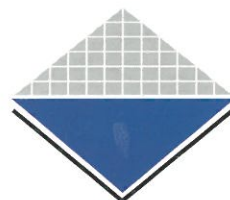


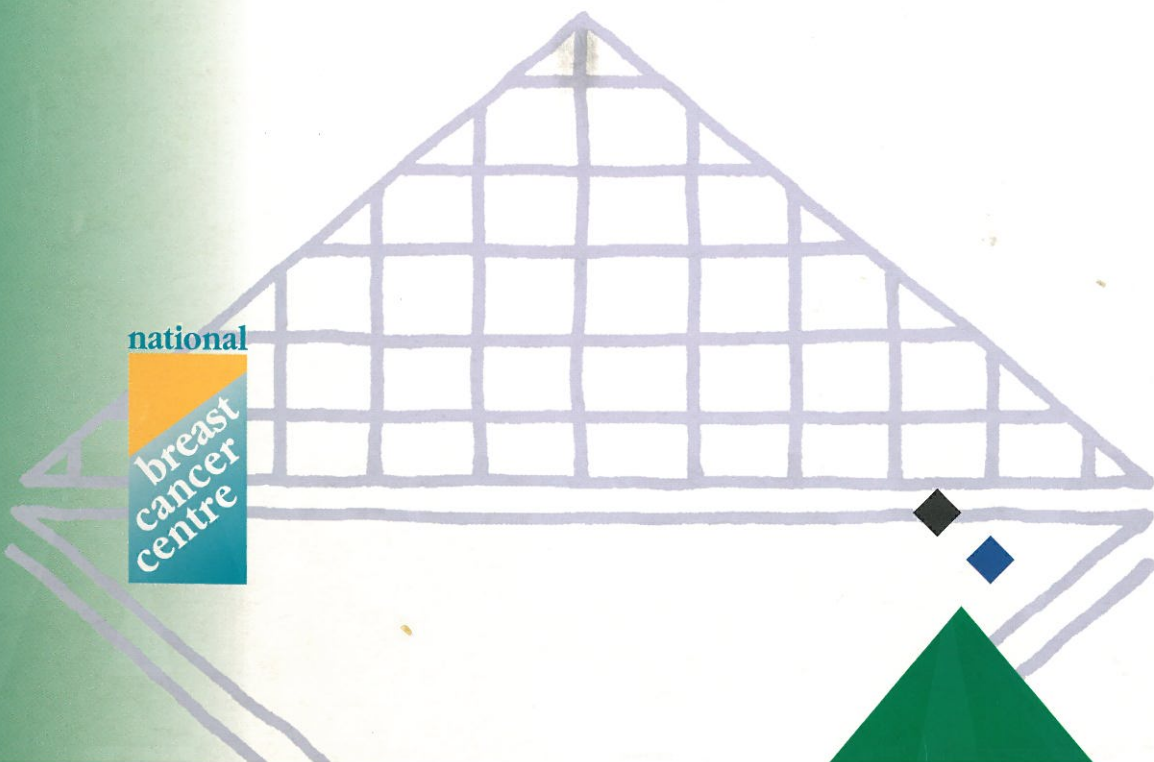
# Breast cancer in Australian women 1921-1994

**NHMRC National Breast Cancer Centre  
Australian Institute of Health and Welfare**

Assisted by the  
Australasian Association of Cancer Registries



AUSTRALIAN INSTITUTE OF  
HEALTH & WELFARE





**CANCER SERIES**

**Number 6**

**Breast cancer in  
Australian women  
1921–1994**

**Anne Krickler, NHMRC National Breast Cancer Centre**

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**Australian Institute of Health and Welfare  
Canberra**

**AIHW Cat. No. CAN 1**

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This is the sixth publication of the Australian Institute of Health and Welfare's Cancer Series. A complete list of the Institute's publications is available from the Publications Unit, Australian Institute of Health and Welfare, GPO Box 570, Canberra ACT 2601.

**National Library of Australia Cataloguing-in-Publication data**

Kricker, Anne

Breast cancer in Australian women 1921–1994

Bibliography.

ISBN 1 876101 01 6

1. Breast - Cancer - Australia - Statistics. I. Jelfs, Paul, 1963-. II. NHMRC National Breast Cancer Centre (Australia). III. Australian Institute of Health and Welfare. IV. Title. (Series: Cancer series (Canberra, ACT); no 6)

614.59990994021

**Suggested citation**

Kricker A, Jelfs P 1996. Breast cancer in Australian women 1921–1994. Canberra: Australian Institute of Health and Welfare, Cancer Series No. 6.

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**Published by**

NHMRC National Breast Cancer Centre and the  
Australian Institute of Health and Welfare

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# Summary

## Incidence and mortality

### Australia

Breast cancer was the most common cancer diagnosed in women in Australia in 1990, apart from non-melanocytic skin cancers, and it was the most common cause of cancer death. In 1990–1992, an average of 7,516 women were diagnosed annually with breast cancer and, on average, 2,458 women died each year of the disease.

Incidence rates increased between 1982 and 1992 but mortality was stable. In this time period:

- incidence increased by 1.5% annually from 57 per 100,000 woman-years in 1982 to 67 per 100,000 woman-years in 1992
- mortality stayed around 19 to 20 per 100,000 woman-years.

Incidence and mortality increased greatly with age:

- incidence rose steeply to 50 years of age and continued to increase, although more slowly, in women at older ages
- breast cancer was rare in women younger than 40 years of age, 15 per 100,000 woman-years in 1987–1992
- incidence increased nine-fold compared with that in women younger than 40 years of age to 138 per 100,000 in women in their 40s, by another 1.5-fold to 207 per 100,000 at 50–69 years of age and again by 1.3-fold to 267 per 100,000 in women 70 years of age and older
- death from breast cancer was extremely rare in women 40 years of age and younger in 1987–1992 at 3 per 100,000 woman-years
- mortality increased ten-fold compared with that experienced by younger women to 30 per 100,000 in women in their 40s, by another 2-fold to 69 per 100,000 at 50–69 years of age and with close to another doubling to 125 per 100,000 in women 70 years of age and older.

The most substantial increase in age-specific incidence rates between 1982–1986 and 1987–1992 was recorded in women 50 to 69 years of age. The increase in incidence in this age group was:

- from 176 per 100,000 woman-years in 1982–1986 to 207 per 100,000 woman-years in 1987–1992.

Mortality from breast cancer in women in Australia from 1921 to 1994 was consistently higher in older than younger women and relatively stable over time in all age groups.

## States and Territories

Age-standardised incidence rates increased in each State and Territory between 1982 and 1992 whereas mortality changed very little. Mortality rates tended to be higher in Victoria than in other States and Territories and lower in Queensland than elsewhere for women 65 years of age and older.

## Histopathological types

Most breast cancers (81%) were ductal carcinomas and 8% were lobular carcinomas. The occurrence of these two types differed by age:

- incidence of ductal carcinoma increased steeply with age to an annual rate of 201 per 100,000 women aged 70–74 years, which was seven times the rate in women in their 30s
- incidence of lobular carcinoma was relatively constant at rates between 14 and 20 cases per 100,000 women in all age groups from 45–49 to 80–84 years.

## Comparisons

### Place of birth

Mortality from breast cancer in Australian women differed by country of birth. Compared with Australian-born women:

- mortality was higher in women born in the UK and Ireland
- mortality was lower in women from some countries in eastern and southern Europe and Asia.

A national dataset for breast cancer incidence in overseas-born women was unavailable. In women in NSW, breast cancer incidence was higher in New Zealand-born women compared with women born in NSW and lower in women from southern European countries and China.

### Regional comparisons

Relatively little information was directly available for estimating variations in breast cancer incidence and mortality by Aboriginality, place of residence or socioeconomic status. Analyses of available data indicated that:

- mortality from breast cancer in rural regions was lower than in urban regions
- the more southerly states had higher mortality rates
- breast cancer incidence increased with increasing socioeconomic status in urban NSW and in Melbourne
- mortality from breast cancer showed no relationship to aggregate socioeconomic characteristics of geographical areas



- breast cancer mortality in recent years was as high in Aboriginal and Torres Strait Islander women as in non-Aboriginal women in Western Australia and the Northern Territory
- breast cancer incidence in Aboriginal and Torres Strait Islander women in these areas appeared to be low, although underascertainment was a likely contributor.

## **International incidence and mortality**

Incidence and mortality varied substantially worldwide during the period under study. For example, compared with Australia:

- incidence and mortality were higher in North America, New Zealand and some parts of western Europe
- incidence and mortality were lower in other Western countries (mainly in eastern Europe), and Asia, and lowest in China.

## **Survival**

Currently there are no national data on survival from breast cancer in women in Australia as a whole. In NSW and South Australia, survival was greatest for localised breast cancers. Overall survival from breast cancer in women in Australia, based on data from NSW and South Australia, may be similar to Canada, lower than in the USA and better than in most western European countries. Briefly:

- relative to survival for all women, around 76–77% of women with breast cancer in South Australia in 1977–1994 and NSW in 1987–1991 survived five years after diagnosis of breast cancer
- women aged 75 years or older at diagnosis had poorer survival than women at younger ages
- survival five years after diagnosis is much greater if the cancer is found to be localised to the breast at the time of diagnosis than if it has already spread regionally or further.



## Acknowledgments

This report would not have been possible without the cooperation and effort of those who develop and operate the State and Territory cancer registries and staff of the Australian Institute of Health and Welfare's National Cancer Statistics Clearing House and the NHMRC National Breast Cancer Centre. They are listed below. Registry staff have worked together, through the Australasian Association of Cancer Registries, to produce the cancer registration data in this publication.

Funding and support of cancer registries in Australia is given by State and Territory Governments and non-government cancer organisations. We would like to acknowledge the support of the State and Territory Governments, the New South Wales Cancer Council, the Anti-Cancer Council of Victoria, the Queensland Cancer Fund, the Cancer Foundation of Western Australia, the Cancer Council of the Northern Territory and the Australian Cancer Society. We acknowledge the contributions of the staff and volunteers who work with the State and Territory cancer registries. We thank those involved in the collection of information in hospitals, pathology laboratories, radiation oncology units and medical practices.

We appreciate the assistance of Associate Professor Konrad Jamrozik, Associate Professor Ian Olver, Professor Bruce Armstrong and Ms Mary Draper in reviewing a draft of this report. Dr Peter Baghurst, Dr John Hopper and Dr Michael Dixon gave permission for use of material which they had produced.

Funding for the NHMRC National Breast Cancer Centre comes from the Commonwealth Department of Health and Family Services.

### State and Territory Cancer Registries:

Australian Capital Territory	- Bruce Shadbolt, Norma Briscoe
New South Wales	- Bruce Armstrong, Marylon Coates, Noreen Panos
Northern Territory	- John Condon, Edouard d'Espaignet
Queensland	- Ian Ring, Judy Symmons
South Australia	- David Roder, Lesley Adlam
Tasmania	- Terence Dwyer, Dace Shugg
Victoria	- Graham Giles, Kathryn Whitfield, Vicky Thursfield
Western Australia	- Tim Threlfall
Australian Institute of Health and Welfare	- Paul Jelfs, Melinda Petrie
NHMRC National Breast Cancer Centre	- Anne Krickler, Catherine Smith, Sarah Thackway



# Introduction

Breast cancer is the most commonly diagnosed cancer (with the exception of non-melanocytic skin cancer) and the most common cause of death from cancer in women in Australia. In 1992, deaths from breast cancer accounted for some 27,000 woman-years of life lost before 75 years of age. The International Agency for Research on Cancer has reported breast cancer to be by far the most frequent cancer, apart from non-melanocytic skin cancer, in women worldwide and the leading cause of death from cancer in women. It has been estimated that 719,100 new cases (19% of all new cancers in females) occurred worldwide in 1985 (Parkin et al. 1993). In developed countries such as the USA and other Western countries, it is the most commonly diagnosed cancer in women (excluding non-melanocytic skin cancers) (Parkin et al. 1993, Ursin et al. 1994), causing about 16% of all deaths due to cancer in women (Pisani et al. 1993). Worldwide, 308,000 women died of breast cancer in 1985, with annual totals expected to be around 340,000 deaths in 1990 and 420,000 by 2000 (Pisani et al. 1993).

The major risk factors for breast cancer are age (breast cancer rates typically increase progressively with age from the third decade) and a family history of the disease. These and other risk factors such as body size or reproductive behaviour, known to be associated with an increased risk of breast cancer, are not readily preventable causes. Prevention of death from breast cancer is currently achievable only by earlier detection, principally by way of mammography in organised screening programs which have been set up to achieve reductions in mortality.

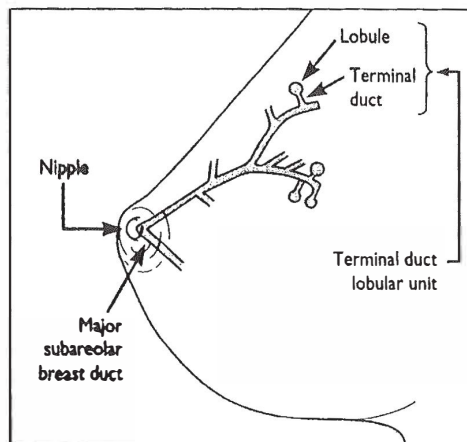
Since the introduction of mammographic screening in Australia, both in the organised national program and more widely in the community, the non-invasive form of breast cancer (in-situ breast cancer) has been diagnosed more frequently. These cancers have not been uniformly notified to cancer registries and are not addressed in this report.

*Breast cancer in Australian women 1921–1994* is based on cases of invasive breast cancer in women recorded by State and Territory cancer registries in the period from 1982 to 1992 and on national statistics on deaths from breast cancer recorded between 1921 and 1994. The most detailed analyses are for the data recorded since 1982.

## Breast cancer

Breast cancers usually have their origin in the epithelial cells that line the terminal duct lobular unit of the breast (see figure; Sainsbury et al. 1994). Invasive cancers have spread beyond the basement membrane of the ducts and lobules into the surrounding normal tissue. Non-invasive or in-situ cancers have not spread, that is, the cells lining the ducts have become cancerous but have not begun to invade normal tissues.

Breast cancers have characteristic patterns by which they can be identified. They are most commonly classified as ductal and lobular types: ductal carcinoma is the most common form. Other forms occur but are rare. Breast cancers with particular features are called invasive carcinomas of special type while the remainder are considered to be of no special type. The classification of breast cancers is important in predicting prognosis, since certain types are associated with a more favourable outcome than others.



Anatomy of breast showing terminal duct lobular units and branching system of ducts.

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## Risk factors

The well established risk factors for breast cancer are increasing age and having a family history of the cancer. Other factors associated with increased risk are a previous history of breast cancer or benign breast disease, a larger body size, reproductive factors including late age at first birth, nulliparity, early menarche and late age at menopause, use of oral contraceptives at young ages, use of hormone replacement therapy and exposure of breast tissue to ionising radiation (particularly before 20 years of age) (see, for example, McMichael & Armstrong 1988; Higginson et al. 1992; Kelsey 1993). More recently, a role for increased physical activity in decreasing risk of breast cancer has been proposed (Friedenreich & Rohan 1995). Diet, especially one rich in fat and protein of animal origin, and consumption of alcohol are other potential risk factors. It has been suggested that some determinants of risk, such as diet, might act during childhood (McMichael & Armstrong 1988; Higginson et al. 1992).

The importance of environmental factors is supported by the considerable geographical variation in incidence and mortality and changes in rates with migration. Data on the mortality of Italian-born women in Australia have shown that their initially very low risk, relative to that of Australian-born women, increased progressively with increasing duration of residence in Australia (McMichael & Armstrong 1988). Migrants from countries of low incidence, such as China and Japan, have increased rates after moving to countries of high incidence like the USA. That migrants may carry with them the higher rates of their homeland has also been noted.

In the years from 1979 to 1988, mortality from breast cancer in England and Wales was 46% higher than in Australia. During the same period, the mortality rate from breast cancer in migrants from England and Wales to Australia was about 14% higher than it was in women born in Australia (Armstrong & Jelfs 1996).

Experimental and observational data have suggested a causal role for oestrogens in breast cancer (see, for example, Armstrong 1982; Higginson et al. 1992; Ursin et al. 1994). There is considerable indirect evidence that factors that increase the supply of endogenous oestrogens are important in determining the risk of breast cancer. The role of menstrual and reproductive events, and possibly also diet, in increasing the risk of breast cancer is considered, most likely, to be related to their part in increasing the total exposure of a woman's breast tissue to oestrogen.

## **The genetics of breast cancer**

Recent discoveries have identified specific genes which carry a high risk for breast cancer, especially two genes called BRCA1 (which also carries an increased risk of ovarian cancer) (Miki et al. 1994) and BRCA2 (Wooster et al. 1994). Available data suggested that cumulative risk for breast cancer in women who carried mutations of high-risk genes was estimated to be around 80% (1 in 1.3) for a 'lifetime' to 80 years of age and around 50% (1 in 2) up to 50 years of age, although these may be overestimates (Easton et al. 1993a; Hopper 1995). Based on current knowledge, cancer-causing mutations of the high-risk genes are rare, occurring in around 1 in 1000 women, and may explain as little as 1–2% of all breast cancers. Mutations of other more common genes may explain 5–15% of all breast cancer (Easton et al. 1993b). Having a 'family history of breast cancer' is not the sole criterion for identifying families in which high-risk genes may cause cancer. Age at diagnosis of cancer, the number of first-degree relatives affected, whether the tumour is bilateral and the influence of culturally transmitted and other environmental risk factors need to be considered.

While mutations of BRCA1 can be detected by available laboratory techniques, the work required is not routine but highly specialised, expensive and time-consuming (Shuttuck-Eidens et al. 1995). Thus it is not readily available. Because of widespread publicity about the BRCA1 gene, however, women are increasingly seeking advice about their probability of developing breast cancer, particularly in the light of their perceived family history. There is currently no validated population-based information available which genetic counsellors can make use of when assessing individual risk for a woman.

## **Screening and diagnosis**

Mammographic screening is widely regarded as the most cost-effective way of detecting breast cancer at a sufficiently early stage to reduce mortality. In Australia, mammographic screening for early detection is carried out by BreastScreen Units as part of a program funded by the Commonwealth government and implemented in all States and Territories.

The national screening program recommends mammography every two years for women who have no symptoms or history suggestive of breast cancer. The efficiency of screening depends on its being targeted at reducing mortality in a group at high risk which, in the national program, is defined as women aged 50–69 years.

Mammographic screening in Australia was rare before the early 1980s. By 1989, approximately 15% of women 50–69 years of age had undergone at least one mammographic screen (estimate made by the NHMRC National Breast Cancer Centre from Medicare data). Screening, due to the earlier detection of breast cancers, causes an increase in frequency of diagnosis of non-invasive breast cancers, small breast cancers and cancers that have not spread to other parts of the body.

## **Guide to *Breast cancer in Australian women 1921–1994***

The information on breast cancer in this report is displayed in graphs and tables. Data about incidence and mortality and variations in rates are presented side by side for ease of comparison. Appendix 2 gives summary tables (Tables A1 to A20) of numbers of cancers and details of rates.

### **New cases and deaths**

The leading cancers and causes of death from cancer in Australian females of all ages in 1990 are presented in pie charts and tables for comparison. Rankings are based on the absolute numbers of new cases and deaths classified according to the International Classification of Diseases, 9th revision (WHO 1977).

Lifetime or cumulative risk of a particular cancer is a way of expressing the percentage chance, or a '1 in N' proportion, that a woman born today would develop the particular cancer in a lifetime of 74 years. It is calculated from the cumulative rate or the sum of the age-specific incidence rates from birth to 74 years, expressed as a percentage (Day 1992). The method makes two assumptions: that the prevailing patterns of cancer risk for each age group at the time of estimation will apply throughout the woman's lifetime, and that each woman will survive to her 75th birthday. Cumulative risks can also be calculated for narrower age bands.

Person-years of life lost (PYLL) is a measure of the number of years of life lost, given life expectancies at specific ages, due to death from a specific cause such as breast cancer. The calculation uses mortality rates from birth to 74 years (Holman et al. 1987).

### **Incidence and mortality**

#### **Incidence data**

This report presents data for the whole of Australia. The New South Wales (NSW) Central Cancer Registry, which included data from the Australian Capital Territory, began operation in 1972, the South Australian Cancer Registry in 1977, the Tasmanian Cancer Registry in 1978, cancer registries in Victoria, Queensland and the Northern



Territory in the 1980s, and the Australian Capital Territory in 1994. The total numbers of new cases are described from 1982 to 1992 and deaths from 1982 to 1994. Age-adjusted and age-specific incidence and mortality rates are presented. Attention is drawn to noteworthy trends.

It is possible that the low rates of breast cancer observed for the Northern Territory were due to underascertainment and do not truly represent incidence. To examine the impact of low rates in the Northern Territory on the incidence estimates for Australia, we calculated the potential additional cases that would have occurred in the Northern Territory in 1982–1992 had the incidence been at the same level as the rest of Australia. The addition of these cases increased the incidence estimates for Australia as a whole, by no more than 0.1 per 100,000. In view of this minor effect, we have included the Northern Territory data in the calculation of all national rates.

### **Mortality data**

Mortality rates were estimated from deaths from breast cancer which were notified to the State and Territory Registrars of Births, Deaths and Marriages and occurred in women resident in each State and Territory from 1921 to 1994. Women with breast cancer who died of other causes were not counted in these death statistics.

### **Population data**

Estimated resident populations for Australia published by the Australian Bureau of Statistics were used to calculate age-specific rates. Populations for analysis by country of birth and urban and rural divisions were derived from population data supplied by the Australian Bureau of Statistics (1993).

### **Age-specific rates**

Age-specific rates have been calculated for women in the Australian population in five year age groups by dividing the number of cases occurring in each age group by the corresponding number of women and expressing the result as an annual rate per 100,000 women.

### **Age-standardised rates**

Age-standardised rates are summary rates calculated to facilitate comparisons between populations with different age structures. A standard population age distribution is used to calculate a weighted average of age-specific rates. The age-standardised rates reflect the annual incidence and mortality that would have been expected if the populations of each area or time period being compared had an identical age structure. The standard world population (Smith 1992) shown in Table A20 in Appendix 2 was used in these calculations.

### **Confidence intervals**

Confidence intervals are given as an indication of how precisely the calculated rates would estimate the true population values. In each case, the true population value is

95% likely to lie within the interval given. The intervals were calculated using the binomial method (Jensen et al. 1991).

### **Time periods**

In certain instances, data from a number of years have been combined to give adequate numbers for summary presentation. Where possible, the data were divided into two time periods, 1982–1986 and 1987–1992, to examine changes over time. These periods were chosen for reasonable correspondence with periods covered in Volume VI of *Cancer Incidence in Five Continents* and planned for Volume VII. Because mortality data were available to 1994, mortality rates for 1993–1994 are also presented.

### **Time trends**

The annual percentage changes in incidence and mortality reported in the text were calculated differences in the geometric means of rates in the first and last time periods (Australian Institute of Health and Welfare 1994). A simple regression of the age-standardised rates was used to test whether any observed trend was statistically significant (Jensen et al. 1991).

The potential contributions of screening and changing patterns of reproductive factors to an increasing incidence of breast cancer have been much discussed in the scientific literature and are not reviewed in this report.

### **Histopathological type**

Cancers with histopathologically verified diagnoses were included in the analyses by histopathological type. Cancer Registries classify histopathological type according to the SNOMED (Côté 1987) and ICD-O (WHO 1990) systems.

Breast cancers were examined for 1986–1990, the most recent period available with these details, and classified in two major histopathological types (ductal carcinoma, lobular carcinoma), four special subtypes (tubular, papillary, mucinous, medullary) and three additional groupings (undifferentiated carcinoma, other carcinomas and unknown). A table of the codes included in each of these groupings (Table A14) is given in Appendix 2.

### **Data sources and quality**

The report has used the most recent data, both published and unpublished, on breast cancer incidence and mortality in women in Australia from the National Cancer Statistics Clearing House (NCSCCH). The Australasian Association of Cancer Registries (AACR) and the NCSCCH at the Australian Institute of Health and Welfare collaborate to compile, analyse and disseminate national statistics on cancer. While data are collected and coded similarly by each cancer registry, there are some differences due to variable multiple information sources including hospitals, pathology laboratories, radiotherapy departments and private practitioners.

The main sources of information on deaths from breast cancer are the Registrars of Births, Deaths and Marriages and the Australian Bureau of Statistics. Variations have occurred over time in the collecting and coding of causes of death. The data set from 1921 to 1994 (given in Table A13 in Appendix 2) is the most consistent available nationally and provides the number of deaths registered each year. More recent data, for example, in Table A7 in Appendix 2, are based on the deaths that actually occurred in each year. Because of this difference, analyses of deaths from the two time periods would give slightly different estimates.

The definitive diagnostic test for cancer is histopathological examination of tissue. Cases may also be registered on the basis of cytology, clinical diagnosis and sometimes according to other evidence. Cancer registries report the percentage of cases with histopathological verification as a measure of data quality. For the Australian registries with data in *Cancer Incidence in Five Continents*, Volume 6 (Parkin et al. 1992), between 89% and 97% of breast cancers were reported to be histopathologically verified.

For a small number of cases, registrations are based on death certificates only (DCO). The percentage of DCO cases is also used as an indicator of data quality in cancer registration. Breast cancer cases registered from a death certificate only accounted for 2% or less of breast cancer cases in Australian registries represented in *Cancer Incidence in Five Continents*, Volume 6 (Parkin et al. 1992).

## Comparisons

### Place of birth

Australia is a country of migrants: about 30% of Australians 25–64 years of age and 27% of older Australians recorded in the 1991 census were born outside Australia (Mathers 1994a; 1994b). Mortality from breast cancer by the women's countries of birth was examined for deaths in 1986–1994 in data from the Australian Bureau of Statistics.

Incidence rates are presented in the report for breast cancer in women in NSW in 1987–1995 by their country of birth. Calculation of incidence rates in all women in Australia by country of birth was complicated by the differences in coding systems between the State and Territory cancer registries and incomplete notification of this characteristic. Population estimates by country of birth from the 1991 census were used in calculating the incidence rates.

### Aboriginal women

The incidence of breast cancer in Aboriginal women has not yet been measured nationally. Limited data are given for the Northern Territory, Western Australia and South Australia. Recording of Aboriginality on cancer notification forms was too incomplete to allow the use of data from other States.

## **Urban and rural comparisons**

Geographical variation in mortality was examined by assigning cases to urban and rural areas according to place of residence at time of diagnosis. Assignment of cases to these areas and districts was based on having a postcode classified as rural or urban in the coding scheme of the Commonwealth Department of Health and Family Services.

## **Regional differences in Australia**

Health differentials among Australians have been documented in two reports that used data on mortality, health status and risk factors from the Australian Bureau of Statistics (Mathers 1994a; 1994b). We have included the results of analyses of differentials for socioeconomic status, State and Territory, metropolitan and non-metropolitan regions and country of birth in relation to breast cancer deaths in 1985–1987. Mathers used differentials for socioeconomic status of area of residence that were based on residential localities grouped according to selected socioeconomic criteria. Subjects were classified in the analyses into fifths of increasing socioeconomic disadvantage of area of residence. 'Metropolitan' region meant the residents of capital cities and they were compared with 'non-metropolitan' residents, ie, all other Australians. The category 'other' country of birth included northern and southern Africa, the Americas, New Zealand and the Pacific region. Aboriginality was not separately examined in these reports because of underreporting in many data sources and the difficulties in analysis caused by small numbers.

## **International**

A comparison of incidence and mortality in selected countries is given in two figures based on the most recent available international data from 1983–1987. The countries were selected to be representative of the countries of origin of the Australian population and other major populations of mainly European origin such as North America. These data were taken from regional and national cancer registries reporting in *Cancer Incidence in Five Continents*, Volume 6 (Parkin et al. 1992).

The highest rates of breast cancer occurred in the most economically advanced areas of the world, particularly North America, Israel, temperate South America, northwestern Europe and Australia. Comprehensive analyses of incidence and mortality data internationally indicate predominantly an upward trend in rates of breast cancer although there has been a suggestion for some countries of a fall or levelling off in mortality in recent birth cohorts or in recent years (Hermon & Beral 1996). Further information on international trends is available in Coleman et al (1993), Ursin et al (1994) and Hermon & Beral (1996).

## Survival

Relative survival is the ratio of the survival observed in women with breast cancer to the survival expected if they were subject to the same overall mortality rates by age and calendar period as the general population. This ratio would indicate the rate of survival from breast cancer if having a diagnosis of breast cancer was the only difference between the patient population and the general population.

Currently there are no national data on survival. In its place we have given population-based survival statistics for women with breast cancer in South Australia in 1977 to 1994 (South Australian Cancer Registry 1994; 1996) and in NSW in 1972 to 1991 (Taylor et al. 1994). The statistics given are five-year relative survival proportions or the percentage of patients who survived five years after diagnosis of breast cancer relative to survival in all women.

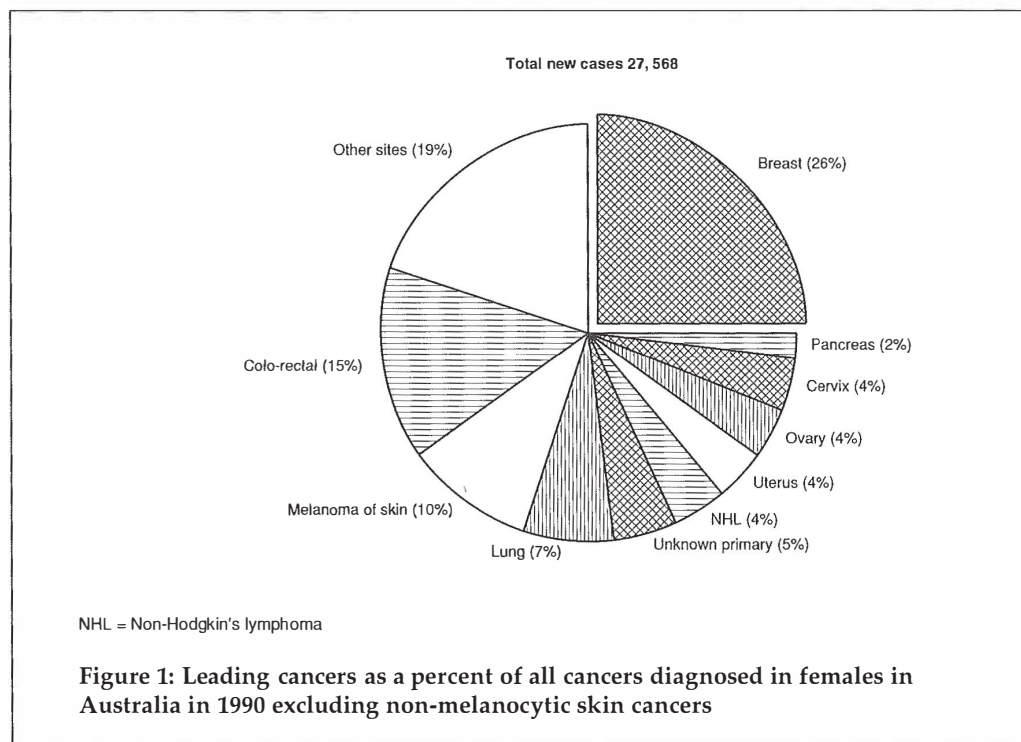
Details of survival analyses for populations in 11 countries of Europe are to be found in *Survival of cancer patients in Europe. The EURO CARE study* (Berrino et al. 1995) and survival data for the USA in *SEER Cancer Statistics Review 1973–1990* (Miller et al. 1993).

## Appendixes

Summary information at the back of the volume includes lists of tables and figures, tables of incidence and mortality, population estimates, coding systems used and the references.

## Most frequent cancers in females in Australia

The most common sites of cancers diagnosed in females in Australia in 1990, excluding non-melanocytic skin cancers, are shown in Figure 1 and Table 1.

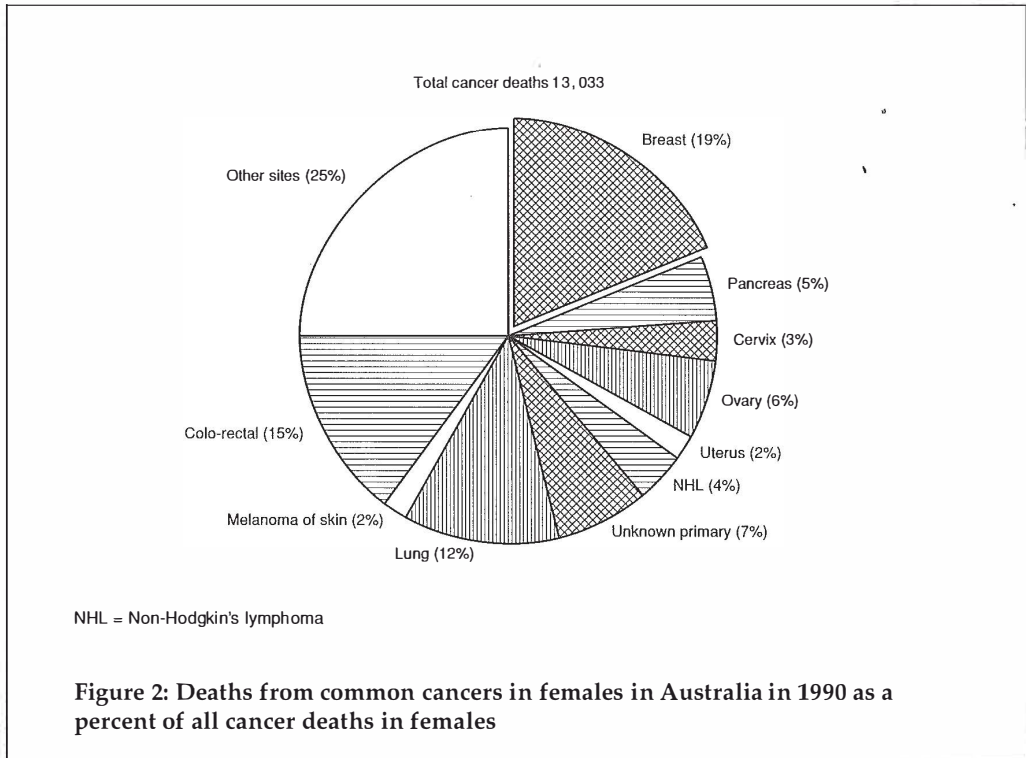


**Table 1: Leading cancers diagnosed in females in Australia in 1990: numbers, percents, age-standardised rates per 100,000 woman-years and cumulative risks to the 75th birthday (Jelfs et al. 1996)**

Type of cancer	New cases			
	Number of new cases	Per cent	Age-standardised rate	Cumulative risk expressed as:
All cancers	27,568	100.0	237.4	1 in 4
Breast	7,121	25.8	65.5	1 in 14
Colo-rectal	4,007	14.5	31.4	1 in 27
Melanoma of skin	2,654	9.6	24.9	1 in 40
Lung	1,826	6.6	15.2	1 in 51
Unknown primary	1,357	4.9	9.9	1 in 93
Uterus	1,075	3.9	9.5	1 in 84
Cervix	1,067	3.9	10.2	1 in 98
Non-Hodgkin's lymphoma	979	3.6	8.1	1 in 108
Ovary	968	3.5	8.7	1 in 99
Pancreas	598	2.2	4.2	1 in 212

## Deaths from common cancers in females in Australia

The most common causes of death from cancer in females in Australia in 1990 are shown in Figure 2 and Table 2.



**Table 2: Leading causes of death from cancer in females in Australia in 1990: numbers, percents, age-standardised rates per 100,000 woman-years and person-years of life lost before 75 years of age (Jelfs et al. 1996)**

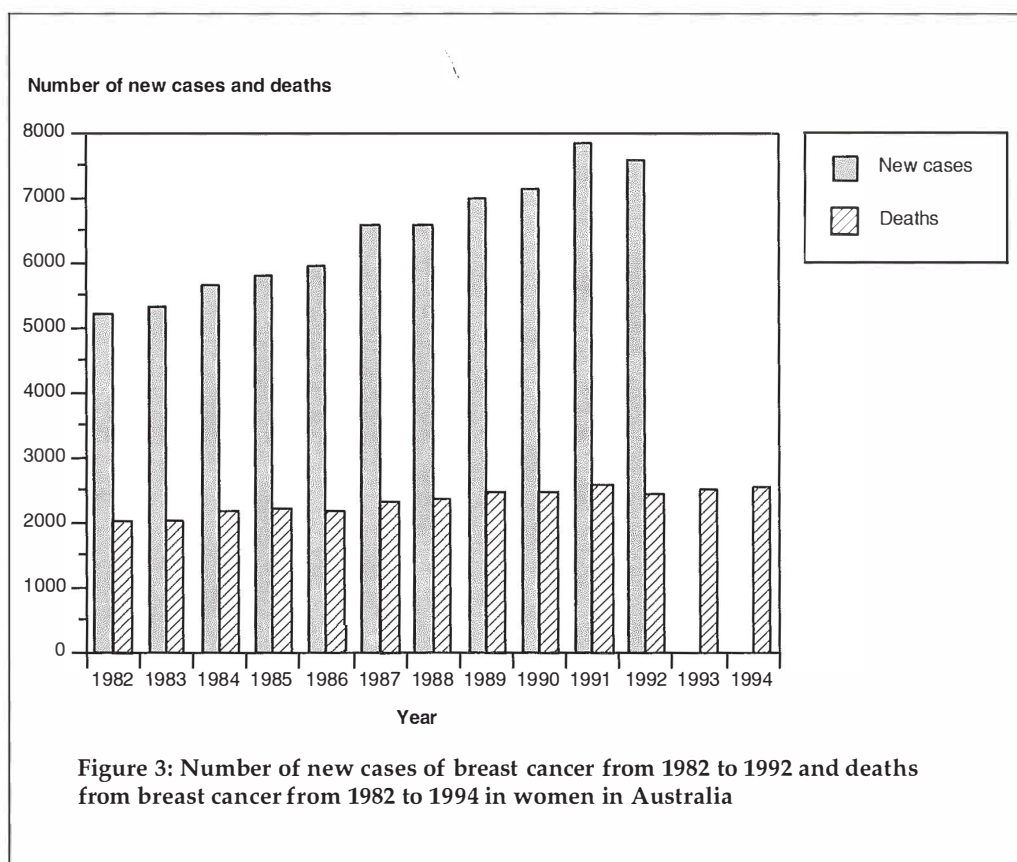
Type of cancer	Deaths			
	Number of deaths	Per cent	Age-standardised rate	PYLL <sup>(a)</sup>
All cancers	13,033	100.0	100.0	108,703
Breast	2,421	18.6	20.4	26,574
Colo-rectal	1,943	14.9	14.1	12,154
Lung	1,593	12.2	12.6	11,847
Unknown primary	937	7.2	6.5	5,250
Ovary	732	5.6	6.0	6,735
Pancreas	657	5.0	4.7	3,547
Non-Hodgkin's lymphoma	538	4.1	3.9	3,522
Cervix	339	2.6	3.0	5,614
Melanoma of skin	317	2.4	2.6	4,167
Uterus	217	1.7	1.5	1,199

(a) PYLL = person-years of life lost before 75 years of age

## Number of new cases of breast cancer and deaths

The number of new cases of breast cancer in women was 70,596 in 1982–1992 (Figure 3; Table A1). The average number of new cases per year in the last three years of the period, 1990–1992, was greater (7,516 cases) than in 1982–1984 (5,390 cases). In 1982–1992, 43% of women with breast cancer were between 45 and 64 years of age and 22% were between 65 and 74 years of age (Table A2). Similar percentages (18% in each age group) of women were younger than 45 years or older than 74 years of age.

There were 30,201 deaths from breast cancer in women in Australia in 1982–1994 (Figure 3; Table A3). The number of deaths increased from 1,987 in 1982 to 2,558 in 1994 with, on average, 2,111 deaths each year in 1982–1986, 2,413 in 1987–1992 and 2,585 in the most recent period, 1993–1994. Thirty-eight per cent of breast cancer deaths were in women 45 to 64 years of age, 28% in women 75 years of age and older, 24% in women 65 to 74 years of age and 10% in women younger than 45 years of age (Table A4).





## Risk of breast cancer by age

Risks of breast cancer by age were calculated for incidence and mortality in two time periods, 1982–1986 and 1987–1992. (Table 3). Women had a risk in 1987–1992 of developing breast cancer between birth and 30 years of age of 1 in 2,446. The oldest women had a much greater risk: 1 in 36 women who were 80 years of age or older in 1987–1992 were diagnosed with breast cancer. Risk of death was 1 in 1,279 in women who were 30–39 years of age and 1 in 92 in women 70–79 years of age.

**Table 3: Risk<sup>(a)</sup> of breast cancer incidence and risk of death from breast cancer by age group in women in Australia in 1982–1986 and 1987–1992**

Risk ages	Incidence		Death	
	1982–1986	1987–1992	1982–1986	1987–1992
0–29	1 in 2,486	1 in 2,446	1 in 17,835	1 in 17,272
30–39	1 in 257	1 in 246	1 in 1,218	1 in 1,279
40–49	1 in 83	1 in 73	1 in 344	1 in 339
50–59	1 in 63	1 in 53	1 in 167	1 in 168
60–69	1 in 50	1 in 43	1 in 122	1 in 124
70–79	1 in 41	1 in 38	1 in 95	1 in 92
<b>0–74</b>	<b>1 in 16</b>	<b>1 in 14</b>	<b>1 in 44</b>	<b>1 in 44</b>

(a) In this table risk is the probability of developing breast cancer (incidence) or dying from breast cancer (death) in the specified age interval. The probability of developing breast cancer has been calculated on the assumption of survival to the end of the age interval and does not take into account risk of death from other causes.

The steep increase in risk with age was not evidently well known among the general population, judging by responses to a survey carried out by the NHMRC National Breast Cancer Centre (NBCC). In 1996, the NBCC surveyed 3,000 well women in Australia about their knowledge, attitudes and self-reported behaviour in relation to breast cancer (National Breast Cancer Centre, in preparation). The survey asked about known risk factors for breast cancer and only 5% of women nominated age. In response to the question 'When is a women at greatest risk?', the majority of women (78%) indicated that women in their 40s and 50s were at greatest risk while no more than 6% suggested that women in their 60s had the highest risk of breast cancer (Table 4).

**Table 4: Percentage of women in Australia in 1996 who nominated particular age groups to be at greatest risk of breast cancer (National Breast Cancer Centre, in preparation)**

Age group	Percentage of women stating the age group to be most at risk of breast cancer
30s	10
40s	33
50s	45
60s	6

## Incidence and mortality rates

In 1992, there were 7,585 new cases of breast cancer in Australia, giving a crude incidence rate of 86.4 per 100,000 woman-years and an age-standardised incidence rate of 66.9 per 100,000 woman-years. Further, it can be estimated that 1 in 14 women, or around 7%, will develop breast cancer if they live to 75 years of age.

There were 2,558 deaths from breast cancer in 1994, which gives a crude mortality rate of 28.6 per 100,000 woman-years and an age-standardised mortality rate of 19.6 per 100,000 woman-years.

Incidence rates from 1982 to 1992 and mortality rates from 1982 to 1994 for Australia as a whole are given for each year in Table A5, together with the ratios of mortality to incidence. The ratio of mortality to incidence in 1992 was 1:3.5, ie, mortality was 28.2% of incidence.

The incidence rate reported for Queensland in 1992 (Table 5) was lower than in the immediately preceding years and compared with other States and Territories (see Table A6). On investigation, no immediate explanation was apparent. Low incidence rates in the Northern Territory are probably due, at least in part, to underascertainment, especially among Aboriginal and Torres Strait Islander women. Age-standardised incidence rates from 1982 to 1992 in each State and Territory are given in Table A6 and mortality rates for 1982 to 1994 in Table A7.

**Table 5: Numbers of new cases and age-standardised incidence rates in 1992 and numbers of deaths and age-standardised mortality rates in 1994, the most recent available years, in each State and Territory**

	1992		1994	
	New cases	Age-standardised rate	Deaths	Age-standardised rate
New South Wales	2,657	67.1	857	19.2
Victoria	2,070	69.8	740	21.6
Queensland	1,035	55.4	410	18.3
Western Australia	755	75.3	225	19.4
South Australia	743	74.3	221	18.5
Tasmania	202	63.1	71	20.1
Australian Capital Territory	95	63.4	30	19.2
Northern Territory	28	43.6	4	9.1
<b>Australia</b>	<b>7,585</b>	<b>66.9</b>	<b>2,558</b>	<b>19.6</b>

*Note:* Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population.

## Trends in incidence and mortality

Age-standardised incidence rates increased from 58.3 cases per 100,000 woman-years in 1982–1986 to 66.0 per 100,000 in 1987–1992 (Table 6). This increase was statistically significant. Age-standardised mortality rates did not change over these two periods although there was a slight decrease in mortality in 1993–1994 (Table 6). Trends for individual States and Territories are shown Figures 11 to 14 and rates are given in Table A8.

**Table 6: Age-standardised rates per 100,000 woman-years and 95% confidence intervals (CI) of breast cancer incidence in women in Australia in two time periods and mortality in three time periods**

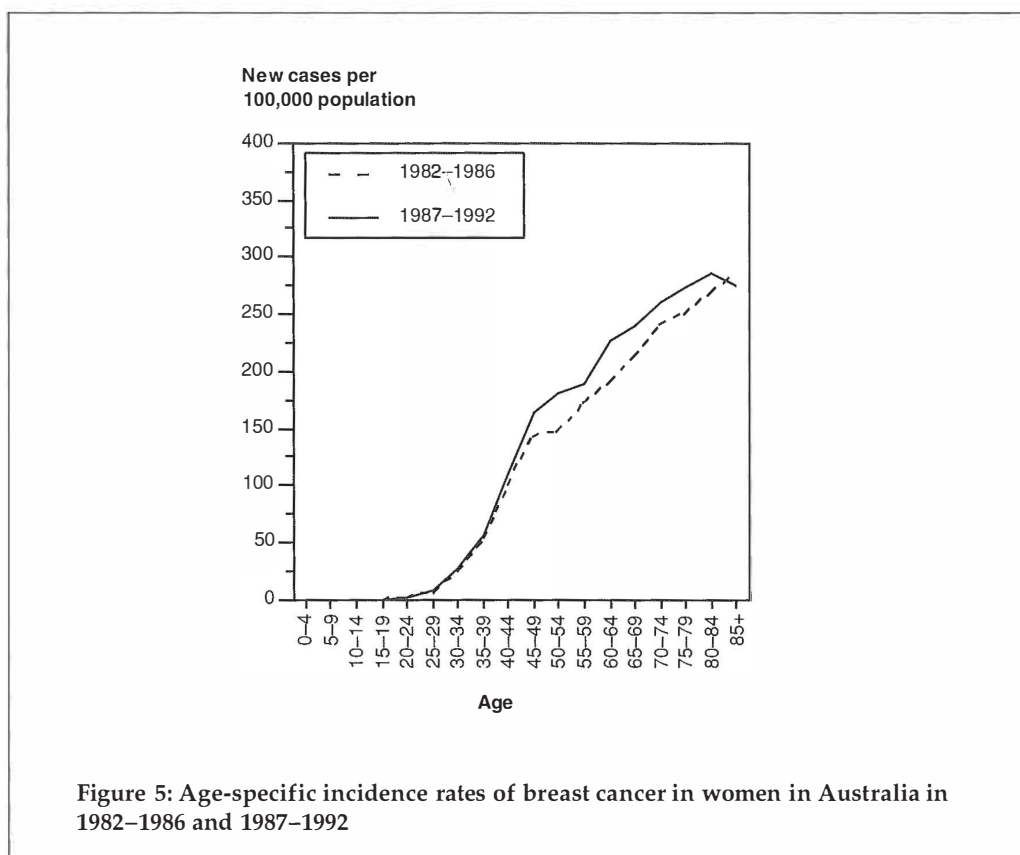
Period	Incidence		Mortality	
	Age-standardised rate	95% CI	Age-standardised rate	95% CI
1982–1986	58.3	(57.5, 59.0)	20.6	(20.2, 21.0)
1987–1992	66.0	(65.4, 66.7)	20.6	(20.2, 20.9)
1993–1994	N/A		20.0	(19.4, 20.5)

On average, incidence rates increased by 1.5% a year from 1982 to 1992. The upward trend in incidence was statistically significant and was most likely affected by an increased detection of breast cancer through the introduction of mammographic screening. Age-standardised mortality rates in women in Australia were stable from 1982 to 1994 (Figure 4).



## Incidence rates by age

The incidence of breast cancer in 1987–1992 was very low before 30 years of age, increased rapidly from 55.8 per 100,000 woman-years at 35–39 years of age to 167.1 per 100,000 at 45–49 years and continued to increase, although at a slower rate, to 277.5 per 100,000 women who were 85 years of age and older (Figure 5). Age-specific incidence rates for States and Territories in 1982–1986 and 1987–1992 are given in Figures 15 and 16 and Table A9.



## Mortality rates by age

In 1993–1994, mortality from breast cancer was low in women younger than 35 years of age but increased rapidly from 11.8 deaths per 100,000 woman-years at 35–39 years to 52.1 per 100,000 at 50–54 years, 84.3 per 100,000 at 65–69 years and 214.3 per 100,000 at 85 years of age and older (Figure 6). Age-specific mortality rates in NSW, Victoria, Queensland, Western Australia, South Australia and Tasmania in 1982–1986, 1987–1992 and 1993–1994, and in 1982–1994 in the ACT and the Northern Territory are given in Figures 17 and 18 and Table A10.

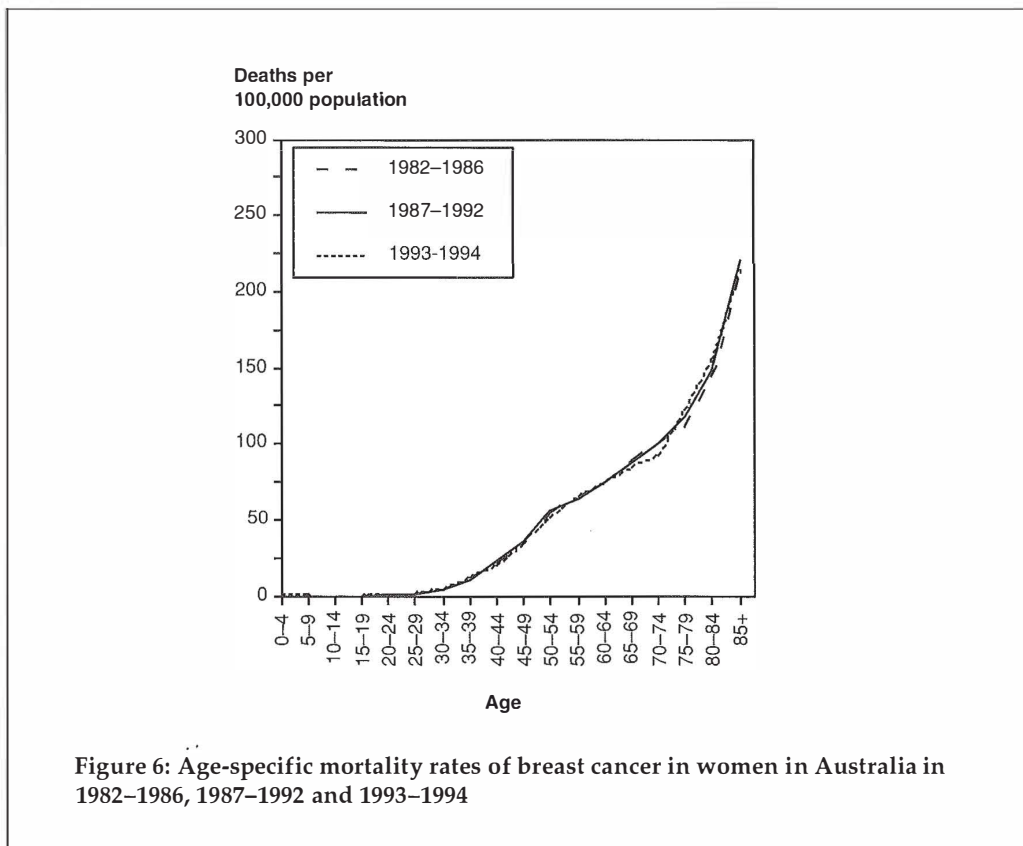


Figure 6: Age-specific mortality rates of breast cancer in women in Australia in 1982–1986, 1987–1992 and 1993–1994

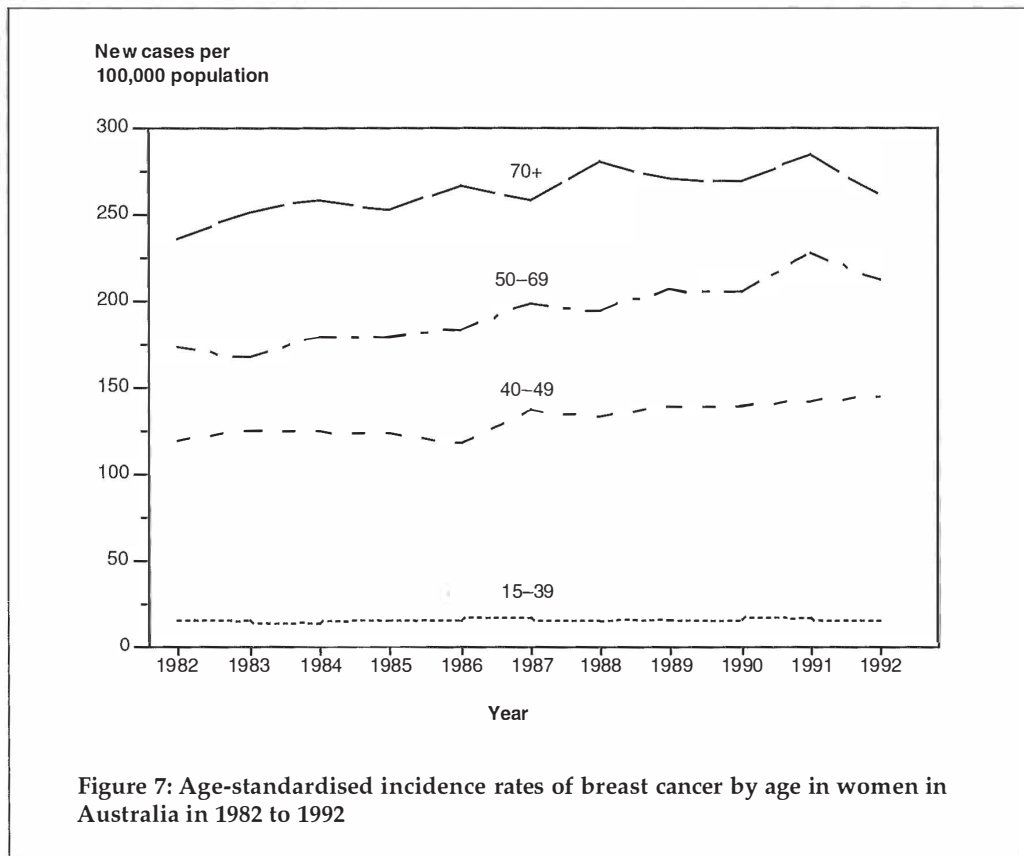
## Incidence trends by age

Breast cancer incidence rates increased slightly in the youngest and oldest women from 1982–1986 to 1987–1992 but more substantially in women 50 to 69 years of age (Table 7).

**Table 7: Age-standardised incidence rates of breast cancer per 100,000 woman-years by age in Australia in 1982–1986 and 1987–1992 (95% confidence intervals are given in brackets)**

Period	Age group			
	15–39	40–49	50–69	70+
1982–1986	14.4 (13.8, 14.9)	121.7 (118.3, 125.1)	176.2 (173.1, 179.4)	253.1 (247.4, 258.7)
1987–1992	15.0 (14.5, 15.5)	138.4 (135.4, 141.3)	207.3 (204.3, 210.3)	267.1 (262.1, 272.0)

The greater increases in incidence in more recent years in women older than 50 years of age, especially 50–69 years of age, compared with younger women are shown in Figure 7. An apparent sharp downturn occurred between 1991 and 1992. Incidence rates for these age groups for each year from 1982 to 1992 are given in Table A11.



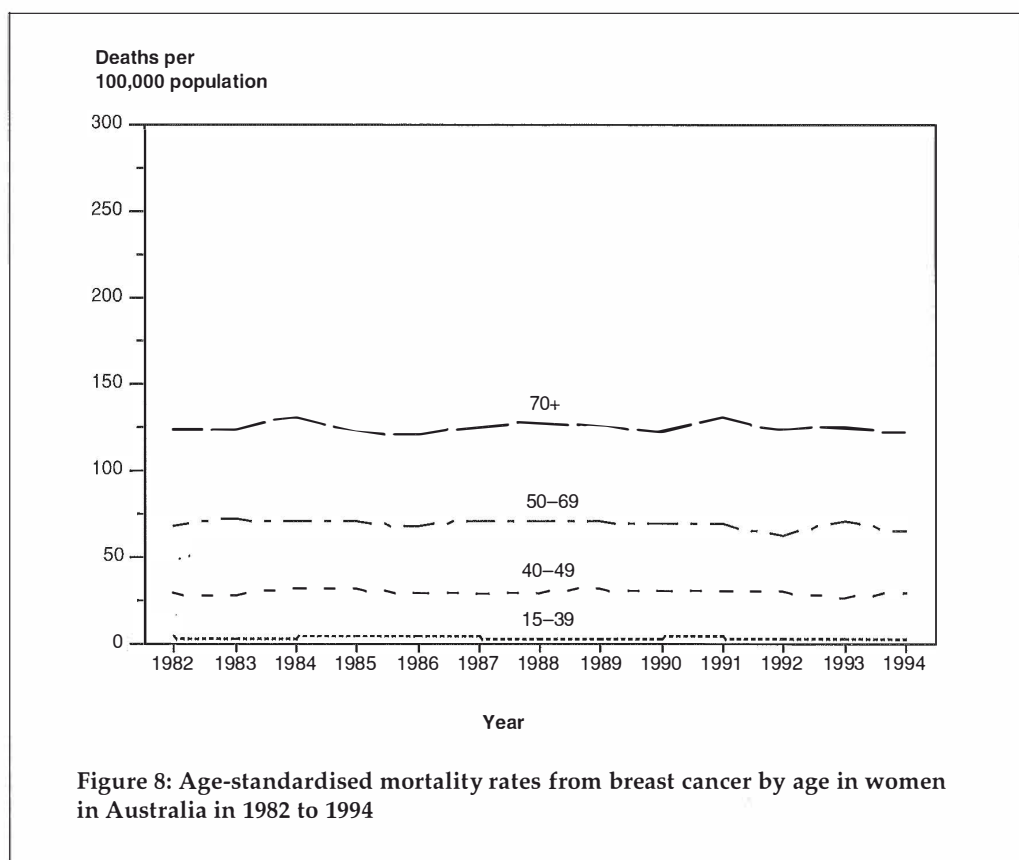
## Mortality trends by age

Mortality from breast cancer remained relatively stable in all age groups, although rates in 1993–1994 tended to be low (Table 8). None of the age-specific trends in mortality was statistically significant.

**Table 8: Age-standardised mortality rates from breast cancer per 100,000 woman-years in Australia in three time periods from 1982 to 1994 (95% confidence intervals are given in brackets)**

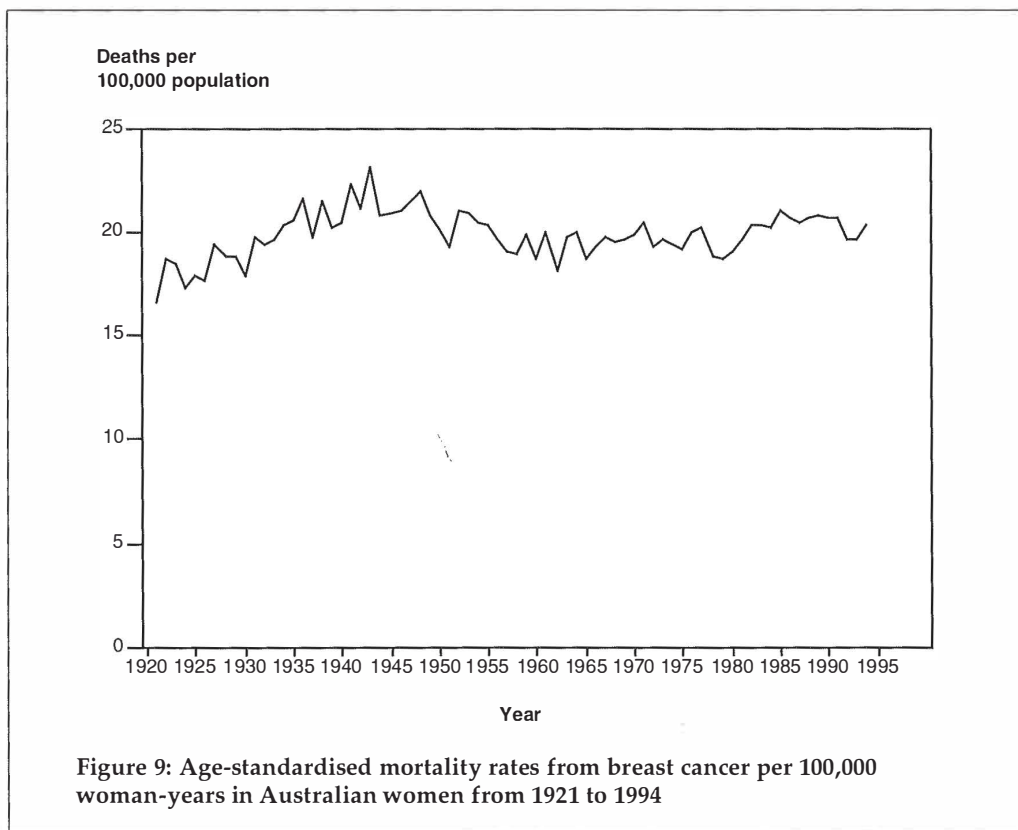
Period	Age group			
	15–39	40–49	50–69	70+
1982–1986	2.9 (2.7, 3.2)	29.1 (27.4, 30.7)	69.1 (67.2, 71.1)	123.7 (119.7, 127.6)
1987–1992	2.8 (2.6, 3.0)	29.5 (28.2, 30.9)	68.5 (66.8, 70.3)	125.3 (122.0, 128.7)
1993–1994	2.6 (2.2, 2.9)	27.2 (25.1, 29.3)	67.5 (64.6, 70.4)	123.4 (118.0, 128.8)

Figure 8 shows the relatively stable mortality in all age groups in Australia. Mortality rates for these age groups for each year from 1982 to 1994 are given in Table A12.



## Long-term trends in breast cancer

Age-standardised mortality from breast cancer increased steadily from 1921 to about 1943 (Table A13). Thereafter it fell to a low point around 1960 and may have increased again by a small amount in the 1980s (Figure 9).



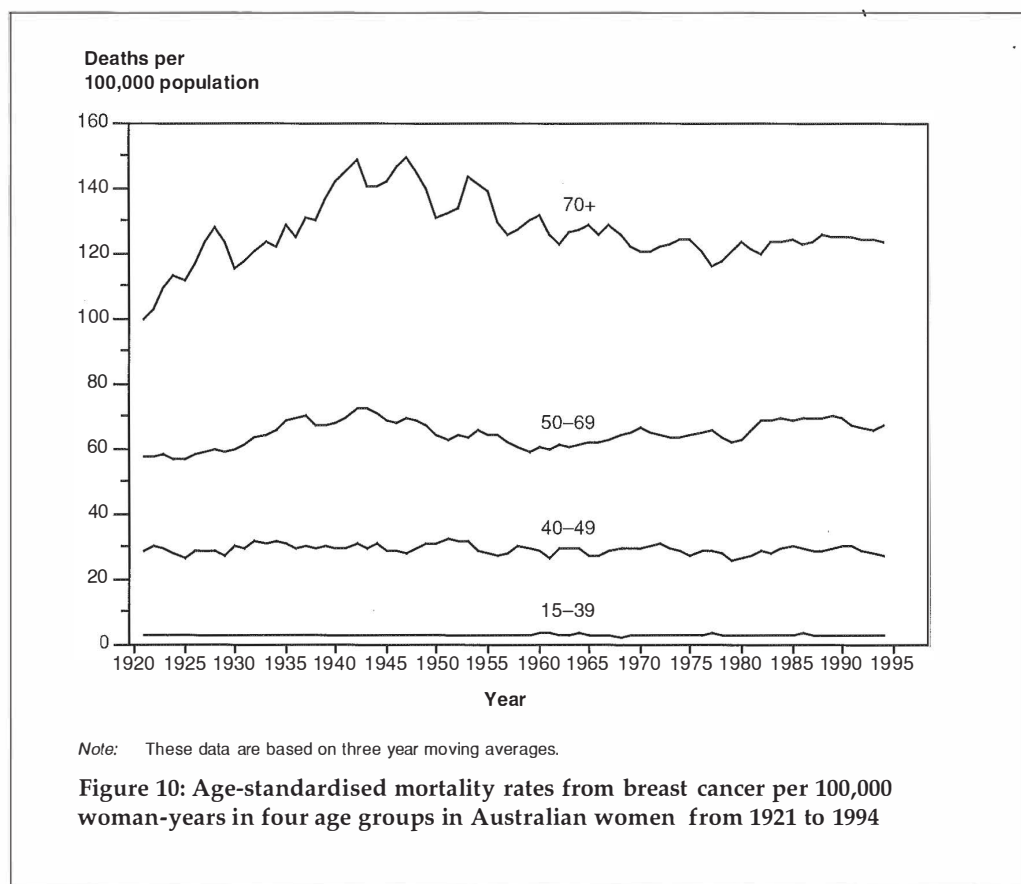
A long term increase in breast cancer incidence has been reported in many countries at the same time as mortality generally increased in the decades before 1990 and levelled off or fell more recently, e.g. in the UK, the USA, Norway and Sweden (Coleman et al. 1993; Ursin et al. 1994, Hermon & Beral 1996).

During 1970–1985, the incidence of breast cancer in women 35–74 years of age was reported to have increased by around 20% in the USA, England and Wales and Norway (Ursin et al. 1994). Substantial increases were also seen in incidence rates to 1990 in women in some centres in the USA and the UK: overall increases were greater in those 45 years of age and older and, since 1960, greatest in women 65–74 years of age (Ursin et al. 1994). At least part of the recent increased incidence of breast cancer internationally was expected to have been caused by the increased screening of symptom-free women (Ursin et al. 1994). An increase in incidence due to screening has probably also occurred in Australia. How much of the increasing incidence is due to screening and how much may be part of a long-term real increase in the disease due to other factors remains to be determined.



## Long-term trends in breast cancer

Breast cancer mortality trends from 1921 to 1994 in broad age groups (Figure 10) generally reflected those seen in the overall rates. In women over 50 years of age there is evidence of an increase in mortality reaching a peak between about 1940 and 1955, depending on age, then falling and, after some stability, possibly rising again in the 1980s. Rates were steady throughout the period in those under 50 years of age. Mortality rates in age groups in each year from 1921 to 1994 are given in Table A13.



Changes in breast cancer mortality in other countries have also tended to be smaller than changes in incidence rates. Mortality has recently been shown to have flattened or begun to fall in many Western countries (Hermon & Beral 1996). In Canada, the Netherlands, the UK and the USA, mortality increases were reported to have stopped with women born in 1920 and fallen with each successive generation (Hermon & Beral 1996). In England and Wales in 1994, breast cancer mortality in women 20 to 79 years of age had fallen by about 10% from its peak in 1985-1989 (Beral et al. 1995).

## Incidence trends by State and Territory

Age-standardised incidence rates of breast cancer have increased over time in each State and Territory (Figures 11 and 12; Table A6). The largest increase was in South Australia where rates rose sharply from 55.5 per 100,000 woman-years in 1982–1984 to 71.5 in 1990–1992 (Figure 12; Table A6).

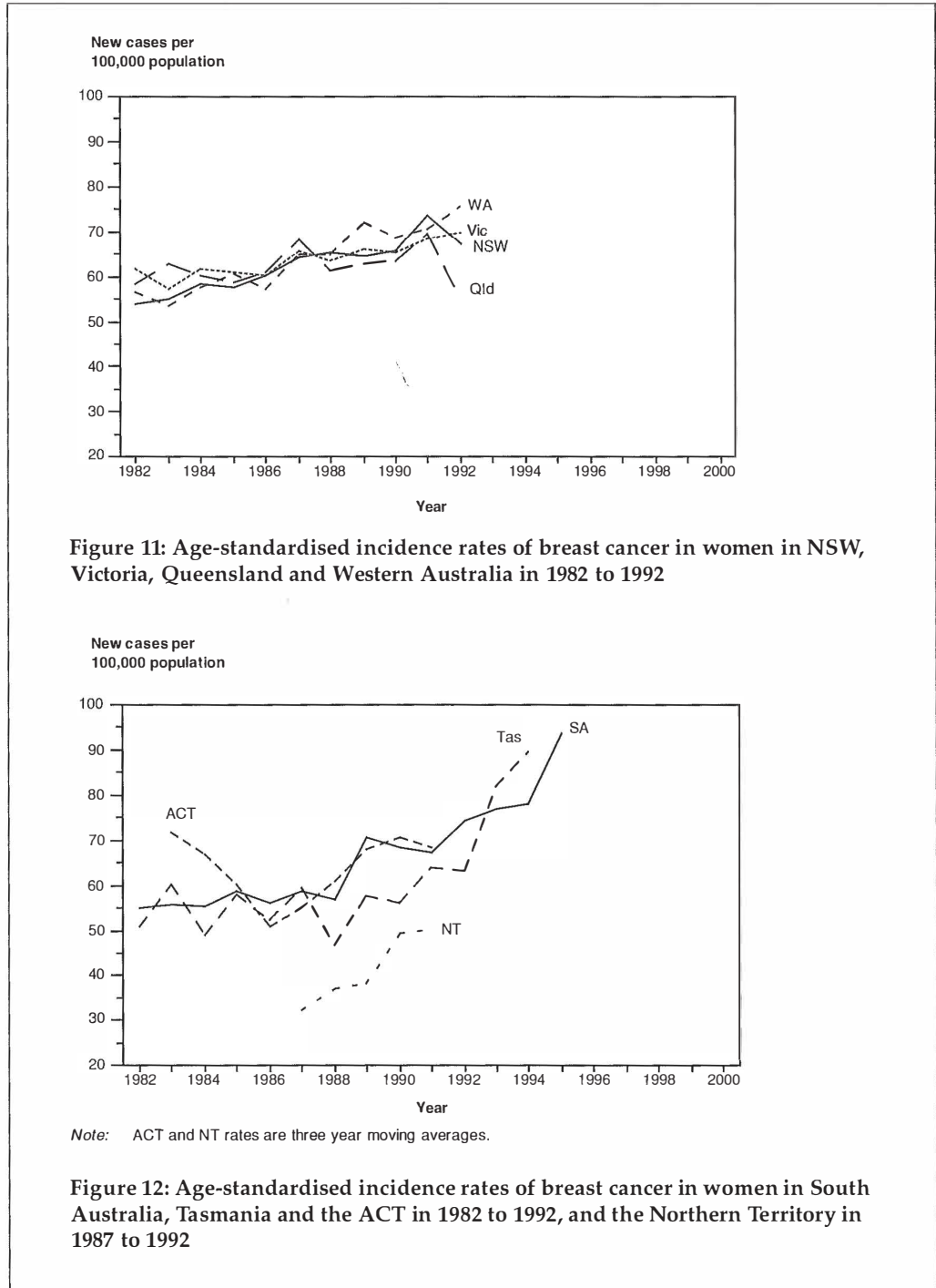


Figure 11: Age-standardised incidence rates of breast cancer in women in NSW, Victoria, Queensland and Western Australia in 1982 to 1992

Figure 12: Age-standardised incidence rates of breast cancer in women in South Australia, Tasmania and the ACT in 1982 to 1992, and the Northern Territory in 1987 to 1992

## Mortality trends by State and Territory

Mortality from breast cancer has not changed appreciably since 1982 in any State or Territory (Figure 13 and 14; Table A7). The mortality recorded for Victoria was higher than for other states and territories except for occasional fluctuations upwards in the ACT and Tasmania. A study of mortality in 1985–1987 showed that, compared with rates for all Australian women, mortality from breast cancer was highest in women of any age in the ACT and Victoria, and in women aged 25 to 64 years in Tasmania (Mathers 1994a; 1994b). Differences between the states were observed for breast cancer mortality in women 65 years of age and older: compared with the national average, death rates were higher in Victoria and lower in Queensland (Mathers 1994b).

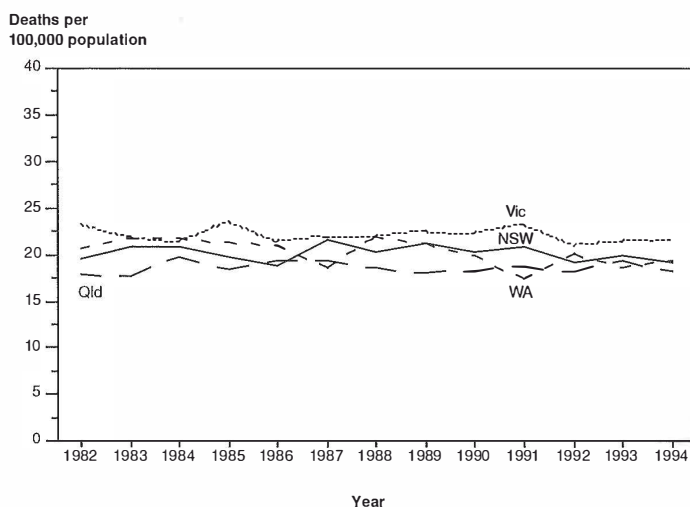
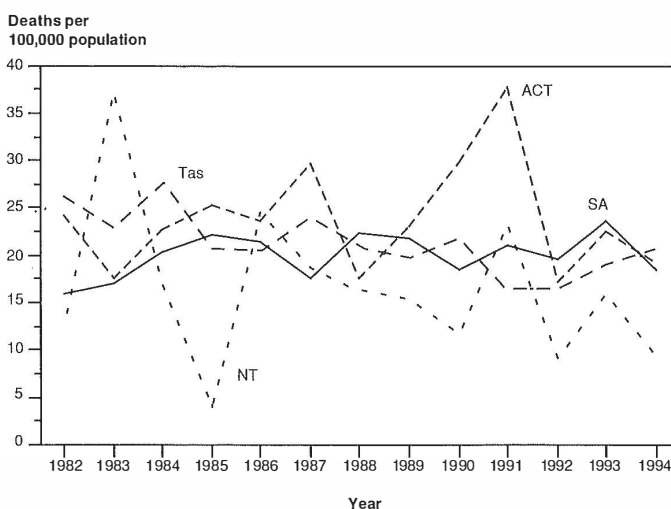


Figure 13: Age-standardised mortality rates for breast cancer in women in NSW, Victoria, Queensland and Western Australia in 1982 to 1994



Note: ACT and NT rates are three year moving averages.

Figure 14: Age-standardised mortality rates for breast cancer in women in South Australia, Tasmania, ACT and Northern Territory in 1982 to 1994

# Mortality rates by age in States and Territories

Age-specific death rates from breast cancer have changed very little over time (Figures 17 and 18; Table A10). The recorded mortality in women 50 years of age or older has been generally higher in Victoria than NSW in all three time periods but has shown no evidence of an increase with time in either State (Table A10).

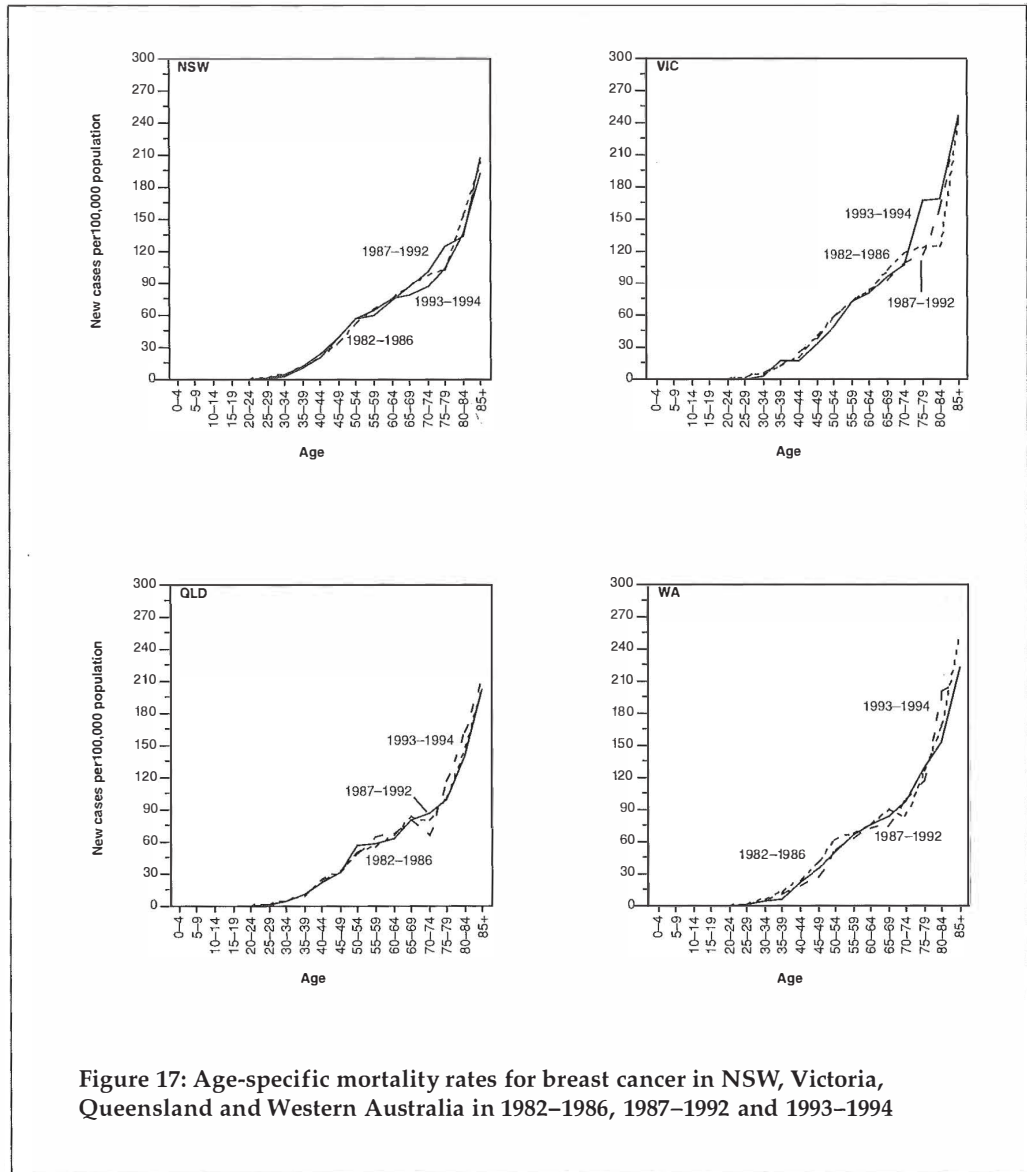


Figure 17: Age-specific mortality rates for breast cancer in NSW, Victoria, Queensland and Western Australia in 1982-1986, 1987-1992 and 1993-1994

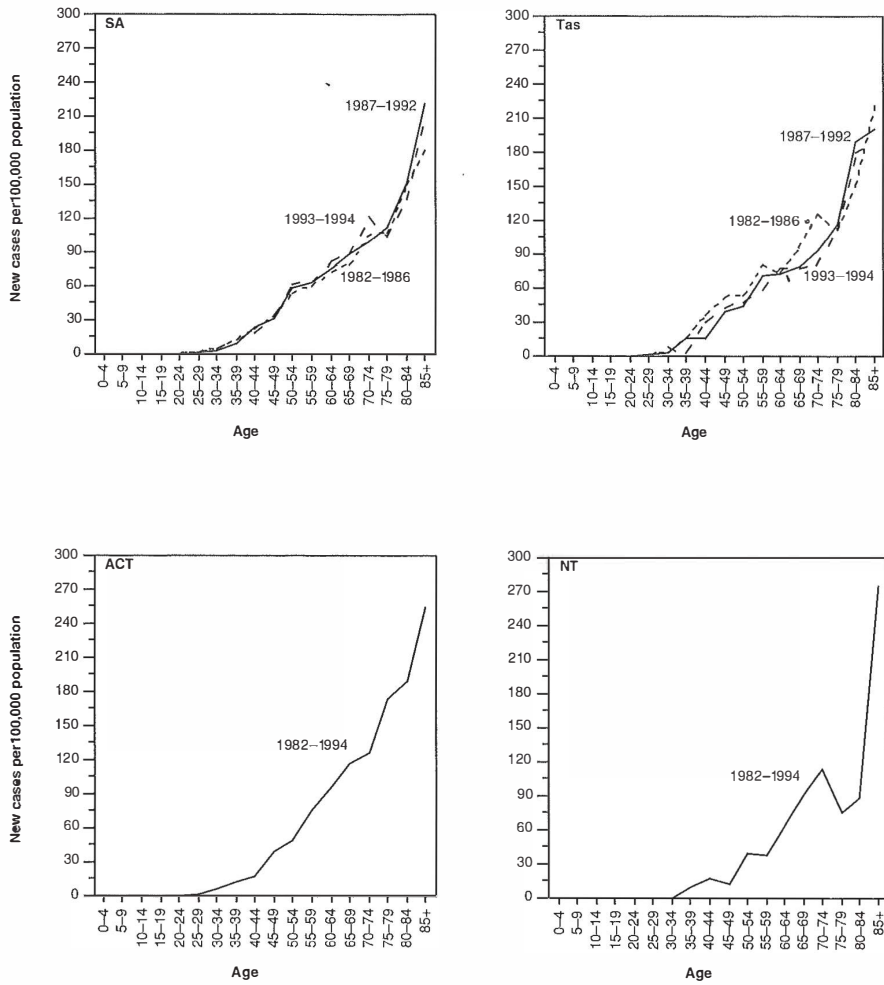


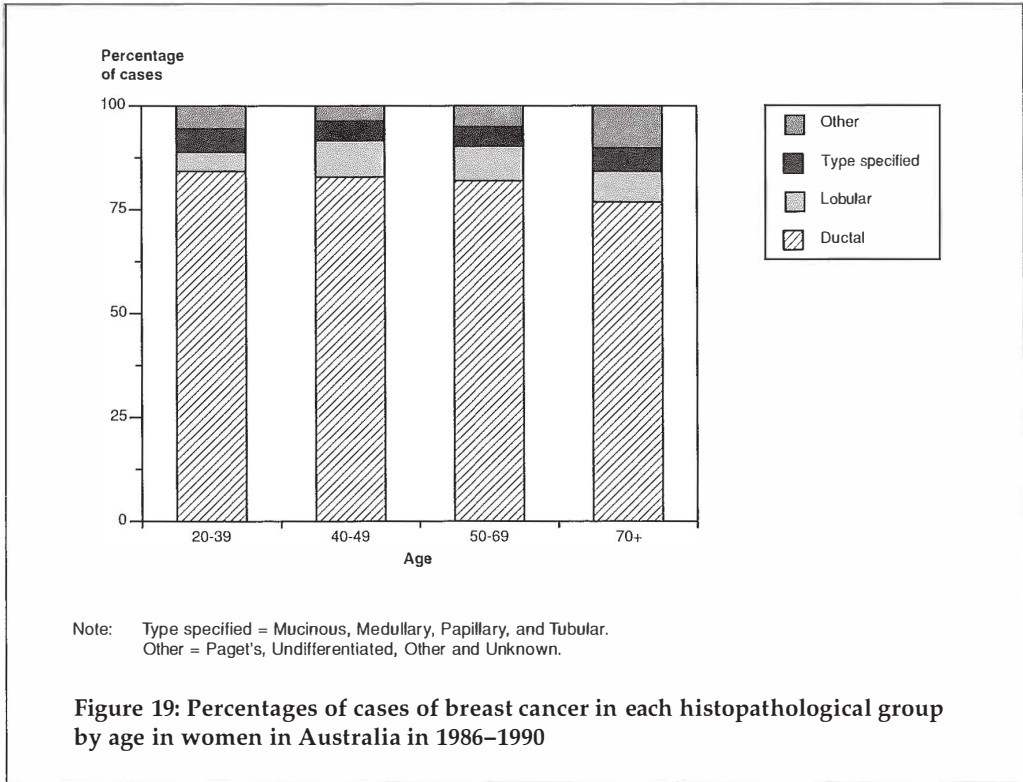
Figure 18: Age-specific mortality rates for breast cancer in South Australia and Tasmania in 1982-1986, 1987-1992 and 1993-1994 and in the ACT and the Northern Territory in 1982-1994

# Distribution by histopathological type

The majority (81%) of histopathologically verified cancers in 1986–1990 were ductal carcinomas (Table 9; Figure 19).

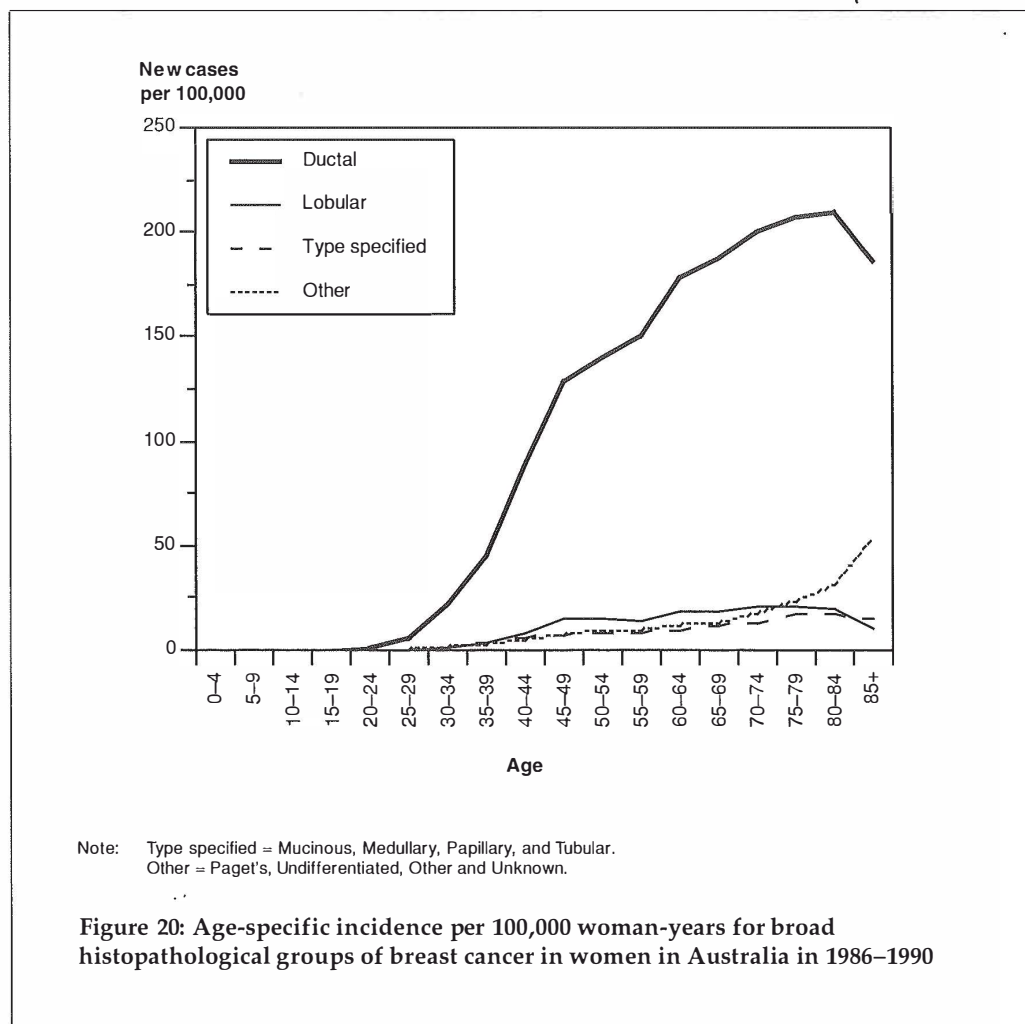
**Table 9: Numbers of cases of histopathologically verified breast cancers in each histopathological group in women in Australia in 1986–1990**

Histological type	Total	Per cent
Ductal	26,633	80.9
Lobular	2,525	7.7
Mucinous	590	1.8
Medullary	546	1.7
Papillary	151	0.5
Tubular	384	1.2
Paget's disease	438	1.3
Undifferentiated	158	0.5
Other	465	1.3
Unknown	1,049	3.2
<b>Total</b>	<b>32,939</b>	<b>100.0</b>



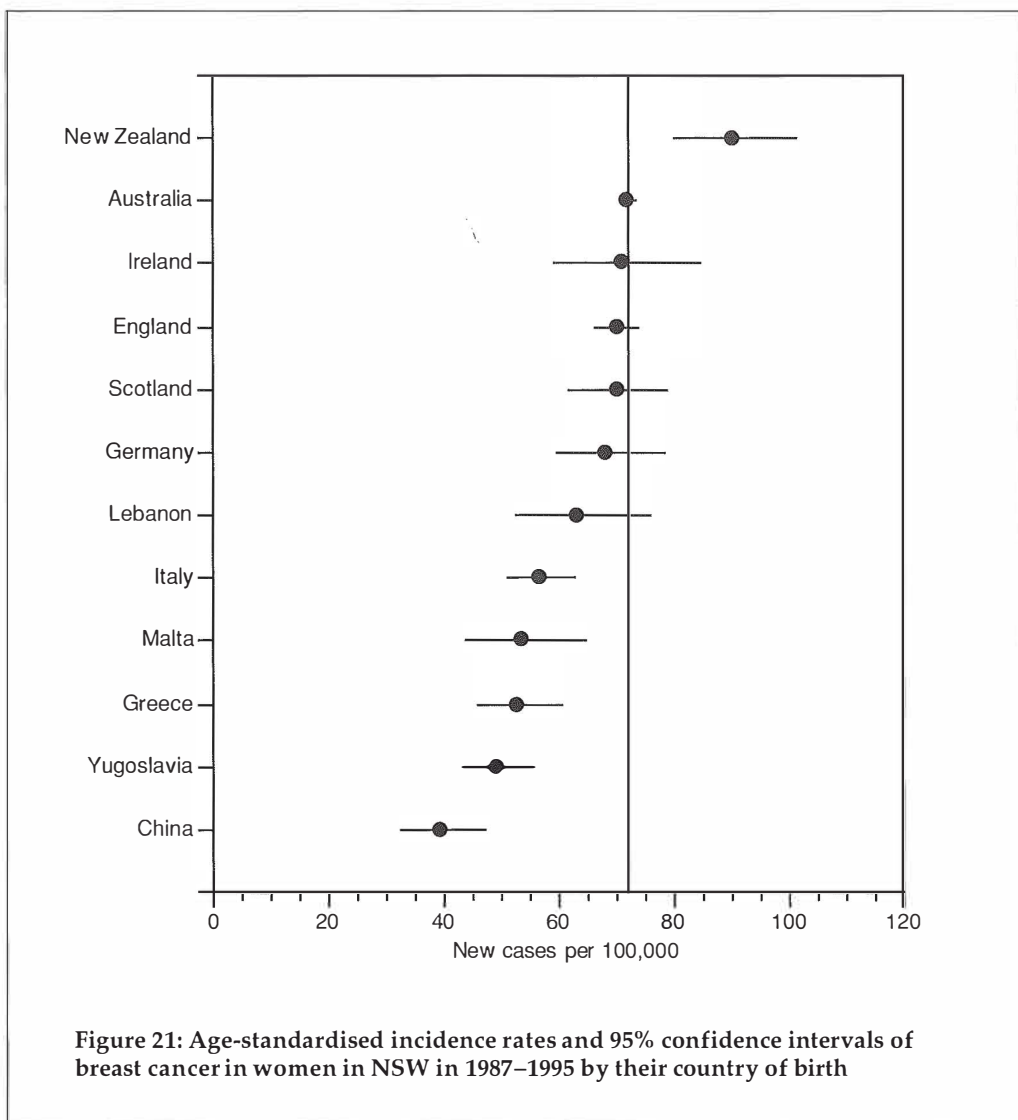
## Histopathological type by age

The age-specific incidence of ductal carcinoma of the breast in 1986–1990 per 100,000 woman-years was 21.9 per 100,000 at 30–34 years of age in 1986–1990 and rose steeply to 128.5 per 100,000 woman-years at 45–49 years of age and 200.5 per 100,000 at 70–74 years of age. Figure 20 shows the different pattern of incidence with age for lobular carcinoma: rates varying in a quite narrow range from 14 per 100,000 to 20 per 100,000 over the age range 45–49 to 80–84 years of age. Age-specific incidence rates for histopathological types of breast cancer are in Table A15.



## Incidence by country of birth

Incidence rates for breast cancer in overseas-born women in NSW in 1987–1995 (provided by M. Coates, NSW Central Cancer Registry) are given as a guide to national rates. In NSW, incidence was lower in women born in southern Europe (Greece, Italy, Malta, the former Yugoslavia) and parts of Asia (China and Taiwan, Hong Kong, Vietnam, Turkey) than in women born in Australia. There was evidence of higher rates only in New Zealand-born women. The rates presented (Figure 21) are for countries from which at least 145 cases were expected in 1987–1995, based on the size of the population in NSW in 1991. Numbers of cases of breast cancer and age-standardised incidence rates in women in NSW in 1987–1995 by their country of birth are given in Table A16.

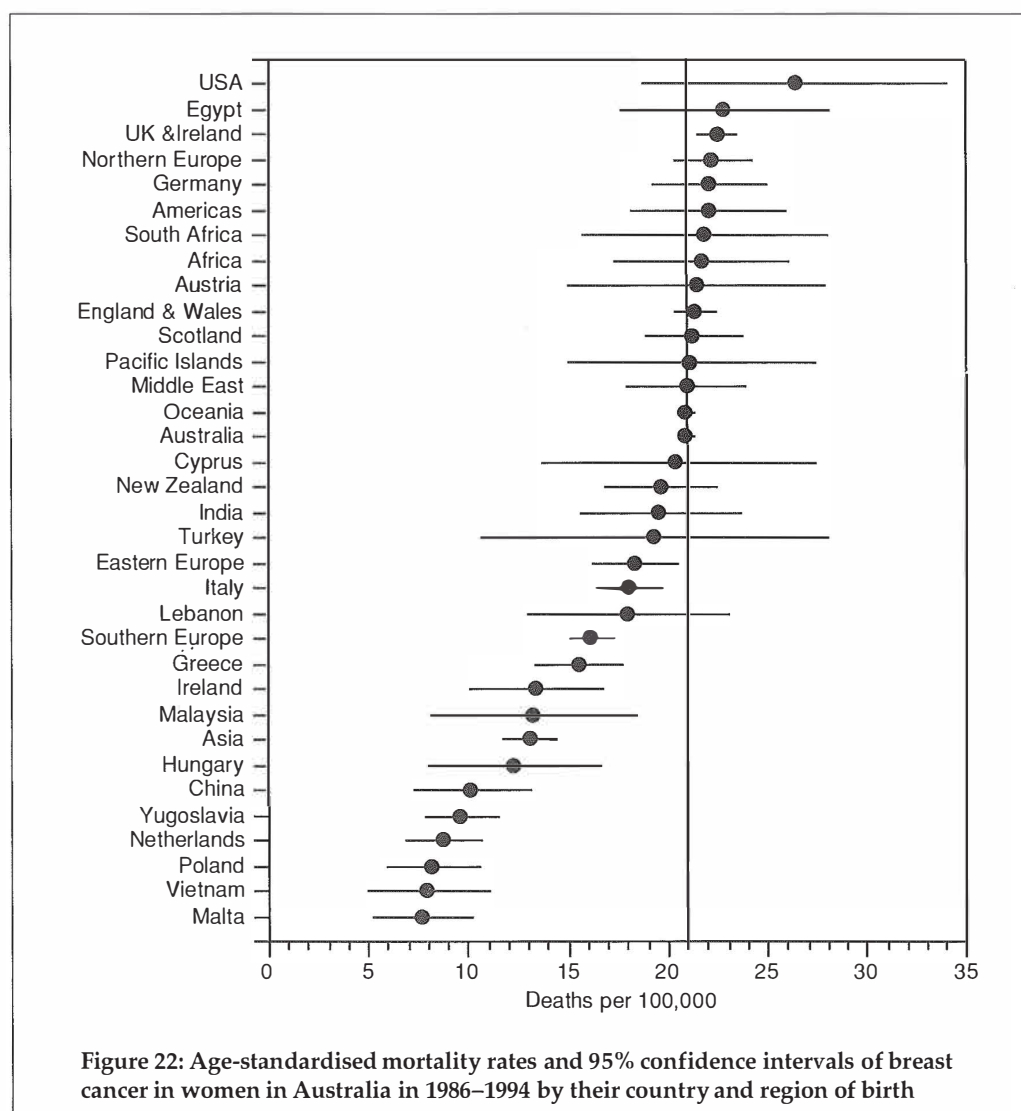




## Mortality by country of birth

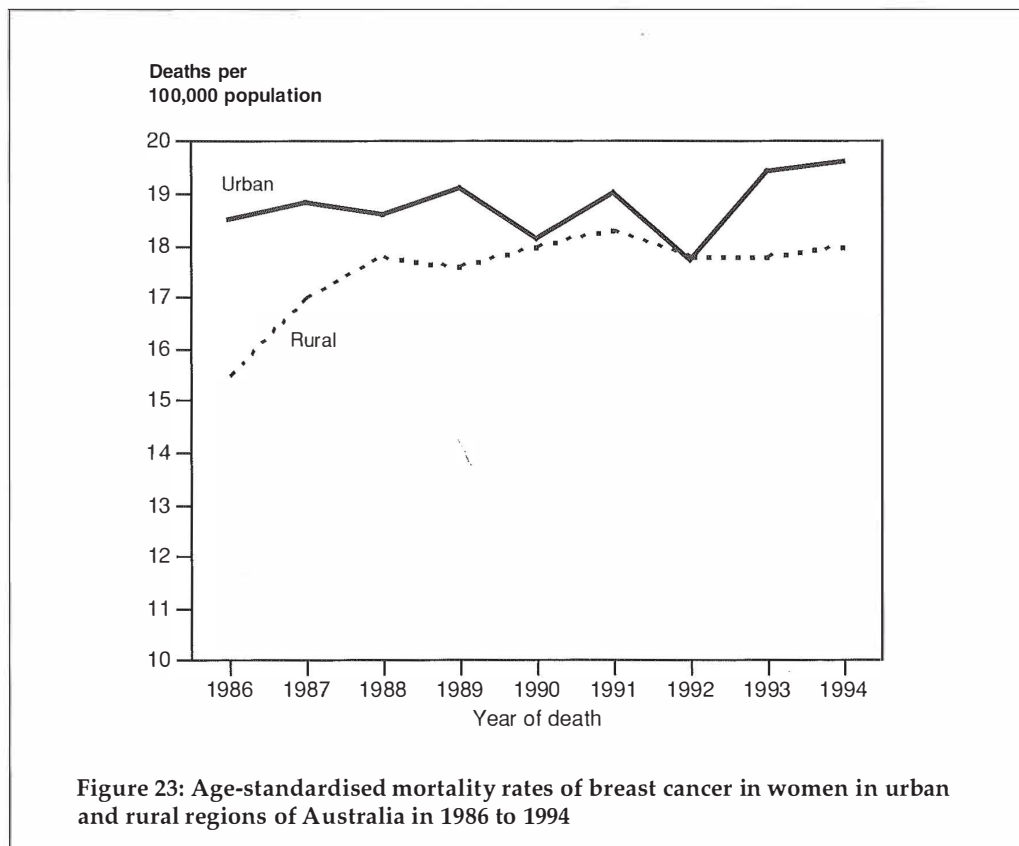
Mortality rates from breast cancer in 1986–1994 were significantly higher in women born in the UK and Ireland (22.6 per 100,000 woman-years) than in women born in Australia (20.9 per 100,000) (Figure 22). Rates were lower in those born in eastern Europe (18.4 per 100,000), southern Europe (16.2 per 100,000) and Asia (13.2 per 100,000). A similar pattern of mortality was reported by Giles et al (1995) for deaths from breast cancer in 1979–1988. Total numbers of deaths and deaths in four age groups in women in Australia in 1986–1994 are given in Table A17 and age-standardised mortality rates in four age groups by country of birth in Table A18.

An analysis of mortality rates from breast cancer in 1985–1987 also showed significant differences by country of birth (Mathers 1994a; 1994b). The study examined two age groups: women 25–64 years of age and women 65 years of age and older. Death rates from breast cancer were significantly higher in women 25 years of age and older born in the UK compared with women born in Australia and, in women 25 to 64 years of age, significantly lower in women born in parts of Europe and Asia.



## Mortality by place of residence in Australia

Breast cancer mortality in rural regions, defined according to the classification system of the Commonwealth Department of Health and Family Services, was lower than in urban regions in each year from 1986 to 1994 (Figure 23).



The substantially lower mortality in the late 1980s in rural regions is reflected in the overall rates for 1986–1990 and 1991–1994 (Table 9). The rate ratio for rural:urban regions in the earlier period was 0.92 and in the more recent years, 0.95.

**Table 10: Number of deaths from breast cancer and age-standardised mortality rates per 100,000 woman-years in 1986–1990 and 1991–1994 in urban and rural regions<sup>(a)</sup> of Australia**

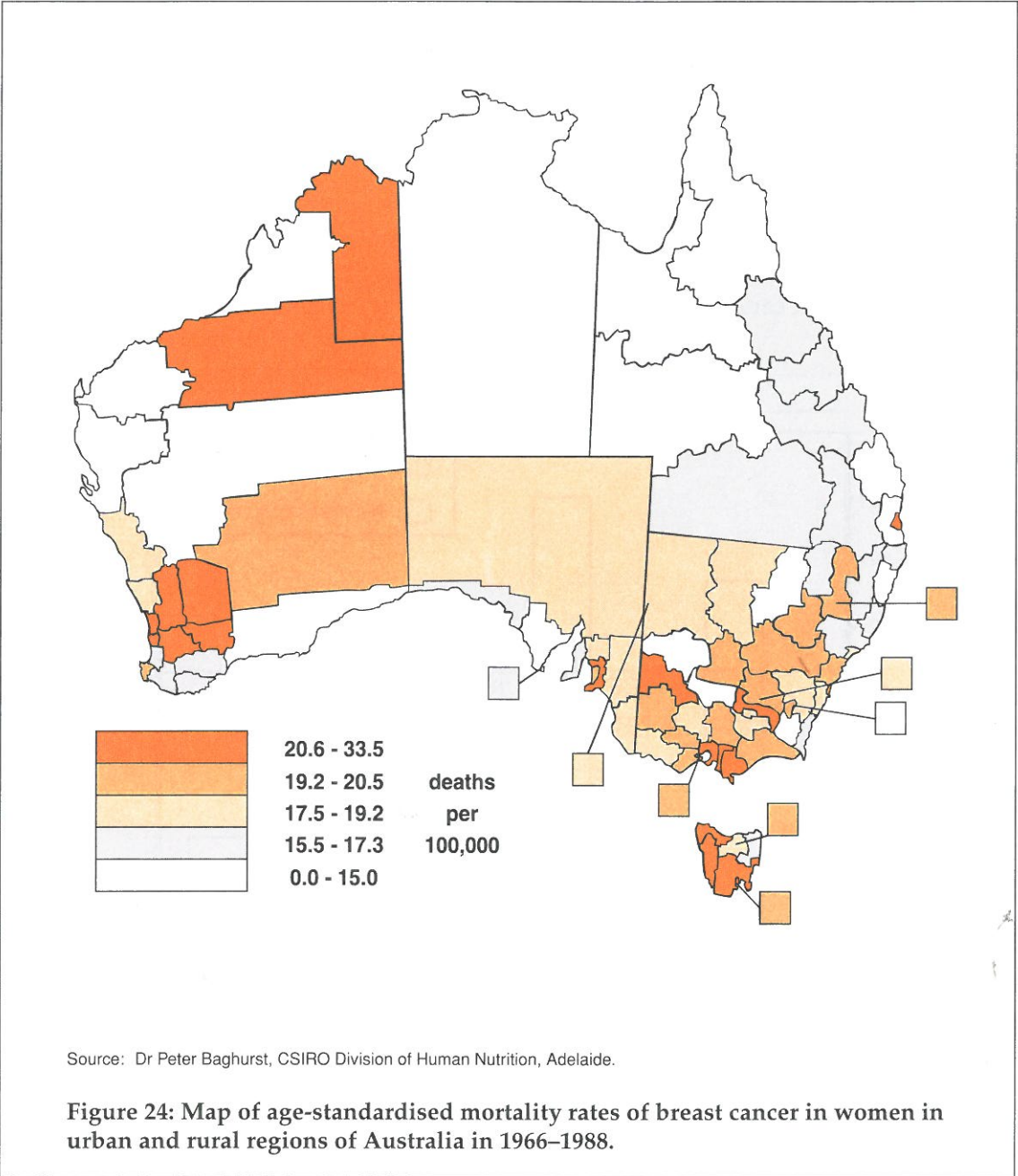
	Deaths <sup>(b)</sup>		Age-standardised mortality rates	
	1986–1990	1991–1994	1986–1990	1991–1994
Urban	8,646	7,520	21.3	21.8
Rural	2,983	2,644	19.6	20.7

(a) Defined according to the coding scheme of the Commonwealth Department of Health and Family Services.

(b) There were 116 additional deaths which lacked sufficient information for classification as rural or urban.

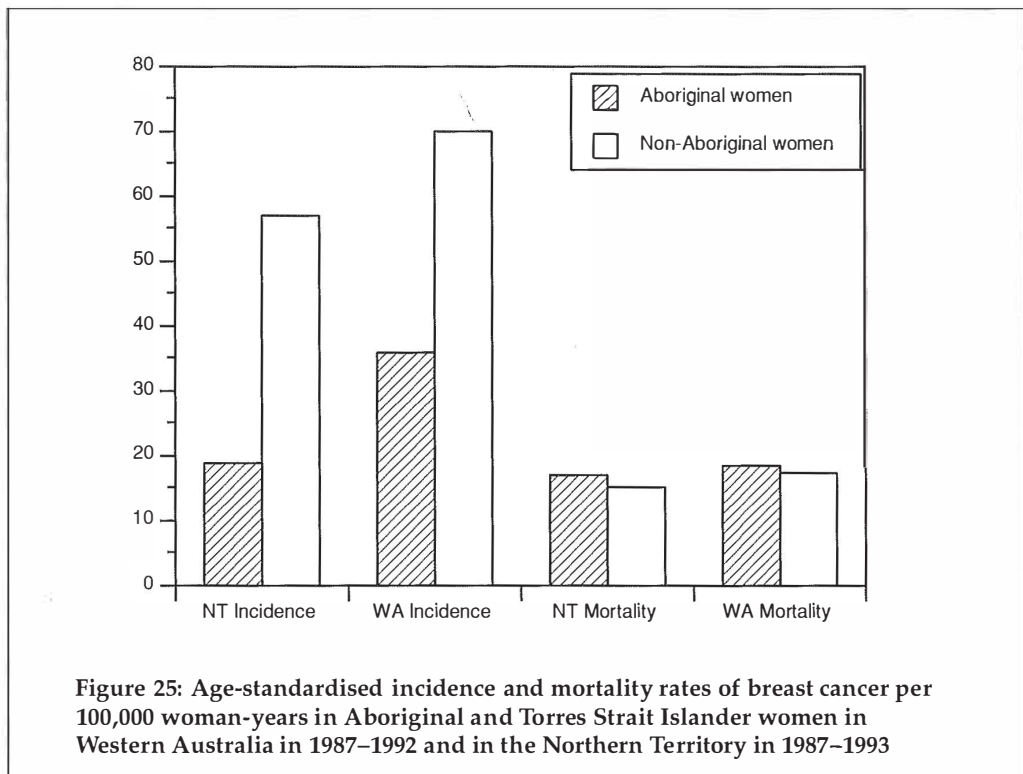
# Mortality by place of residence in Australia

Mortality from breast cancer was highest in the more southerly parts of Australia in 1966–1988 (Figure 24).



# Incidence and mortality among Aboriginal and Torres Strait Islander women

Cancer registries recorded 22 cases of breast cancer in Aboriginal and Torres Strait Islander women in Western Australia in 1988–1992 (T Threlfall, personal communication), 14 cases in South Australia in 1977–1992 (South Australian Cancer Registry 1993) and 13 cases in the Northern Territory in 1987–1993 (d’Espaignet et al. 1996). In the Northern Territory, there were 17 deaths from breast cancer in Aboriginal women and 49 in non-Aboriginal women in 1979–1991 (Plant et al. 1995). A comparison of rates for Aboriginal and non-Aboriginal women in the Northern Territory and Western Australia showed that mortality rates were very similar but recorded incidence rates were much lower in Aboriginal women (Figure 25). The completeness of identification of Aboriginal and Torres Strait Islander women among women with breast cancer in Western Australia and the Northern Territory is not known.

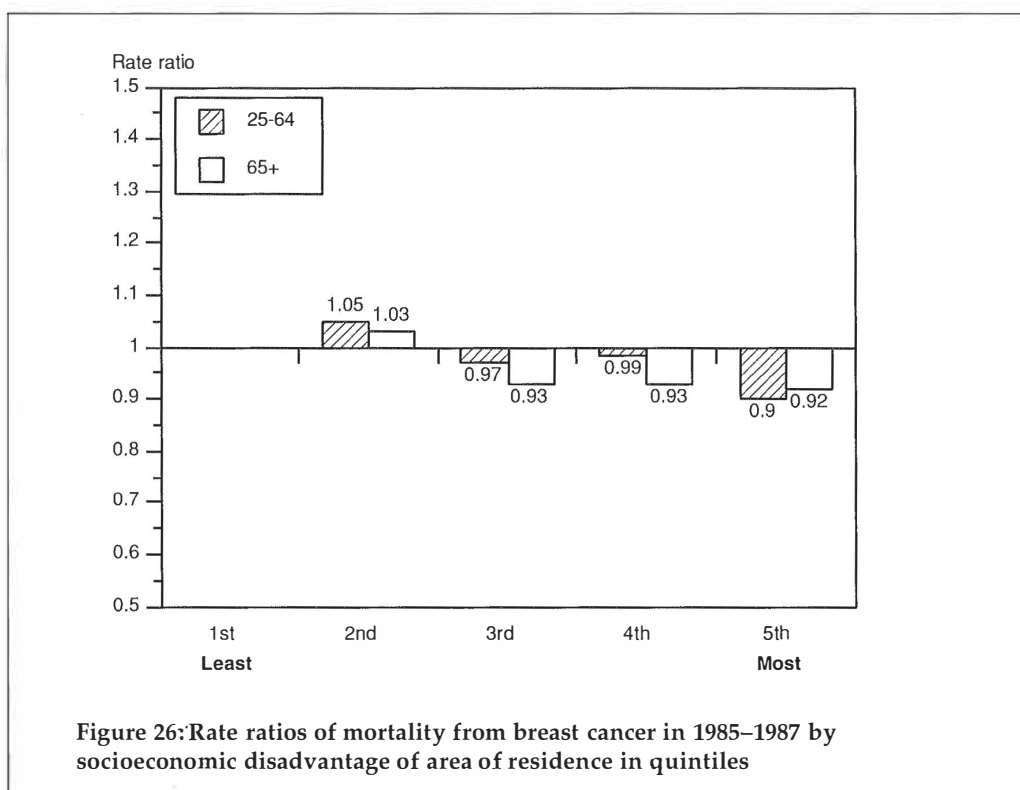


An estimate was calculated of the numbers of Aboriginal and Torres Strait Islander women who would have been affected by breast cancer had they experienced similar age-specific incidence and mortality rates to those for all Australian women. This analysis suggested that as many as 60 new cases and 16 deaths in each year would be expected in this group of Australian women.

## Incidence and mortality by socioeconomic status

Mortality from breast cancer in 1985–1987 was examined by aggregate socioeconomic characteristics (economic resources, education and occupation in households) in defined geographical areas in Australia (Mathers 1994a; 1994b). Socioeconomic status was categorised into five levels of increasing socioeconomic disadvantage of area of residence.

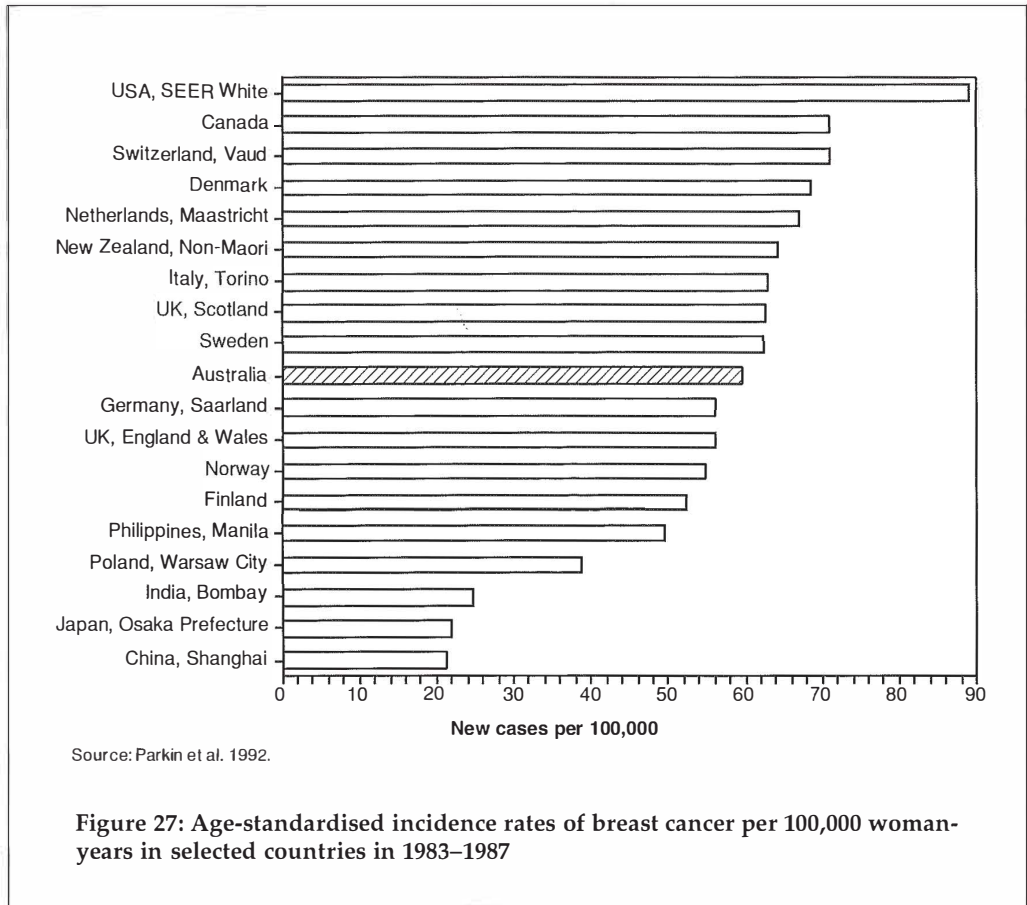
Women 65 years of age and older in the two least socioeconomically disadvantaged areas had higher death rates from breast cancer than women in the three more socioeconomically disadvantaged areas (Figure 26). Women younger than 65 years of age had death rates that were reasonably similar in the four least socioeconomically disadvantaged areas and slightly above the rate in the most disadvantaged areas. There was, however, no consistent evidence of increasing risk of death from breast cancer with increasing disadvantage in either group.



Socioeconomic characteristics of geographical areas were also examined in relation to incidence and mortality of breast cancer in urban residents of NSW in 1987–1991 (Smith et al. 1996) and incidence in 1982–1983 and mortality in 1979–1983 in Victoria (Williams et al. 1991). The data on mortality in NSW and Victoria showed even less evidence than the Australian data (Mathers 1994a; 1994b) that breast cancer deaths were related to socioeconomic status. A clear gradient, however, was seen of significant increases in breast cancer incidence with increasingly favourable socioeconomic status in NSW and Victoria. Smith et al. (1996) suggested that a greater uptake of mammographic screening in higher social class areas, with greater detection of breast cancer, may account, at least in part, for this gradient.

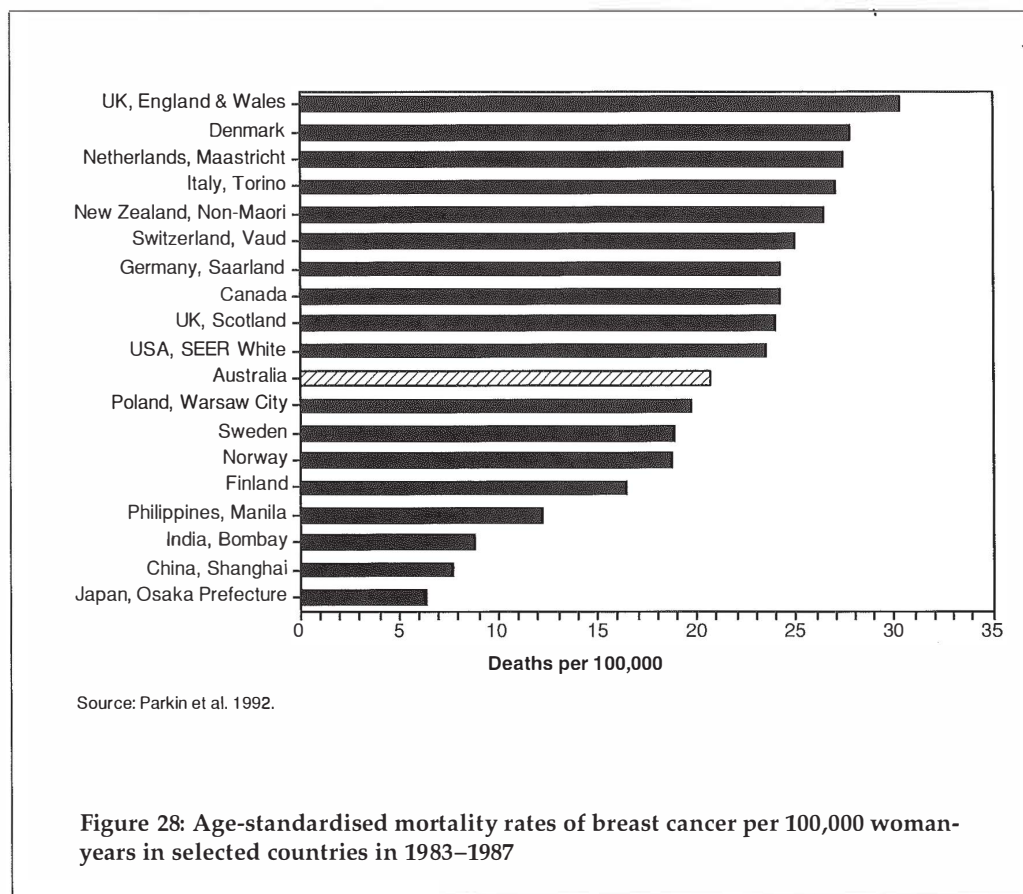
## International comparisons of incidence

Breast cancer incidence varies substantially between countries (Figure 27). The age-standardised incidence in Australia in 1983–1987 was 62.6 per 100,000 woman-years. This rate was higher than in England and Wales (56.1 per 100,000), Norway (54.8 per 100,000), and Finland (52.5 per 100,000) and lower than Scotland (62.6 per 100,000), New Zealand (64.3 per 100,000), Canada (71.11 per 100,000) and the United States (89.2 per 100,000). Incidence rates for these regions and countries are given in Table A19.



## International comparisons of mortality

In 1983–1987, mortality in Australia (22.1 deaths per 100,000 woman-years) was considerably lower than in England and Wales (30.3 per 100,000) and New Zealand (26.4 per 100,000) but higher than in Norway (18.7 per 100,000) and Finland (16.4 per 100,000) (Figure 28). Mortality rates for these regions and countries are given in Table A19.

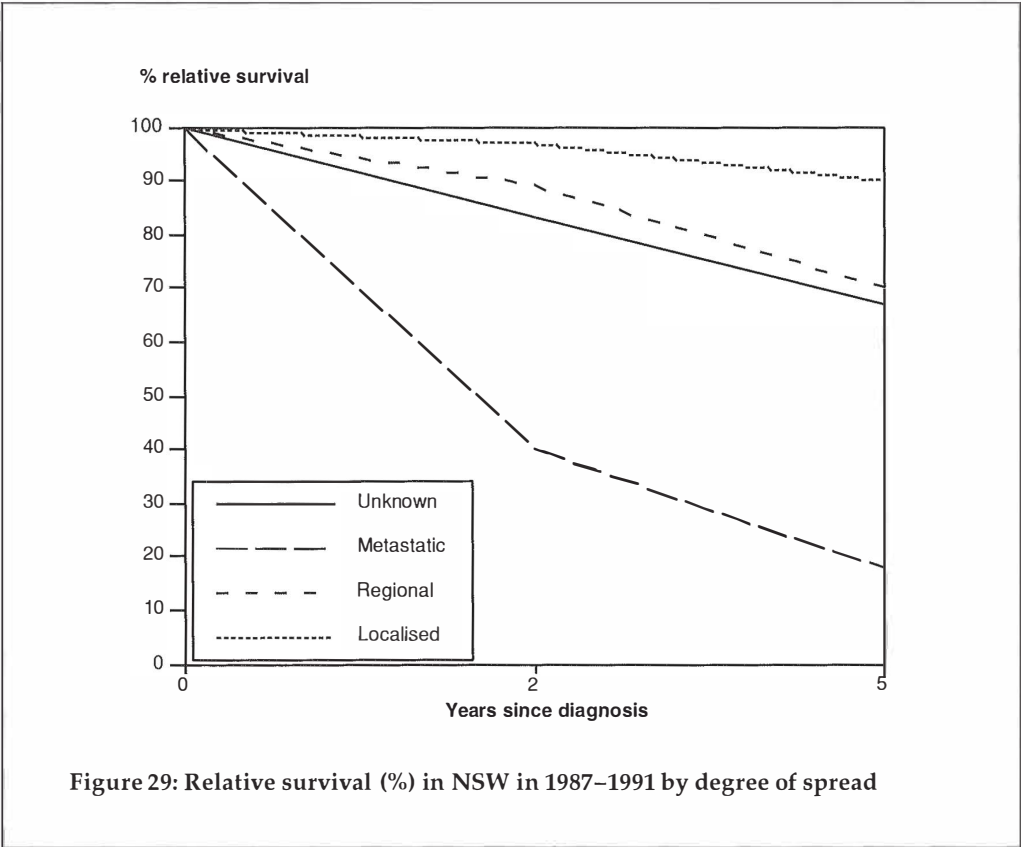


# Survival from breast cancer

The five-year relative survival proportion in women with breast cancer in South Australia in 1977–1994 was 76% (South Australian Cancer Registry 1996) and 77% in NSW in 1987–1991 (Taylor et al. 1994). Survival was a little higher in women from Adelaide (76.7%) than women in the rest of South Australia (73.3%) in 1977–1993 (South Australian Cancer Registry 1995).

These five-year relative survival proportions of 76%–77% are similar to those of 74–76% observed in Saskatchewan (Saskatchewan Cancer Registry 1991) and Ontario (McLaughlin et al. 1995) in Canada and 79% in the Surveillance, Epidemiology and End Results (SEER) registries in the USA in 1983–1989 (Miller et al. 1993). The proportions in Australia are higher than in selected European registries (67%) in 1978–1985 (Berrino et al. 1995), Denmark (69%) in 1983–1987 (Ewertz 1993) and Yorkshire (63%) in 1979–1988 (Forman & Rider 1995).

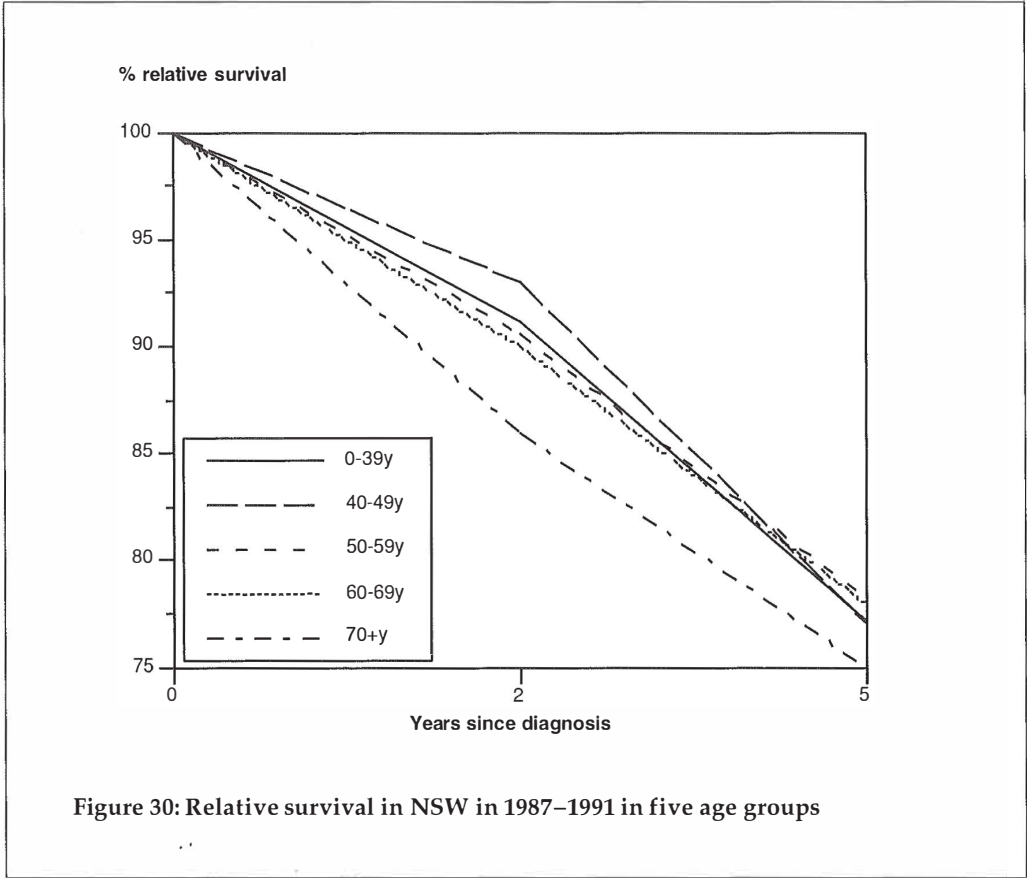
Survival in NSW women in 1972–1991 was much greater for localised breast cancers than for disease that had spread regionally or further (Figure 29), highlighting the importance of early detection. Better survival with more localised disease or cancers with no nodal involvement was also seen in the survival reports from South Australia (South Australia Cancer Registry 1996), Denmark (Ewertz 1993), Yorkshire (Forman et al. 1995) and the USA (Miller et al. 1993) and in a sample of women in Victoria in 1986 in whom the all-stage five-years survival was 71% (Giles et al. 1993).





# Survival from breast cancer

Survival showed little variation with age. Five-year survival proportions in NSW in 1987–1991 were 77% in women less than 50 years of age, 78% in women 50–69 years of age and 75% in older women (Figure 30) (Taylor et al. 1994). In South Australia, five-year survival proportions were 68% in cases aged 75 years or more at diagnosis and 77–78% in women younger than 75 years (South Australian Cancer Registry 1996). Tasmanian data showed five year survival proportions for cases in 1978–1990 of around 75% for women 20–49 years of age and 67% for women 50 years of age and older (Shugg et al. 1994).



# Survival internationally

The lack of substantial variation with age was consistent across countries with high and low overall survival rates as, for example, in certain European countries (Table 11) and the US SEER registries (Miller et al. 1993). Nonetheless, the oldest women tended to have a comparatively low survival.

**Table 11: Relative survival (%) at five years for breast cancer in women in selected European countries in 1983–1987 (Berrino et al. 1995)**

Country	Age group					All ages
	15–44	45–54	55–64	65–74	75+	
Denmark	76	75	70	67	56	69
Netherlands <sup>(a)</sup>	77	80	68	67	62	72
Finland	78	79	74	74	65	75
Italy <sup>(a)</sup>	79	77	70	67	65	72
Switzerland <sup>(a)</sup>	79	76	77	76	72	76
Scotland	67	64	62	62	56	62

(a) National data are not available: selected registry data only.

Patients with breast cancer are known to have mortality rates in excess of the general population for as long as 20 to 30 years after first diagnosis (McMichael & Armstrong 1988). Mortality after 15 years in cases diagnosed in Denmark between 1943 and 1987 was about 70% higher than in the general population (Ewertz 1993).

A recent examination of the much higher mortality than incidence in England and Wales compared with Australia suggested that survival may be better in Australia than in England and Wales (Armstrong & Jelfs 1996). The authors commented that the apparent difference in survival between the two countries could be due to differences in the stage at diagnosis or the quality of treatment or, possibly, to behavioural and lifestyle differences that influence survival, such as excess weight and high intake of fat.

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## APPENDIX 2

**Table A1: Numbers of new cases of breast cancer in States and Territories and Australia in 1982 to 1992**

Year	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
1982	1786	1493	830	406	468	130	66	11	5190
1983	1843	1451	898	410	481	154	74	19	5330
1984	2001	1593	889	452	485	136	84	11	5651
1985	2021	1599	887	498	547	156	60	15	5783
1986	2161	1605	968	472	521	149	65	14	5955
1987	2329	1763	1104	572	558	167	62	21	6576
1988	2430	1735	1024	591	542	139	81	19	6561
1989	2434	1858	1086	668	675	168	93	21	7003
1990	2536	1873	1136	644	655	171	95	22	7132
1991	2876	1994	1278	684	672	190	100	36	7830
1992	2657	2070	1035	755	743	202	95	28	7585

**Table A2: Numbers of new cases of breast cancer in Australia from 1982 to 1992 in four age groups**

Year	Age group				Total
	15-39	40-49	50-69	70+	
1982	502	923	2387	1377	5189
1983	501	991	2320	1518	5330
1984	491	1033	2507	1620	5651
1985	540	1056	2529	1657	5782
1986	531	1047	2600	1777	5955
1987	620	1274	2859	1823	6576
1988	571	1312	2824	1854	6561
1989	578	1398	3065	1962	7003
1990	586	1472	3069	2005	7132
1991	634	1574	3424	2198	7830
1992	590	1665	3239	2091	7585



**Table A3: Numbers of deaths from breast cancer in States and Territories and Australia from 1982 to 1994**

Year	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
1982	701	605	273	160	148	74	22	4	1987
1983	747	596	272	166	167	64	19	9	2040
1984	782	587	317	181	194	76	24	5	2166
1985	748	661	299	182	217	58	29	2	2196
1986	735	617	315	188	212	62	29	7	2165
1987	845	652	329	171	182	70	37	7	2293
1988	827	655	335	211	234	72	22	5	2361
1989	878	688	343	210	232	60	31	7	2449
1990	848	700	353	199	204	72	41	5	2422
1991	874	739	370	187	238	54	52	11	2525
1992	849	674	381	218	217	60	23	6	2428
1993	874	737	416	212	262	66	35	9	2611
1994	857	740	410	225	221	71	30	4	2558

**Table A4: Numbers of deaths from breast cancer in Australia from 1982 to 1994 in four age groups**

Year	Age group				Total
	15-39	40-49	50-69	70+	
1982	101	217	933	736	1987
1983	85	215	992	748	2040
1984	96	253	978	839	2166
1985	123	263	991	819	2196
1986	115	251	970	829	2165
1987	117	268	1010	898	2293
1988	100	272	1043	946	2361
1989	116	318	1050	965	2449
1990	95	316	1056	955	2422
1991	122	334	1049	1020	2525
1992	118	344	949	1017	2428
1993	113	317	1083	1097	2610
1994	108	347	1019	1084	2558

**Table A5: Age-standardised breast cancer incidence and mortality rates with mortality to incidence ratios: Australia, 1982 to 1994**

Year	Incidence	Mortality	Ratio (%) of mortality/incidence
	Age-standardised rate	Age-standardised rate	
1982	56.9	20.2	35.5
1983	57.1	20.4	35.7
1984	59.0	21.1	35.8
1985	58.9	21.0	35.7
1986	59.3	20.1	33.9
1987	64.4	20.8	32.3
1988	62.7	20.7	33.0
1989	65.6	21.1	32.2
1990	65.5	20.4	31.1
1991	70.4	20.9	31.0
1992	66.9	19.4	28.2
1993		20.4	
1994		19.6	

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population.

**Table A6: Age-standardised incidence rates of breast cancer in States and Territories and Australia from 1982 to 1992**

Year	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
1982	54.0	61.5	58.2	56.5	55.2	50.9	65.2	30.9	56.9
1983	55.0	57.4	63.0	53.4	55.8	60.1	72.6	42.8	57.1
1984	58.3	61.8	60.2	57.5	55.5	49.0	77.0	26.5	59.0
1985	57.7	61.1	58.7	60.6	58.6	57.9	51.2	37.7	58.9
1986	60.4	60.3	61.1	57.4	56.2	52.4	52.6	25.9	59.3
1987	64.3	65.8	68.3	65.0	58.6	59.3	49.2	39.5	64.4
1988	65.5	63.6	61.3	64.9	56.7	46.9	63.5	31.9	62.7
1989	64.5	66.3	62.9	72.2	70.5	57.6	69.7	40.7	65.6
1990	65.9	65.5	63.7	68.5	68.5	56.2	71.2	42.0	65.5
1991	73.7	68.2	69.6	70.7	67.4	63.8	70.5	65.1	70.4
1992	67.1	69.8	55.4	75.3	74.3	63.1	63.4	43.6	66.9

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population.

**Table A7: Age-standardised breast cancer mortality rates in States and Territories and Australia in 1982 to 1994**

<b>Year</b>	<b>NSW</b>	<b>Vic</b>	<b>Qld</b>	<b>WA</b>	<b>SA</b>	<b>Tas</b>	<b>ACT</b>	<b>NT</b>	<b>Australia</b>
1982	19.5	23.3	17.8	20.7	16.0	26.2	24.2	12.4	20.2
1983	20.9	21.9	17.7	21.7	17.1	22.9	17.5	37.1	20.4
1984	20.9	21.4	19.7	21.7	20.4	27.9	22.7	16.8	21.1
1985	19.8	23.6	18.4	21.5	22.1	20.6	25.3	4.1	21.0
1986	18.9	21.4	19.3	21.1	21.5	20.4	23.7	24.5	20.1
1987	21.6	21.9	19.3	18.6	17.5	23.9	29.7	18.7	20.8
1988	20.3	21.9	18.6	21.9	22.4	20.9	17.5	16.3	20.7
1989	21.3	22.6	18.1	21.2	21.7	19.5	23.1	15.3	21.1
1990	20.3	22.4	18.3	19.9	18.5	21.8	29.9	11.7	20.4
1991	20.8	23.2	18.8	17.5	21.1	16.3	37.8	23.2	20.9
1992	19.1	21.0	18.3	20.2	19.5	16.4	17.2	9.1	19.4
1993	19.9	21.4	19.4	18.6	23.6	19.0	22.6	15.9	20.4
1994	19.2	21.6	18.3	19.4	18.5	20.1	19.2	9.1	19.6

*Note:* Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population.

**Table A8: Age-standardised rates of breast cancer in States and Territories and Australia in four age intervals and all ages: incidence and mortality in 1982–1986 and 1987–1992 and mortality in 1993–1994**

Year	Incidence								
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>1982–1986</b>									
15–39	14.2	15.0	14.3	13.8	14.6	15.9	14.3	9.7	14.4
40–49	122.6	121.5	131.2	119.1	108.8	124.6	114.4	78.8	121.7
50–69	171.1	187.8	176.7	170.8	176.2	146.3	202.9	74.5	176.2
70+	243.8	256.1	272.7	261.3	240.4	245.1	298.4	189.7	253.1
<b>All ages</b>	<b>57.1</b>	<b>60.4</b>	<b>60.2</b>	<b>57.2</b>	<b>56.3</b>	<b>54.0</b>	<b>63.4</b>	<b>32.6</b>	<b>58.3</b>
<b>1987–1992</b>									
15–39	15.5	15.6	13.2	15.7	15.4	13.6	12.1	12.3	15.0
40–49	143.1	137.5	133.1	143.6	135.9	125.3	136.0	91.9	138.4
50–69	207.8	208.8	201.7	217.8	211.6	178.5	222.9	138.7	207.3
70+	267.6	272.4	257.9	294.9	258.2	235.7	215.1	158.3	267.1
<b>All ages</b>	<b>66.8</b>	<b>66.6</b>	<b>63.5</b>	<b>69.7</b>	<b>66.2</b>	<b>58.1</b>	<b>65.1</b>	<b>44.1</b>	<b>66.0</b>
Year	Mortality								
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>1982–1986</b>									
15–39	3.0	2.9	2.8	3.2	2.9	2.9	2.9	1.7	2.9
40–49	27.3	30.3	28.1	31.6	27.3	43.6	34.6	13.4	29.1
50–69	67.8	76.1	61.6	71.2	64.4	73.4	70.4	49.1	69.1
70+	119.3	135.8	109.2	126.0	119.9	137.9	157.6	206.1	123.7
<b>All ages</b>	<b>20.0</b>	<b>22.3</b>	<b>18.6</b>	<b>21.4</b>	<b>19.4</b>	<b>23.6</b>	<b>22.8</b>	<b>18.3</b>	<b>20.6</b>
<b>1987–1992</b>									
15–39	2.8	3.2	2.6	1.9	2.4	3.4	4.0	1.6	2.8
40–49	31.7	31.0	26.2	27.8	27.4	27.3	27.9	15.4	29.5
50–69	67.3	74.3	62.6	67.0	68.8	63.9	88.8	59.9	68.5
70+	123.7	135.0	110.8	127.5	123.8	123.9	168.4	95.7	125.3
<b>All ages</b>	<b>20.5</b>	<b>22.2</b>	<b>18.6</b>	<b>19.9</b>	<b>20.1</b>	<b>19.7</b>	<b>25.8</b>	<b>15.9</b>	<b>20.6</b>
<b>1993–1994</b>									
15–39	2.2	3.3	2.5	2.3	3.1	1.7	2.6	0.0	2.6
40–49	29.9	24.8	28.4	22.9	26.5	35.8	18.5	16.8	27.2
50–69	67.0	71.2	63.4	63.9	71.7	62.9	73.3	48.3	67.5
70+	110.4	146.8	109.1	129.3	130.6	113.2	149.4	66.8	123.4
<b>All ages</b>	<b>19.5</b>	<b>21.5</b>	<b>18.8</b>	<b>19.0</b>	<b>21.0</b>	<b>19.5</b>	<b>20.9</b>	<b>12.4</b>	<b>20.0</b>

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population.

**Table A9: Incidence rates of breast cancer in States and Territories and Australia in 1982–1986 and 1987–1992: age standardised rates (ASR) and age-specific rates per 100,000 woman-years**

Age group	1982–1986								
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
0–4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10–14	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1
15–19	0.2	0.0	0.2	0.0	0.4	0.0	0.0	0.0	0.1
20–24	1.3	0.5	1.3	1.0	1.0	1.1	1.8	0.0	1.0
25–29	6.0	6.8	6.3	9.1	8.7	8.9	5.3	5.4	6.8
30–34	24.7	23.9	27.1	17.6	24.4	22.7	25.0	2.9	23.9
35–39	52.8	58.6	50.5	53.9	52.1	61.9	53.4	49.8	54.2
40–44	103.9	101.5	98.8	100.9	91.7	91.1	93.3	80.3	100.4
45–49	141.3	141.5	163.6	137.2	125.9	158.0	135.4	77.4	143.0
50–54	141.9	155.8	143.0	139.0	160.2	112.2	218.3	98.2	147.2
55–59	165.6	178.3	175.4	180.4	168.0	158.6	171.1	112.8	171.6
60–64	189.6	203.9	190.1	171.3	191.5	150.3	198.9	40.5	190.8
65–69	202.5	232.4	216.8	210.1	193.2	181.4	224.7	28.9	211.4
70–74	232.1	240.7	269.5	257.0	219.9	228.4	297.3	333.5	241.5
75–79	245.9	251.7	260.4	254.6	241.2	270.0	332.4	91.9	251.0
80–84	248.8	275.6	311.4	292.0	279.1	202.6	167.7	0.0	269.9
85+	281.1	307.0	271.3	260.9	281.9	304.6	365.5	0.0	286.5
<b>All ages (ASR)</b>	<b>57.1</b>	<b>60.4</b>	<b>60.2</b>	<b>57.2</b>	<b>56.2</b>	<b>54.0</b>	<b>63.4</b>	<b>32.6</b>	<b>58.3</b>

Age group	1987–1992								
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
0–4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10–14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0
20–24	1.1	1.0	0.7	1.8	1.2	2.0	0.0	0.0	1.1
25–29	6.2	8.3	6.6	8.5	6.1	7.4	8.0	4.0	7.1
30–34	26.0	28.7	21.8	26.6	26.8	22.7	13.7	21.3	25.8
35–39	59.5	55.2	50.1	56.3	58.3	48.7	48.4	49.5	55.8
40–44	112.8	112.6	101.7	112.6	105.0	102.5	116.9	74.6	109.6
45–49	173.4	162.4	164.5	174.5	166.9	148.0	155.0	109.1	167.1
50–54	184.7	180.8	187.6	196.1	183.0	157.4	168.1	112.4	183.6
55–59	196.7	199.1	181.2	192.7	205.7	168.6	217.0	145.5	194.5
60–64	221.9	223.5	210.8	252.0	227.1	191.5	273.6	186.6	223.1
65–69	242.5	248.8	240.6	241.8	246.6	209.7	254.6	109.5	243.0
70–74	261.4	256.9	259.4	269.7	243.1	195.1	197.3	109.2	256.0
75–79	275.7	286.3	251.7	294.1	251.7	243.8	239.2	245.0	272.6
80–84	280.3	304.1	284.1	313.4	279.2	293.9	268.6	91.6	290.0
85+	263.8	274.7	238.1	378.7	310.5	323.6	184.4	248.1	277.5
<b>All ages (ASR)</b>	<b>66.9</b>	<b>66.6</b>	<b>63.5</b>	<b>69.7</b>	<b>66.2</b>	<b>58.1</b>	<b>65.1</b>	<b>44.1</b>	<b>66.0</b>

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population (ASR).

**Table A10: Mortality rates of breast cancer in States and Territories and Australia in 1982–1986, 1987–1992 and 1993–1994: age-standardised rates (ASR) and age-specific rates per 100,000 woman-years**

Age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>1982–1986</b>									
0–4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10–14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20–24	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
25–29	0.5	1.2	2.0	1.3	1.1	0.0	1.8	0.0	1.1
30–34	5.0	3.7	4.7	5.2	3.7	2.4	6.7	0.0	4.4
35–39	12.4	12.4	9.7	12.6	12.4	15.5	8.9	10.7	12.0
40–44	20.5	20.5	24.3	23.0	22.1	35.8	19.6	26.8	21.9
45–49	34.0	40.1	31.9	40.3	32.5	51.4	49.5	0.0	36.2
50–54	51.9	58.2	49.9	60.7	52.6	54.1	63.0	32.7	54.2
55–59	66.1	72.5	54.7	67.0	60.2	80.3	81.1	28.2	66.0
60–64	75.4	82.5	66.7	75.2	72.7	74.1	75.2	40.5	75.5
65–69	86.3	102.0	83.5	88.9	78.9	95.3	62.0	115.7	89.6
70–74	98.0	117.4	79.6	83.3	103.7	126.6	133.3	190.6	101.0
75–79	102.7	123.0	101.3	126.6	106.9	111.2	166.2	91.9	111.0
80–84	153.9	124.1	148.0	167.9	150.0	152.0	139.7	143.9	145.2
85+	203.3	246.6	204.7	254.1	180.0	222.3	255.8	558.7	218.0
<b>All ages (ASR)</b>	<b>20.0</b>	<b>22.3</b>	<b>18.6</b>	<b>21.4</b>	<b>19.4</b>	<b>23.6</b>	<b>22.8</b>	<b>18.3</b>	<b>20.6</b>
<b>1987–1992</b>									
0–4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10–14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20–24	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1
25–29	0.8	1.1	1.0	0.7	1.7	1.9	1.3	0.0	1.0
30–34	4.4	5.5	4.1	4.5	3.2	2.7	6.8	0.0	4.5
35–39	11.6	12.4	10.8	6.5	9.5	15.6	16.1	9.9	11.1
40–44	23.7	24.9	21.1	21.0	24.0	15.9	21.7	9.0	23.0
45–49	39.6	37.1	31.2	34.7	30.7	38.7	34.2	21.8	36.1
50–54	56.5	57.7	55.9	50.5	58.2	43.6	47.6	46.3	55.8
55–59	59.5	72.8	57.9	66.7	62.1	70.8	67.3	38.8	63.9
60–64	73.6	82.8	62.8	75.9	74.9	71.6	120.2	74.6	75.0
65–69	87.1	92.8	79.7	83.1	87.5	78.0	144.1	91.2	87.5
70–74	100.3	109.0	86.2	97.1	98.6	92.3	136.1	81.9	99.9
75–79	123.7	117.1	99.7	128.7	112.3	116.6	220.0	49.0	117.9
80–84	134.3	160.1	140.9	152.3	150.9	188.6	201.4	91.6	147.3
85+	206.8	249.8	201.4	221.7	220.4	200.0	161.3	248.1	220.0
<b>All ages (ASR)</b>	<b>20.6</b>	<b>22.2</b>	<b>18.6</b>	<b>19.9</b>	<b>20.1</b>	<b>19.7</b>	<b>25.8</b>	<b>15.9</b>	<b>20.6</b>

(continued)

**Table A10 (continued): Mortality rates of breast cancer in States and Territories and Australia in 1982–1986, 1987–1992 and 1993–1994: age-standardised rates and age-specific rates per 100,000 woman-years**

Age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
	<b>1993–1994</b>								
0–4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5–9	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1
10–14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20–24	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1
25–29	0.2	0.3	0.0	0.0	1.8	0.0	0.0	0.0	0.3
30–34	3.0	3.2	4.3	4.3	4.2	7.8	3.9	0.0	3.6
35–39	10.1	16.3	11.2	10.2	12.3	2.7	12.2	0.0	11.8
40–44	20.7	17.1	23.4	18.6	18.5	29.3	0.0	23.8	19.7
45–49	39.0	32.5	33.4	27.2	34.5	42.3	36.9	9.8	34.7
50–54	56.2	48.6	48.6	52.5	61.1	46.5	28.0	30.9	52.1
55–59	63.8	71.8	64.4	63.4	62.6	58.2	86.9	49.7	65.9
60–64	75.0	80.5	68.3	71.6	82.3	77.1	73.8	67.9	75.7
65–69	78.8	95.9	80.3	73.5	87.6	77.4	129.9	49.4	84.3
70–74	86.8	106.4	66.5	98.4	121.8	79.7	91.5	75.2	92.6
75–79	103.7	167.3	116.3	116.8	104.3	111.5	69.4	116.7	123.1
80–84	136.9	168.4	162.3	200.8	137.5	179.3	230.9	0.0	156.2
85+	192.1	245.8	212.0	206.7	211.7	184.4	459.7	0.0	214.3
<b>All ages (ASR)</b>	<b>19.5</b>	<b>21.5</b>	<b>18.8</b>	<b>19.0</b>	<b>21.0</b>	<b>19.5</b>	<b>20.9</b>	<b>12.4</b>	<b>20.0</b>

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population (ASR).

**Table A11: Age-standardised incidence rates of breast cancer in Australian women from 1982 to 1992 in four age groups**

Year	Age group			
	15–39	40–49	50–69	70+
1982	15.1	118.9	172.6	235.1
1983	14.4	124.7	167.1	251.1
1984	13.8	124.4	179.2	258.4
1985	14.6	123.1	178.7	252.6
1986	14.1	117.6	183.5	266.1
1987	16.3	136.4	198.0	257.7
1988	14.8	132.6	193.5	260.2
1989	14.6	136.0	206.9	270.1
1990	14.5	137.8	205.2	269.5
1991	15.6	141.5	226.6	284.8
1992	14.2	144.1	212.3	260.1

*Note:* Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population.

**Table A12: Age-standardised mortality rates from breast cancer in Australian women from 1982 to 1994 in four age groups**

Year	Age group			
	15–39	40–49	50–69	70+
1982	3.0	28.0	67.6	123.1
1983	2.4	27.1	71.2	122.4
1984	2.7	30.8	69.7	130.1
1985	3.3	31.0	69.7	121.7
1986	3.0	28.3	67.5	121.0
1987	3.1	28.6	70.1	124.9
1988	2.6	28.0	70.8	127.3
1989	2.9	31.0	70.2	126.2
1990	2.4	29.5	69.5	122.1
1991	3.0	29.9	68.9	128.7
1992	2.8	29.9	61.8	123.0
1993	2.6	26.5	69.9	125.1
1994	2.5	28.0	65.1	121.7

*Note:* Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population.



**Table A13: Mortality from breast cancer in Australian women from 1921 to 1994: age-standardised rates (ASR) and age-specific rates per 100,000 woman-years**

Year	Age group									
	ASR	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
1921	16.61	33.5	59.1	49.8	55.8	56.0	50.0	140.1	116.5	90.9
1922	18.73	35.7	49.2	44.7	76.3	74.8	90.9	93.5	103.8	250.0
1923	18.49	42.5	53.6	48.0	58.9	72.1	89.9	109.6	63.6	236.4
1924	17.38	29.1	52.4	59.1	60.8	61.0	71.4	112.6	103.4	230.8
1925	17.95	29.9	47.8	56.5	58.1	69.0	90.0	134.2	190.1	173.1
1926	17.64	37.0	39.6	52.3	63.0	75.6	85.5	114.4	120.0	150.9
1927	19.42	37.5	47.7	54.3	67.7	91.6	87.1	90.5	108.5	327.3
1928	18.89	32.9	41.6	52.8	64.7	85.5	102.6	146.8	142.9	303.6
1929	18.81	40.5	44.8	51.2	62.9	85.0	101.7	125.0	161.8	135.6
1930	17.89	32.3	50.8	57.8	64.2	68.2	97.2	100.0	119.7	145.2
1931	19.81	44.2	56.2	53.7	62.5	82.7	100.7	107.8	137.0	200.0
1932	19.46	36.0	53.8	56.8	68.5	80.5	111.8	107.1	133.3	223.7
1933	19.66	36.2	45.0	62.4	78.6	79.8	101.6	98.6	115.4	195.1
1934	20.36	36.6	41.9	77.1	71.2	74.5	91.7	135.5	129.6	261.9
1935	20.60	37.6	52.2	65.0	64.2	100.4	102.3	111.9	162.8	186.0
1936	21.59	35.4	48.3	82.8	96.6	77.5	103.7	122.7	164.9	241.4
1937	19.82	32.3	50.0	64.6	82.2	72.8	103.4	122.5	125.6	168.5
1938	21.46	40.4	45.4	59.4	90.8	92.1	110.2	145.3	216.8	177.8
1939	20.21	36.0	53.5	62.5	68.3	88.8	94.3	111.3	128.6	315.2
1940	20.47	38.8	53.1	64.0	70.0	88.4	110.6	122.0	177.6	239.6
1941	22.30	35.5	55.7	62.6	76.9	100.3	133.4	149.1	182.5	247.6
1942	21.12	34.4	50.6	69.6	82.7	90.0	115.8	147.4	165.5	194.7
1943	23.14	43.0	57.0	76.8	78.9	97.9	117.6	124.5	180.3	283.3
1944	20.87	31.2	44.1	71.3	86.6	96.7	106.9	154.4	152.1	187.5
1945	20.95	41.2	56.3	55.2	77.6	84.0	111.6	130.5	188.1	225.4
1946	21.08	36.7	52.0	63.2	76.0	88.6	124.9	145.2	189.6	225.8
1947	21.48	31.8	54.2	67.6	74.1	93.2	115.3	136.8	179.1	281.4
1948	21.96	33.9	56.1	67.7	81.1	85.2	133.2	135.9	149.9	227.3
1949	20.79	41.4	50.1	67.8	64.3	90.0	107.0	141.7	187.2	206.5
1950	20.16	37.9	45.7	61.5	61.5	100.9	111.4	116.0	155.5	225.1
1951	19.35	38.2	50.5	57.7	73.9	77.0	91.3	122.1	142.9	219.4
1952	20.99	40.6	46.1	54.9	66.0	91.7	94.6	150.3	168.8	295.0
1953	20.91	40.5	49.4	59.0	80.4	91.1	104.6	138.4	180.2	230.0
1954	20.44	34.6	46.1	53.3	71.4	86.1	115.0	162.3	162.5	250.0
1955	20.35	33.5	53.3	63.7	71.9	89.8	105.2	129.7	163.8	244.6
1956	19.69	33.5	43.9	65.7	66.3	88.1	89.5	159.7	161.1	208.3
1957	19.05	31.2	43.3	62.8	66.1	91.0	91.5	115.9	180.1	188.5
1958	18.93	38.4	52.0	52.5	68.6	69.4	101.4	126.6	149.1	187.3
1959	19.83	39.4	44.7	51.6	68.9	81.5	101.2	141.1	159.0	245.1
1960	18.72	35.6	43.0	48.2	68.8	76.8	95.5	118.5	153.2	262.2

(continued)

**Table A13 (continued): Mortality from breast cancer in Australian women from 1921 to 1994: age-standardised (ASR) rates and age-specific rates per 100,000 woman-years**

Year	Age group									
	ASR	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
1961	19.95	33.1	53.3	60.8	65.7	84.6	87.5	130.6	177.6	247.3
1962	18.20	33.4	53.2	58.1	53.7	74.3	92.8	107.2	176.3	182.4
1963	19.73	44.2	50.2	58.2	64.3	78.2	88.6	102.6	167.8	243.6
1964	20.02	33.5	48.3	62.1	67.1	77.9	115.0	128.5	190.8	211.5
1965	18.72	33.4	44.4	54.0	67.3	85.0	95.6	104.4	160.4	205.7
1966	19.26	34.9	51.9	55.8	73.5	76.7	112.3	110.6	147.4	184.1
1967	19.72	33.6	54.5	58.6	70.8	76.7	101.4	129.2	157.9	231.7
1968	19.52	39.3	54.5	59.8	70.5	65.4	100.4	136.1	165.8	189.4
1969	19.65	36.5	55.4	65.0	77.1	76.6	73.5	132.8	149.0	223.7
1970	19.91	33.6	46.3	61.3	76.8	88.6	95.7	119.8	150.7	187.3
1971	20.41	40.0	54.4	65.8	70.8	83.1	83.7	127.3	165.2	242.0
1972	19.36	40.3	46.1	60.3	75.1	77.4	88.8	112.0	150.6	209.8
1973	19.70	38.7	47.3	62.9	69.5	83.8	94.1	105.1	156.4	243.3
1974	19.44	32.4	54.5	60.1	69.1	78.6	88.5	132.9	169.8	234.8
1975	19.21	33.2	48.8	59.1	71.0	78.4	89.9	111.8	161.9	221.7
1976	20.00	33.1	54.3	62.4	73.6	80.3	92.1	127.2	151.1	222.8
1977	20.24	38.2	56.8	56.5	78.4	83.9	90.4	124.6	127.6	192.4
1978	18.86	34.3	51.0	63.6	67.8	75.3	86.0	101.4	146.3	168.0
1979	18.74	31.0	50.9	55.5	63.1	78.1	104.5	114.0	145.4	228.9
1980	19.02	30.4	53.2	57.1	68.7	76.7	107.9	107.5	143.4	214.3
1981	19.69	37.7	50.1	66.7	74.4	81.1	87.4	121.7	154.8	181.8
1982	20.32	34.5	55.6	66.4	76.9	79.2	94.7	112.4	141.0	234.1
1983	20.39	34.2	54.2	63.6	88.5	85.5	106.0	100.0	133.0	214.3
1984	20.20	35.5	56.1	65.2	66.2	89.0	108.6	108.4	163.8	204.3
1985	21.10	41.2	53.1	67.1	76.4	94.0	96.1	113.6	146.4	221.8
1986	20.71	36.7	51.1	68.5	69.9	101.3	99.3	120.0	141.6	199.8
1987	20.42	31.3	57.0	68.0	74.6	81.9	97.9	117.8	136.3	226.1
1988	20.68	35.6	54.6	67.0	80.4	89.6	95.6	124.7	145.2	224.6
1989	20.83	37.7	55.7	61.2	79.5	87.7	96.6	121.7	156.0	231.0
1990	20.70	35.7	58.0	61.4	78.1	95.4	97.5	115.5	147.8	204.4
1991	20.73	36.0	57.5	64.6	71.9	87.9	110.4	110.9	145.0	204.5
1992	19.62	37.3	51.0	61.1	66.0	79.2	100.4	113.6	145.0	231.1
1993	19.61	33.5	50.0	66.1	75.8	85.9	85.4	125.0	158.1	211.8
1994	20.32	35.9	54.0	65.7	75.6	83.1	99.6	121.3	154.4	216.6

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population (ASR).

Table A14: SNOMED codes used to define each histopathological group of breast cancer

Histopathological group	SNOMED code
<b>Carcinoma</b>	
Ductal carcinoma	8500, 8501, 8521, 8140, 8141, 8010
Lobular carcinoma	8520
<b>Special types of carcinoma</b>	
Tubular	8211
Papillary	8050, 8260
Mucinous	8480, 8481
Medullary	8510, 8512
Other	various, including 8201
Unknown	8000, 9990

Table A15: Incidence rates by histopathological type of breast cancer in women in Australia in 1986–1990: age standardised rates (ASR) and age-specific rates per 100,000 woman-years

Age group	Histological type									
	Ductal	Mucinous		Papillary		Paget's		Other		Unknown
	Lobular	Medullary	Tubular	Undiff <sup>(a)</sup>	Unknown					
0–4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10–14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
20–24	0.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0
25–29	6.2	0.2	0.1	0.3	0.0	0.0	0.1	0.1	0.3	0.1
30–34	21.9	0.9	0.1	1.3	0.1	0.1	0.2	0.1	0.7	0.4
35–39	45.4	3.2	0.4	1.9	0.0	0.6	0.7	0.2	1.0	0.8
40–44	89.4	8.1	1.1	2.6	0.2	1.3	0.8	0.4	1.7	1.2
45–49	128.5	14.4	1.3	3.0	0.3	2.4	1.8	0.6	2.0	2.5
50–54	140.0	15.0	1.6	3.4	0.3	3.0	2.5	0.8	2.9	2.5
55–59	149.9	14.1	2.0	3.4	0.5	2.2	2.3	0.8	2.2	3.4
60–64	178.2	17.9	2.9	2.7	0.7	2.9	3.2	1.0	2.6	4.9
65–69	187.4	19.0	4.4	2.8	1.6	2.4	3.6	1.3	2.6	4.8
70–74	200.5	20.5	5.7	2.5	1.9	2.7	3.8	1.4	2.9	9.4
75–79	207.2	20.2	10.2	1.8	3.2	2.5	4.0	1.2	3.9	13.5
80–84	209.8	19.2	11.8	1.7	2.2	2.0	4.0	1.5	4.2	21.8
85+	186.7	9.9	11.7	1.0	1.2	1.4	4.0	1.8	2.0	46.3
<b>All ages (ASR)</b>	<b>51.5</b>	<b>5.0</b>	<b>0.9</b>	<b>1.1</b>	<b>0.2</b>	<b>0.8</b>	<b>0.8</b>	<b>0.3</b>	<b>0.9</b>	<b>1.6</b>

(a) Undifferentiated.

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population (ASR).

**Table A16: Numbers of cases of breast cancer and age-standardised incidence rates per 100,000 woman-years by country of birth in women in NSW in 1987–1995 (M. Coates, personal communication)**

Country of Birth	No. of cases observed	No. of cases expected	Age-standardised rate	95% confidence interval
Australia	16,842	16,842	71.9	(70.7–73.1)
New Zealand	324	269.6	89.9	(79.7–101.0)
England	1,594	1,641.5	69.9	(66.2–73.7)
Scotland	331	342.5	69.9	(61.6–78.8)
Wales	54	69.1	48.1	(34.2–65.1)
Ireland (all)	136	145.4	70.9	(59.1–84.3)
Austria	57	58.3	67.2	(49.0–89.4)
Belgium	6	8	50.6	(17.1–112.7)
Bulgaria	2	2.4	45.5	(5.5–164.3)
Czechoslovakia	42	43	72.3	(49.2–101.5)
Denmark	16	12.5	88.1	(49.0–145.0)
Estonia	12	19.5	33.1	(9.3–69.8)
Finland	14	15.8	60.9	(32.8–102.8)
France	31	30.1	72.7	(49.0–103.8)
Germany	238	256.3	68.2	(59.3–78.1)
Greece	239	345.6	52.8	(45.8–60.4)
Hungary	113	86.3	87.6	(70.3–107.5)
Italy	410	533.7	56.7	(51.0–62.9)
Latvia	27	32.6	119.2	(0.0–278.1)
Lithuania	10	16.8	111.7	(0.0–310.9)
Malta	108	146.6	53.4	(43.7–64.6)
Netherlands	161	167.4	66.2	(56.1–77.6)
Norway	8	4.2	147.9	(61.0–296.1)
Poland	107	114.8	68.2	(53.6–85.0)
Portugal	36	41.7	69	(46.3–98.1)
Romania	27	21.9	92.9	(59.0–138.0)
Spain	42	39.1	83.7	(58.4–115.4)
Sweden	12	8.3	111.4	(49.7–206.6)
Switzerland	16	14	93.5	(52.1–153.8)
Ukraine	18	38.7	29.2	(9.4–57.6)
USSR	73	66.3	122.2	(86.6–164.5)
Yugoslavia	243	364.8	49.1	(43.0–55.8)
China (& Taiwan)	145	278.3	39.2	(32.4–46.9)
Cyprus	32	44.8	52.8	(35.5–75.3)
Hong Kong	58	68.1	57.8	(41.7–77.2)
India	86	108	57.5	(45.7–71.3)
Indonesia	36	36.1	76.3	(52.7–106.6)
Iran	23	28.4	57.8	(35.5–88.2)
Iraq	16	19.2	51.6	(28.9–84.6)
Israel	16	15.9	74.2	(40.7–123.0)
Lebanon	133	151.7	63.2	(52.2–75.8)
Malaysia & Singapore	88	60.4	99.2	(76.1–126.3)
Philippines	118	122.1	68.5	(54.1–85.0)
Sri Lanka	27	28.9	69.4	(45.3–101.5)
Syria	20	15.7	103.5	(60.2–164.1)
Turkey	22	35.1	47	(27.5–73.9)
Vietnam	58	83	49	(36.0–64.9)
Canada	30	27.1	84.5	(55.8–122.1)
USA	56	51.2	78	(57.7–102.8)
Egypt	122	106.2	82	(67.7–98.4)
South Africa	72	67.8	77.2	(59.3–98.6)
All other countries	339			
Unknown	1,939			
<b>All countries</b>	<b>24,858</b>	<b>26,776.3</b>	<b>66.6</b>	<b>(65.8–67.5)</b>

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population.

**Table A17: Deaths from breast cancer in age groups and all ages and age-standardised mortality rates per 100,000 woman-years in women in Australia in 1986–1994 by their region and country of birth**

Country of birth	Age group					All ages	Age-standardised rate
	15–39	40–49	50–69	70+			
Oceania	787	1,958	6,730	6,724	16,200	*	20.9
Australia	760	1,899	6,615	6,645	15,920		20.9
New Zealand	20	44	89	75	228		19.7
Pacific Islands	7	15	26	4	52		21.2
United Kingdom & Ireland	67	326	1,102	1,236	2,731		22.6
England & Wales	54	249	833	943	2,079		21.4
Ireland	3	12	30	27	72		13.4
Scotland	4	46	157	195	402		21.3
Northern Europe	22	110	291	176	599		22.3
Austria	1	6	24	26	57		21.5
Germany	7	59	140	60	266		22.2
Netherlands	0	17	38	37	92		8.8
Eastern Europe	10	28	203	189	430		18.4
Hungary	1	5	16	19	41		12.3
Poland	1	7	33	29	70		8.2
Southern Europe	54	171	563	234	1,022		16.2
Cyprus	2	8	20	5	35		20.5
Greece	6	55	136	30	227		15.6
Italy	20	53	297	151	521		18.1
Malta	1	13	11	12	37		7.7
Yugoslavia	10	22	64	20	116		9.7
Middle East	18	36	90	57	201		21.0
Egypt	1	12	34	32	79		22.9
Lebanon	9	12	27	7	55		18.0
Turkey	3	3	7	11	24		19.4
Asia	34	92	153	104	383		13.2
China	1	9	26	20	56		10.2
India	5	14	36	45	100		19.6
Malaysia	5	10	11	5	31		13.3
Vietnam	6	16	7	3	32		8.0
Africa	10	24	42	34	110		21.8
South Africa	1	13	22	24	60		21.9
Americas	7	25	58	45	135		22.1
United States	6	10	20	17	53		26.5

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population.

**Table A18: Age-standardised mortality rates of breast cancer per 100,000 woman-years in women in Australia in 1986–1994 in four age groups by their country and region of birth**

Country of birth	Age group				All ages (ASR)
	15–39	40–49	50–69	70+	
Oceania	2.9	29.3	72.4	118.0	20.9
Australia	3.0	29.3	72.4	118.0	20.9
New Zealand	2.5	25.2	67.5	123.4	19.7
Pacific Islands	3.0	40.8	83.7	46.0	21.2
United Kingdom & Ireland	2.5	32.0	79.3	127.7	22.6
England & Wales	2.5	29.9	74.5	123.7	21.4
Ireland	2.2	25.1	42.1	71.9	13.4
Scotland	1.1	33.6	77.2	113.1	21.3
Northern Europe	4.8	34.4	73.2	118.1	22.3
Austria	3.7	27.4	71.0	137.1	21.5
Germany	4.1	40.3	74.0	100.1	22.2
Netherlands	0.0	15.2	27.0	66.6	8.8
Eastern Europe	2.9	23.7	63.6	108.7	18.4
Hungary	1.8	25.5	33.5	80.3	12.3
Poland	0.6	15.0	25.2	54.5	8.2
Southern Europe	4.0	25.1	51.6	87.0	16.2
Cyprus	3.2	36.4	73.8	79.5	20.5
Greece	2.3	31.0	54.6	57.4	15.6
Italy	4.7	23.2	59.5	102.6	18.1
Malta	0.9	18.4	14.3	71.2	7.7
Yugoslavia	2.4	14.6	31.7	49.2	9.7
Middle East	3.7	28.7	66.8	136.9	21.0
Egypt	1.1	35.4	69.1	179.7	22.9
Lebanon	4.1	28.7	60.3	85.0	18.0
Turkey	3.9	14.4	57.6	174.0	19.4
Asia	1.6	22.9	41.1	81.4	13.2
China	0.6	17.6	36.5	50.6	10.2
India	3.0	26.3	54.3	166.2	19.6
Malaysia	2.4	23.9	36.7	91.3	13.3
Vietnam	1.7	32.2	15.0	27.6	8.0
Africa	3.3	35.5	71.1	122.6	21.8
South Africa	0.7	36.9	75.9	127.7	21.9
Americas	1.6	20.1	76.1	173.0	22.1
United States	4.1	25.5	87.3	198.4	26.5

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population (ASR).

**Table A19: Age-standardised incidence and mortality rates (ASR) per 100,000 woman-years, mortality/incidence ratios and population sizes for selected countries and regions in 1983–1987 (Parkin et al. 1992)**

Country	Incidence (ASR)	Mortality (ASR)	M/I <sup>(b)</sup> Ratio (%)	Female population	Total population <sup>(c)</sup>
Australia <sup>(a)</sup>	62.6	22.1	35.3	7,911,085	15,796,784
USA, SEER White	89.17	23.48	26.05	9,318,383	18,318,672
Canada	71.11	24.17	33.75	12,671,114	25,037,770
Switzerland, Vaud	70.82	25.08	34.73	277,933	533,482
Denmark	68.62	27.79	40.15	2,596,193	5,117,434
Netherlands, Maastricht	68.07	27.24	38.93	422,239	837,326
New Zealand, Non-Maori	64.33	26.39	41.03	1,501,442	2,976,512
Italy, Torino	62.8	26.7	40.58	538,493	1,033,907
UK, Scotland	62.64	24.04	37.24	2,654,206	5,133,121
Sweden	62.46	18.87	29.61	4,234,602	8,365,374
Germany Saarland	56.33	24.39	40.18	550,783	1,050,717
UK, England & Wales	56.09	30.27	52.56	25,593,500	49,925,500
Norway	54.78	18.72	33.65	2,104,017	4,162,341
Finland	52.5	16.44	31.02	2,522,880	4,889,440
Philippines, Manila	49.65	12.25	26.41	2,087,435	4,019,000
Poland, Warsaw City	38.7	19.77	49.57	871,217	1,626,035
India, Bombay	24.6	8.8	38.33	3,891,661	8,813,708
Japan, Osaka Prefecture	21.89	6.37	29.35	4,381,650	8,668,095
China, Shanghai	21.17	7.68	34.51	3,235,013	6,594,080

(a) Australian data from the Australian Bureau of Statistics and the Australian Institute of Health and Welfare.

(b) Mortality/incidence.

(c) The total population coverage in 1983–1987 of each cancer registry shown in this table was at least 1 million people, except for Maastricht, the Netherlands (837,000) and Vaud, Switzerland (533,000).

Note: Rates are expressed per 100,000 woman-years and age-standardised to the World Standard Population (ASR).

**Table A20: Age distribution of the World Standard Population (Smith et al. 1992)**

<b>Age group</b>	<b>World standard population</b>
0-4	12,000
5-9	10,000
10-14	9,000
15-19	9,000
20-24	8,000
25-29	8,000
30-34	6,000
35-39	6,000
40-44	6,000
45-49	6,000
50-54	5,000
55-59	4,000
60-64	4,000
65-69	3,000
70-74	2,000
75-79	1,000
80-84	500
≥ 85	500
<b>All ages</b>	<b>100,000</b>



# Appendix 3

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