the proposed NDI deaths, comparing them for:

- similarity of name, name combinations and name rarity
- plausibility of death linkage, e.g. diagnosis date or follow-up date later than death date
- similarity of dates of birth, incidence and death, checking multiple reporting sources
- similarity of cause of death and the cancer diagnosis.

It was recognised that some latitude was required in handling these proposed matches as the recording of information from all cancer registry and death notification sources is not consistent and not always accurate, although the use of multiple checking sources helped to alleviate this problem. It was noted that there was a tendency to accept matches more readily where complete date of birth details were available from the cancer registry file and the NDI rather than an estimated year of birth.

Cancer registry officers applied the matching criteria described above and validated the linkage by one or more of the following methods:

- comparing the proposed NDI death with full case details on the cancer registry database
- comparing the proposed NDI death with electoral roll details
- comparing the proposed NDI death with hospital records
- following up the proposed NDI death and case details with treating doctors
- comparing the case and proposed NDI death with details from other cancer registries.

In circumstances where these strategies failed to confirm or reject the linkage clearly, the case, for the purposes of this analysis, was treated as being alive until further evidence was obtained. Cases registered in the Australian Capital Territory were handled mainly by the New South Wales registry staff, and the South Australian registry handled a large proportion of the Northern Territory cases, both situations being covered under existing contractual arrangements.

NCSCH internal matching

To ensure that incident cases were not counted more than once when they had recorded diagnoses in more than one State or Territory, a deduplication probabilistic linkage was undertaken on the final database. Positive matches were referred to the cancer registries for resolution using standard registration rules based on personal identification, date of diagnosis, histological comparisons (to check for multiple primaries) and place of usual residence at time of diagnosis. Where cancer registries were not able to resolve the cases in the available time, the AIHW made an allocation based on the available information. Only the most definite matches were accepted in this last phase; otherwise, the matched pairs were treated as separate new cases.

Final analysis data set

In undertaking the relative survival analysis, some key assumptions were made which are important in the interpretation of the results:

1. Records with the following characteristics were excluded from the survival analysis:
   (a) any person whose age at diagnosis was not known or was missing
   (b) any person aged 100 years or over at diagnosis—this was due to the lack of precision in the hazard rates for persons older than 99 years, the atypical nature of survival in this cohort, and the relatively few cases available for analysis when compared with younger persons
   (c) any person for whom there was ambiguity surrounding their exact date of diagnosis or death
   (d) death certificate-only cases (i.e. cases diagnosed at death) because the survival methods used by the analysis do not allow for a survival time of zero.
2. All cancer cases were followed up to 31 December 1999. Unless a person diagnosed with cancer was known to have died before 31 December 1999, it was assumed that they were still alive. The impact of this, combined with the modelling methods used, is that survival proportions can be estimated for persons for a number of years following their diagnosis. Persons diagnosed between 1982 and 1987 can generate survival estimates up to fifteen years, those diagnosed between 1988 and 1992 can generate estimates up to ten years, while those diagnosed between 1993 and 1997 can generate survival estimates from two to seven years.

Records included in the analysis

The NCSCH contained records for 1,008,227 different persons. After removing records identified in Table A1.2, 984,751 records remained for the survival analysis. Table A1.3 presents the distribution of the remaining records by State and Territory.

Table A1.2: Records excluded in the analysis

Reason	Records deleted
Missing age	71
Person aged 100 years or more	236
Date of diagnosis later than date of death	383
Date of diagnosis same as date of death	16,656
Total records excluded	**17,349**

Table A1.3: Final number of records included in the analysis by State and Territory

State/Territory	Years	Matched cases
New South Wales	1982–1997	350,388
Victoria	1982–1997	252,435
Queensland	1982–1997	170,044
Western Australia	1982–1997	81,234
South Australia	1982–1997	88,415
Tasmania	1982–1997	27,306
Australian Capital Territory	1982–1997	11,026
Northern Territory	1982–1997	3,903
Total Australia	**1982–1997**	**984,751**

Appendix 2: Topography codes

Table A2.1: Topography codes for International Classification of Diseases, 9th revision (ICD-9) used in this report

ICD-9 code	Cancer name
All cancers	All cancers excluding ICD-9 173 (non-melanotic skin cancer)
151	Cancer of the stomach
153	Cancer of the colon
154	Cancer of the rectum
157	Cancer of the pancreas
162	Cancer of the lung
172	Melanoma of the skin
174	Cancer of the breast (female)
179, 182	Cancer of the uterus
180	Cancer of the cervix
183	Cancer of the ovary
185	Cancer of the prostate
186	Cancer of the testis
188	Cancer of the bladder
189	Cancer of the kidney
191	Cancer of the brain
193	Cancer of the thyroid
195–199	Cancer of unknown primary
201	Hodgkin's lymphoma
200, 202	Non-Hodgkin's lymphoma
204–208	Leukaemia

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