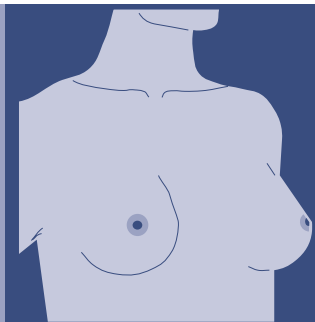


# Canstat



No 34, August 2002

ISSN 0815-7219

Registered by Australia Post

PP 328866/00118

**Canstat:** A digest of facts and figures on cancer

#### Editors

Graham Giles

Vicky Thursfield

#### Circulation

Suzi Neumann

#### Published by the

Cancer Epidemiology Centre

The Cancer Council Victoria

1 Rathdowne Street

Carlton Victoria 3053

Australia

Tel: +61[0]3 9635 5000

Fax: +61[0]3 9635 5270

Email: [enquiries@cancervic.org.au](mailto:enquiries@cancervic.org.au)

Internet: [www.cancervic.org.au](http://www.cancervic.org.au)

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## Breast cancer

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**The  
Cancer  
Council  
Victoria**

In 2000,  
breast cancer  
was diagnosed  
in 22 men and  
2,839 women  
in Victoria.

# Overview

## Incidence and mortality

Breast cancer is the most frequently diagnosed cancer in women. In Victoria, 2,839 women were diagnosed with this cancer, at a median age of 56 years, in 2000. The age-standardised incidence rate was 84.8 new cases per 100,000 women. The lifetime risk of contracting breast cancer before the age of 75 years was 1 in 11 women.

Breast cancer caused the deaths of 713 Victorian women in 2000. The age-standardised mortality rate was 18.4 per 100,000 women. Years of premature life lost (YPLL) measures the extent of "premature" mortality, assumed to be any death between the age of 1 and 75 years. Over 7,000 YPLL were attributable to breast cancer in 2000, more than double the years lost due to bowel or lung cancer in women.

Figure 1 illustrates incidence and mortality rates by age and sex. The curves for males and females are different in shape, but the incidence and mortality curves for each sex are similar. Incidence in women rises steeply from the 20s until the menopause after which the curve flattens, rising only slowly thereafter. Male incidence, on the other hand, rises at a constant proportional rate with increasing age. In both sexes, the mortality curves mimic the incidence curves with a 5 to 10 year scalar shift towards older age. This indicates that survival prospects from breast cancer do not change with age in either sex.

Breast cancer occurs over 100 times more often in women than in men in Victoria. Male breast cancer is a rare event

with an average of 20 new cases each year. The age-standardised rate is 0.6 per 100,000 men, the lifetime risk is less than 1 in 1000 men and the median age at diagnosis is 65 years. On average six Victorian men die from breast cancer per year at a median age of 77 years. The age-standardised mortality rate is 0.1 deaths per 100,000 men.

## Tumour characteristics

Over 98% of breast cancers were histologically verified in 2000 and, of these, almost 80% were infiltrating ductal carcinomas. The proportions of tumours by type are shown in Table 1.

Figure 2 summarises breast cancers by tumour grade, size (being the largest diameter of the invasive part of the breast tumour) and nodal status (being the number of lymph nodes sampled and the number found to contain metastatic tumour). The figures show that the majority of breast tumours are small, with over half being less than 2 cm in diameter, and without nodal spread. Over 60% of women who had nodes removed had no tumour in their lymph nodes. Almost 60% of tumours were well or moderately differentiated.

Most women (72.4%) had at least one lymph node dissected and more than half (54.8%) had 10 or more nodes taken for assessment of metastatic carcinoma. The reasons for lymph node dissection not being undertaken were not recorded but this group (27.6% of total) included women aged over 80 years (16%), tumours not histologically confirmed (9%) and tumours of advanced stage at diagnosis (6%).

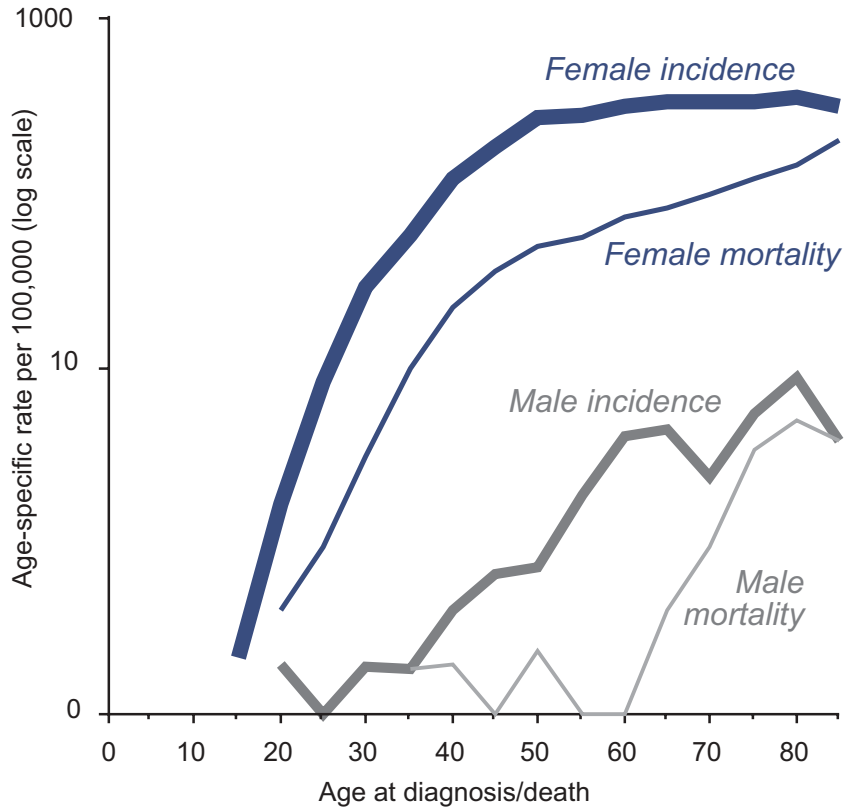
**Table 1: Distribution of female breast cancer by histological type, Victoria 2000**

Percent of histologically verified breast cancers diagnosed in Victorian women in 2000. No histological confirmation is obtained for 1.6% of all breast tumours.

<i>Histological type</i>	<i>Number of tumours</i>	<i>%</i>
Ductal carcinoma	2,228	79.8%
Lobular carcinoma	470	16.8%
Paget's disease of breast (+/- ductal carcinoma)	25	0.9%
Medullary carcinoma	20	0.7%
Inflammatory adenocarcinoma	3	0.1%
Other/unspecified carcinomas	44	1.6%
Phyllodes tumour (malignant)	2	0.1%
Sarcomas & soft tissue tumours	1	< 0.1%
<b>Total (histologically verified tumours)</b>	<b>2,793</b>	<b>100.0%</b>

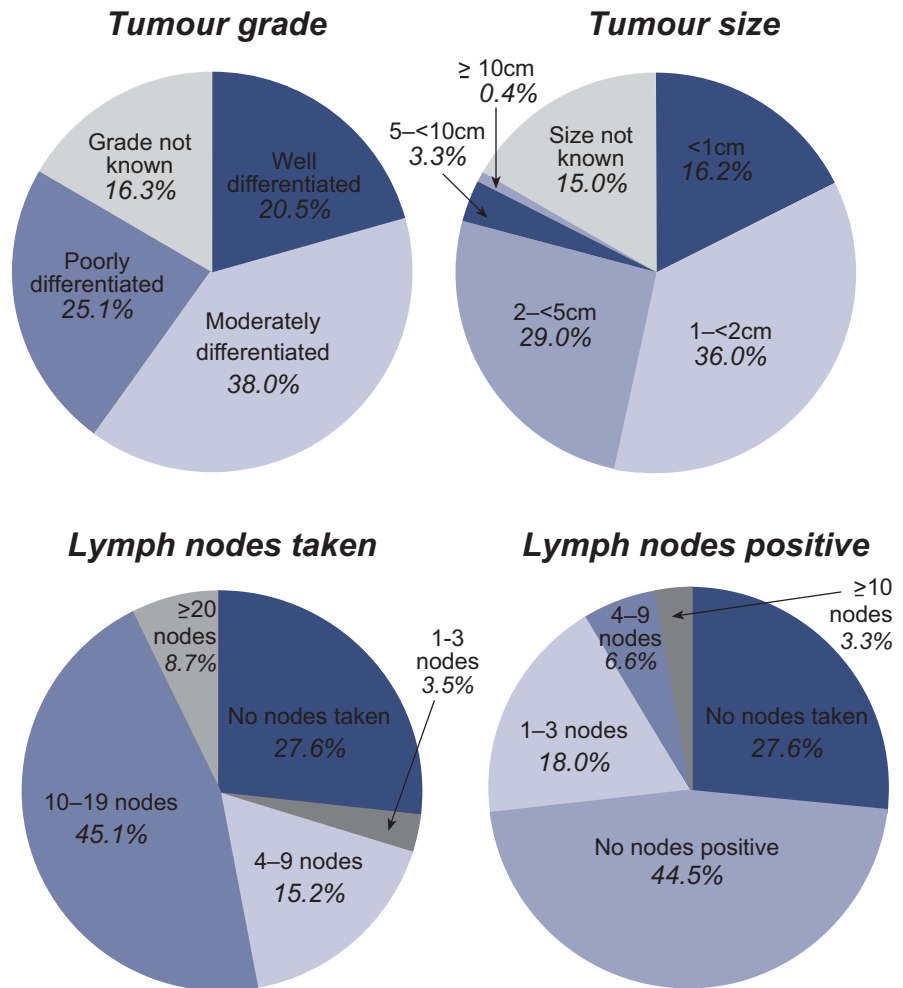
**Figure 1: Age-specific incidence and mortality rates for breast cancer**

Incidence and mortality rates by age group and sex for breast cancer in Victoria in 1998–2000.



**Figure 2: Characteristics of breast cancers diagnosed in Victoria**

Maximum tumour diameter, tumour grade, number of lymph nodes taken and number found to contain tumour in all invasive breast tumours diagnosed in Victorian women in 2000.



Since 1982, breast cancer incidence rates have risen by 2.2% and mortality rates have fallen by 0.9% per annum in Victorian women

## Trends in incidence and mortality

Figure 3 illustrates the annual age-standardised rates for breast cancer incidence and mortality in Victoria from 1982 to 2000. Incidence rates have risen by an average 2.2% per year during this period. This increase is largely related to mammographic screening which started in the 1980s prior to the commencement of the BreastScreen program (see page 10). The rapid rise in incidence rates observed in 1993 and 1994 was most likely case finding in women aged 50–69 years as a result of the introduction of this program.

It is apparent that the mortality rate, which has been virtually static for decades, is now showing a downturn. As mortality rates reflect deaths in women diagnosed with breast cancer several years earlier, there is inevitably a delay of several years before the impact of screening can be seen. The breast cancer mortality rate has fallen by an average 0.9% per year since 1982 but more rapidly since 1995.

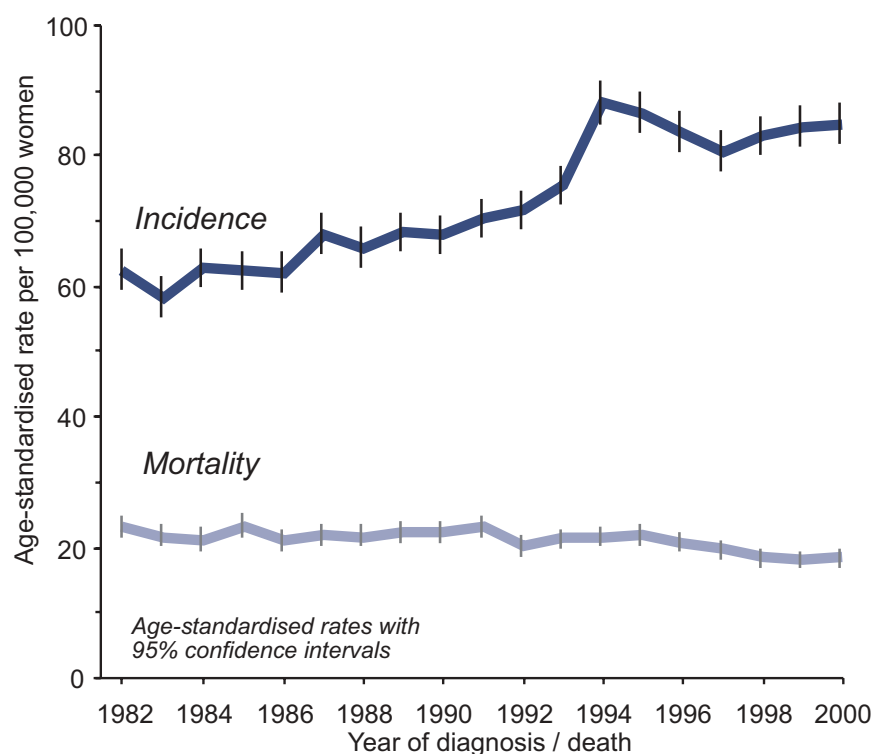
Figure 4 compares breast cancer mortality in Australia since 1950 with mortality due to lung cancer. Breast cancer mortality is beginning to decline (possibly as a result

of screening programs) while lung cancer mortality has increased steadily since the 1960s, as a result of smoking, and now appears to be reaching a plateau (similar to that seen in men). It seems likely that mortality rates for breast and lung cancer in Australian women will converge over the next decade.

Figure 5 shows age-specific breast cancer incidence and mortality trends in Victorian women from 1982 to 2000 by median year of birth. It can clearly be seen that incidence rates have risen steeply in women aged over 50 years, more gradually in women in their 40s and have remained stable in younger women. In contrast, mortality has fallen in all women aged over 45 years (except the very elderly) while remaining stable in younger women. The greatest increases in incidence have occurred in women in the BreastScreen target age group, 50–69 years. The corresponding reduction in mortality in women up to 10 years older is consistent with the time lag between diagnosis and death. This pattern of change is consistent with the effect of earlier detection through mammographic screening.

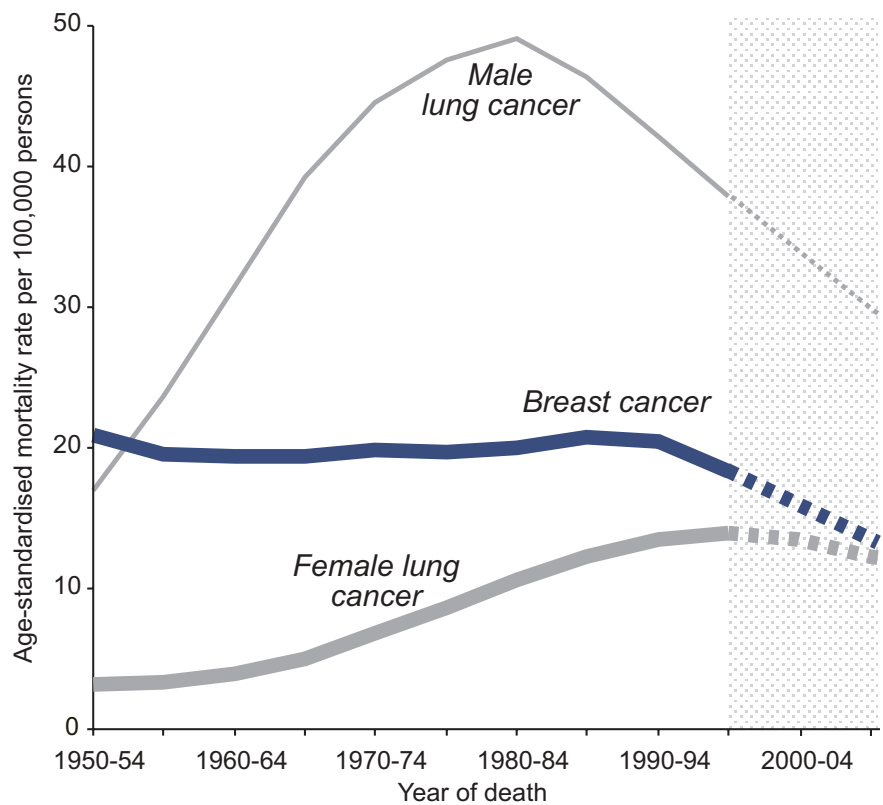
**Figure 3: Breast cancer incidence and mortality trends by sex**

Incidence and mortality trends for Victoria 1982–2000. The graph shows age-standardised rates per 100,000 women with 95% confidence intervals.



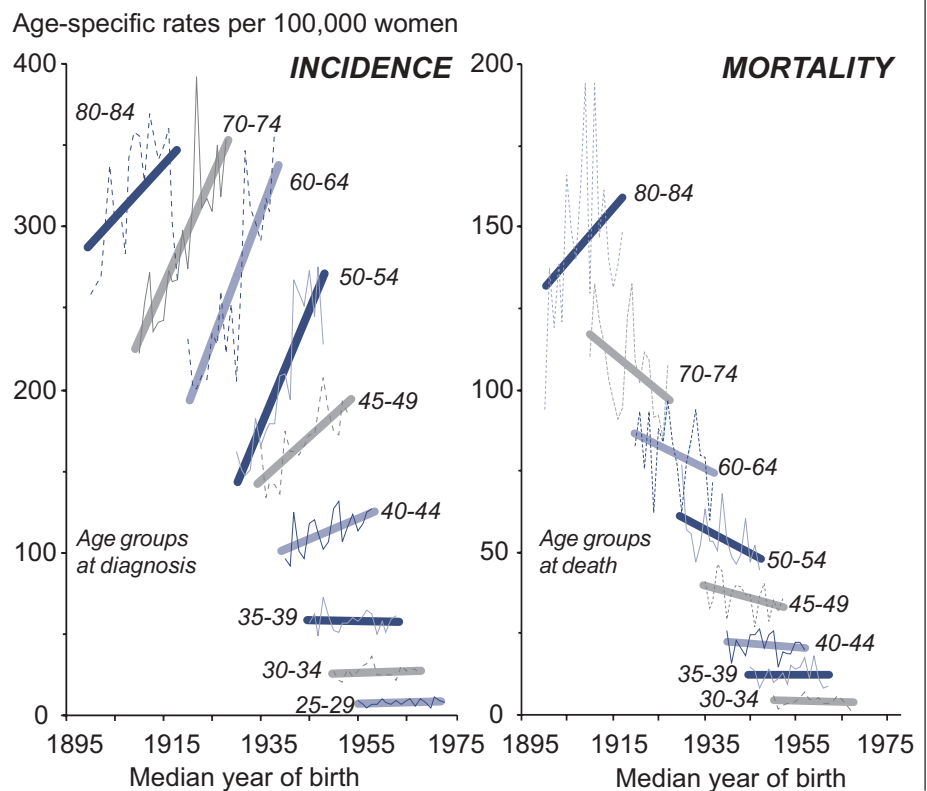
**Figure 4: Mortality trends for breast and lung cancer, 1950–99**

Australian mortality from cancer of the breast and lung from 1950 to 1999 with crude projections to 2009 based on current trends.



**Figure 5: Age-specific breast cancer incidence and mortality in Victorian women 1982–2000 by median year of birth**

Each curve, with fitted line of best fit, shows incidence (or mortality) trends in Victorian women in a specific age-group by their median year of birth.



Survival from breast cancer is good with 84% of women alive five years, and 68% of women alive 10 years, after diagnosis

# Survival

Survival analysis links individuals with their deaths and can be adjusted for other causes of death using population life-tables. This is termed “relative” survival and can be used in making comparisons of survival in different populations and between strata in the same population.

For Australian women diagnosed in the period 1992–7, relative survival one year after diagnosis was 96.4% and five years after diagnosis was 84.0%<sup>1,2</sup>. Survival after diagnosis of breast cancer in females is good when compared with other cancer sites. Five-year survival (%) in other leading cancer sites for women was—all cancer 63.4, colon 58.7, rectum 60.6, lung 14.0, melanoma 94.5, non-Hodgkin’s lymphoma 55.8, uterus 81.4 and ovary 42.0.

Australian five-year breast cancer survival rates in women diagnosed 1987–91 compared favourably with those seen in other developed countries during the same period. The highest survival rate was observed in the United States of America (85%) with the Australian rate of 79% comparable to Scandinavia (Finland and Iceland 79%, Denmark 71%) and better than the United Kingdom (England and Scotland 66%, Wales 64%).

Table 2 shows relative survival in Australian women diagnosed with breast cancer in 1992–7 by age group. There was

no clear relationship between breast cancer survival and age.

Figure 6 shows overall Australian breast cancer survival by five-year interval from 1982–97. There was a significant improvement in survival over this period with five-year relative survival increasing from 72% to 84%.

**Table 2: Breast cancer survival in Australian women**

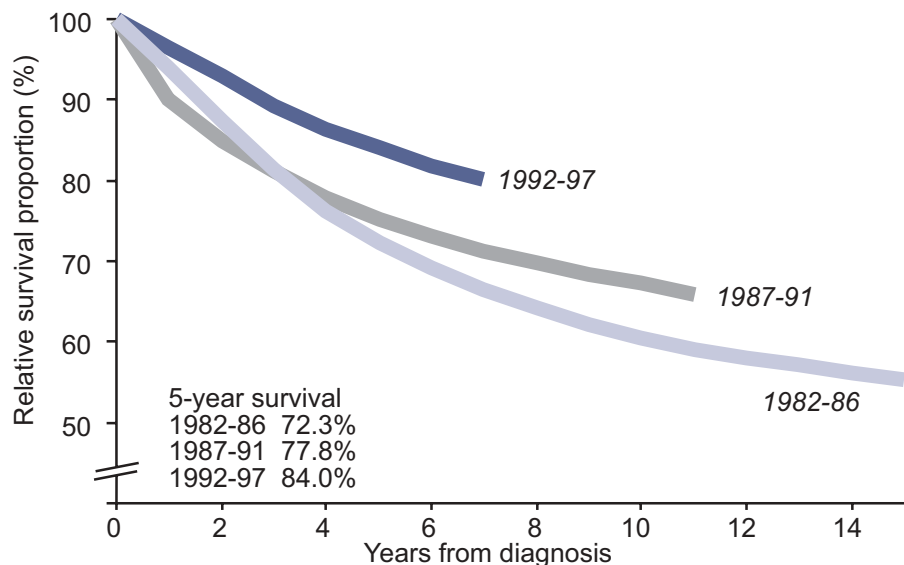
*New cases, deaths and five-year relative survival proportions by age group at diagnosis in Australian women diagnosed with breast cancer in 1992–7<sup>1,2</sup>.*

	Cases	Deaths	5YS(%)
All women	55,815	12,889	84.0
By age at diagnosis			
0-19	9	1	*
20-29	370	98	72.4
30-39	3,575	727	79.8
40-49	11,244	1,694	85.8
50-59	12,834	1,976	85.7
60-69	12,351	2,317	86.1
70-79	10,159	3,041	82.8
80-89	4,619	2,522	72.2
90+	654	513	64.7

**5YS = 5-year relative survival (%)**  
 \* result not presented because of statistical instability

**Figure 6: Survival from breast cancer in Australian women**

*Relative survival proportions in Australian women up to 15 years after diagnosis with breast cancer in 1982–86, 1987–91 and 1992–97<sup>1,2</sup>.*



# Comparisons

## Regional variation

Within Australia, Victoria had the highest age-standardised incidence and mortality rates of female breast cancer in the 1970s and early 1980s. In 1994–8 the situation was less marked though mortality remained relatively high<sup>3</sup> (Table 3). There are many reasons for variation between the states and territories including statistical errors, migration problems and enumeration problems related to poor linkage. Low incidence in the Northern Territory is explainable in terms of the high proportion of Aboriginal women who are at low risk of breast cancer.

**Table 3: Breast cancer (female) in Australia 1994–8**

Annual average new cases, deaths and age-standardised rates per 100,000 women (World Standard Population) for each state and territory, Australia 1994–8<sup>3</sup>.

	Incidence		Mortality	
	Number	Rate	Number	Rate
New South Wales	3,493	82.2	880	18.5
Victoria	2,604	82.6	718	20.4
Queensland	1,698	78.9	432	18.3
Western Australia	901	81.9	225	18.3
South Australia	886	82.5	242	19.2
Tasmania	254	78.3	65	17.3
Australian Capital Territory	147	85.6	40	23.1
Northern Territory	44	60.4	8	15.0

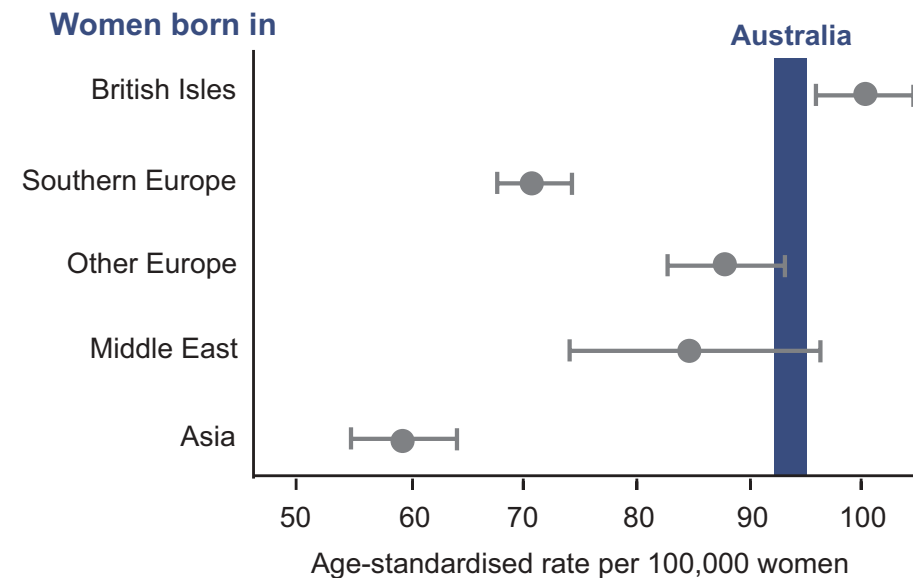
## Migrants to Australia

Clues in regard to the environmental causes of breast cancer are obtained from studying migrants. It has long been observed that migrants from low-risk populations who move to live among a high-risk population experience an increase in risk of cancer, including breast cancer. Classic studies have been conducted in Japanese migrants to Hawaii. In these migrants increases are observed in subsequent generations so that their rates closely approximate those of the host population. This pattern of increase provides fairly convincing evidence that breast cancer is at least partly due to differences in lifestyle rather than ethnic differences in genetic susceptibility.

Figure 7 illustrates the incidence of breast cancer in various migrant groups in Victoria compared to the breast cancer rate in the Australian born. The figure shows that women from the Middle East and Other Europe (countries of Northern and Eastern Europe) have rates which are very similar to those of women born in Australia. Women from Southern Europe (Mediterranean countries) and Asia have significantly reduced breast cancer rates and women from the British Isles have significantly higher rates than women born in Australia.

**Figure 7: Breast cancer incidence in Victoria by birthplace, 1993–9**

The graph of migrant rates displays age-standardised rates and their 95% confidence intervals as horizontal lines. The graph also contains a vertical band representing the 95% confidence interval of the rate in Australian-born women. Each migrant rate can be directly compared to the vertical band. If the migrant 95% confidence interval overlaps the Australian-born band, the rates do not differ significantly.



Australian breast cancer rates are similar to those observed in the UK, Canada and Sweden

# International comparisons

**B**reast cancer incidence varies widely from country to country. There is a thirty-fold variation of age-standardised rates reported in Globocan<sup>4</sup>. There is further variation within countries by ethnic group (page 7). White Americans have higher rates than most ethnic minorities with the exception of Hawaiians. Pacific populations, including New Zealand Maoris, have high breast cancer rates. When making comparisons between countries of a similar level of economic development, women in Australia have similar rates to those in Canada, Sweden and the United Kingdom (Figure 8).

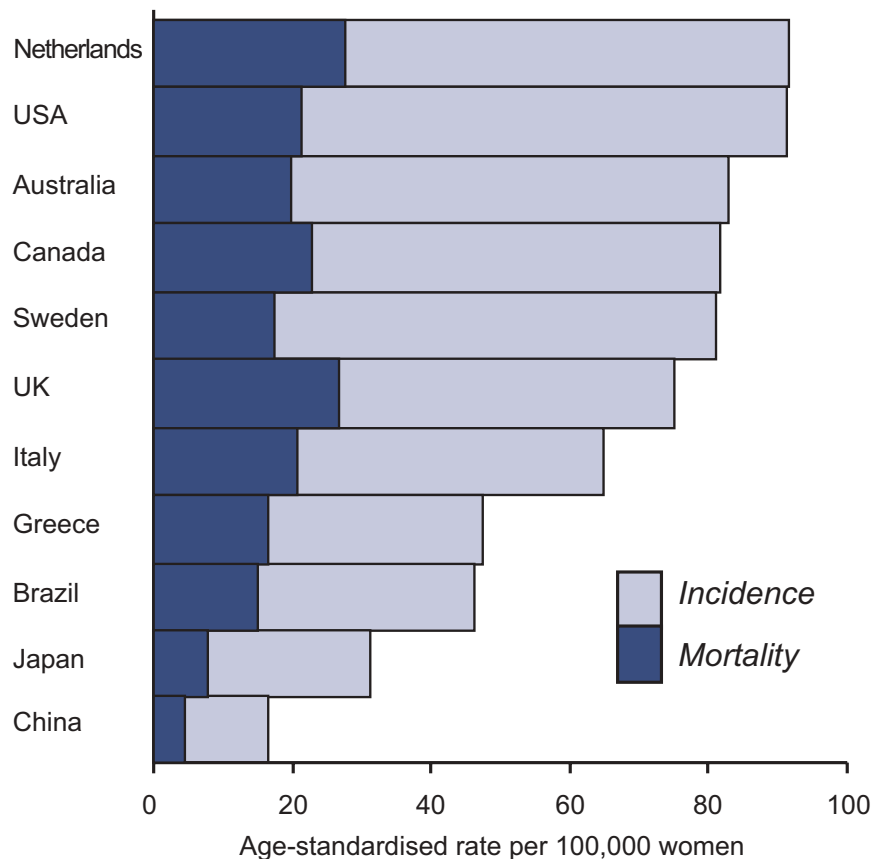
International and ethnic variation in breast cancer is most pronounced in cancers occurring after the menopause. Figure 9 illustrates the age incidence curves of breast cancer for countries selected from among those given in Figure 8. As can be seen, the curves prior to age 50

are close together and diverge in later life. Such international variation gives clues about the possible environmentally-related (and therefore preventable) fraction of breast cancer. It would appear that preventable breast cancer occurs largely after the menopause.

Figure 10 shows long-term mortality trends in breast cancer for selected countries. Recent downturns may show the effect of national mammographic screening programmes but also reflect improvements due to treatment with tamoxifen.

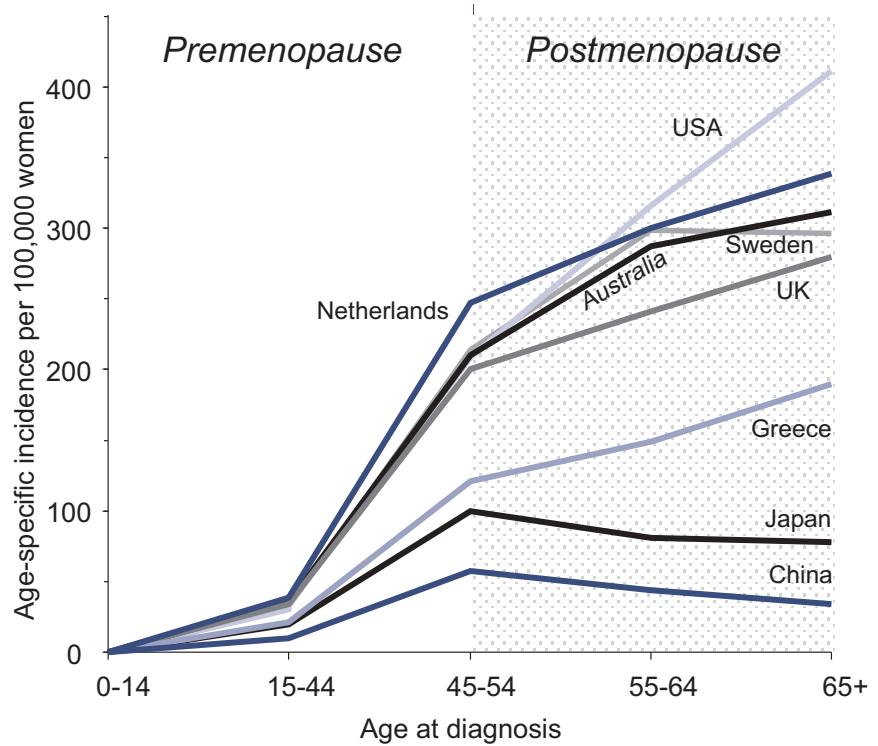
**Figure 8: International breast cancer incidence**

*Age-standardised incidence and mortality rates per 100,000 women for selected countries from Globocan<sup>4</sup>.*



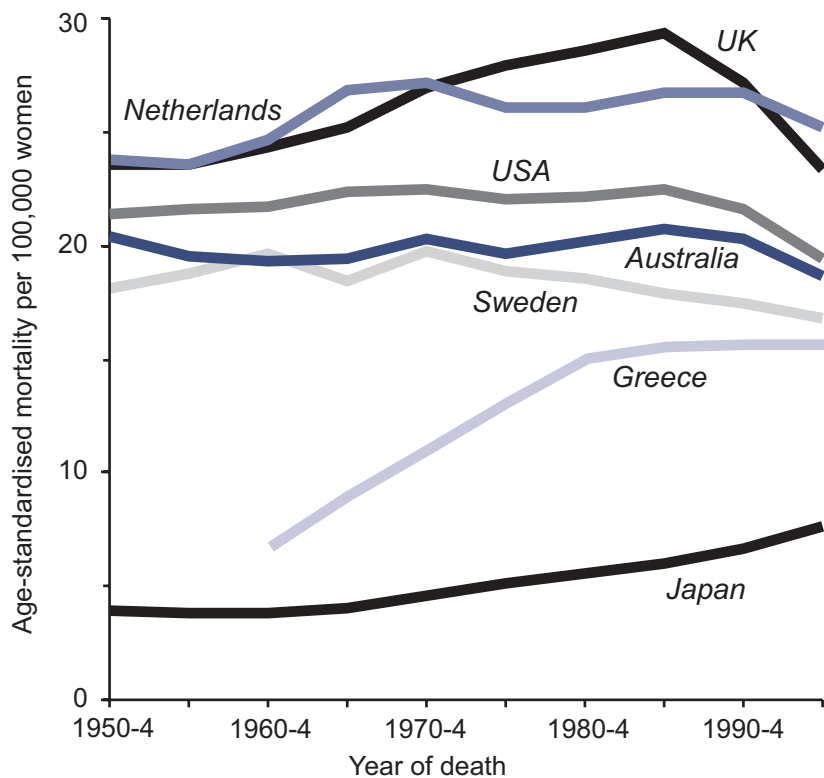
**Figure 9: Age-specific breast cancer incidence for selected countries**

Age-specific incidence rates per 100,000 women for selected countries, from Globocan<sup>4</sup>.



**Figure 10: International trends in breast cancer mortality**

Age-standardised mortality rates (five year averages) 1950–99 for selected countries from Cancer Mondial<sup>5</sup>.



BreastScreen offers free mammographic screening to all Australian women aged 50–69 every two years

# Mammography and BreastScreen

**M**ortality from breast cancer in Australia was stable for much of this century and currently there is no known means of prevention. The only possibility of control lies in gains from early detection.

BreastScreen Australia is a mammographic screening program for women without breast symptoms or breast problems. The program aims to detect breast cancer at an early stage of its development when treatment can be most effective and thereby to reduce associated mortality and morbidity. Free screening is recommended every two years for women aged 50–69 without breast symptoms, as this is when screening has been shown to be most effective. Women aged 40–49, or 70 and over, may also be screened if they wish. If a change from the usual x-ray appearance is found by screening, BreastScreen provides assessment by a multi-disciplinary team, up to the point of a definite diagnosis. If a breast cancer is found, it is followed up through the usual health care services and not within BreastScreen.

In 1992 BreastScreen Australia was established, jointly funded by the Commonwealth and state or territory governments with an annual budget of \$91 million. The service is locally delivered in each of the six states and two territories. The Victorian program, BreastScreen Victoria, includes eight assessment and 40 screening centres, one mobile and one relocatable unit which together screen about 160,000 women each year<sup>6</sup>.

The National Accreditation Standards provide the basis for monitoring the performance of services and the program on a State and Territory and national level. These standards are:

- **Participation rates:** At least 60% participation by all women aged 50–69 and rates amongst women from non-English-speaking backgrounds of at least half the population rate.
- **Cancer detection rate:** more than five cancers per 1,000 screens at prevalent and at least two cancers per 1,000 screens at incident rounds.

- **Small cancer detection rate:** more than 0.8 cancers per 1,000 screened will be less than or equal to 10 mm.
- **In situ carcinoma:** 10–20% of cancers will be ductal carcinoma in situ.
- **Interval cancers:** Twelve-month interval cancer rate will be less than six per 10,000 women.

BreastScreen Victoria's most recent report<sup>7</sup> shows that three of these standards have been achieved with, in Victoria in 2000,

- **Participation rate:** Participation by women aged 50–69 was 59% and by women from non-English-speaking backgrounds was 61%.
- **Cancer detection rate:** 6.4 cancers were detected per 1,000 screens at prevalent and 5.5 cancers per 1,000 screens at incident rounds.
- **Small cancer detection rate:** The small cancer detection rates were 1.4 and 1.8 per 10,000 screens at incident and prevalent rounds respectively.
- **In situ carcinoma:** 18% of cancers detected were ductal carcinoma in situ (23% at first and 18% at prevalent rounds).
- **Interval cancers:** Twelve-month interval cancer rates were 7.2 per 10,000 women and 7.8 per 10,000 women aged 50–69 years.

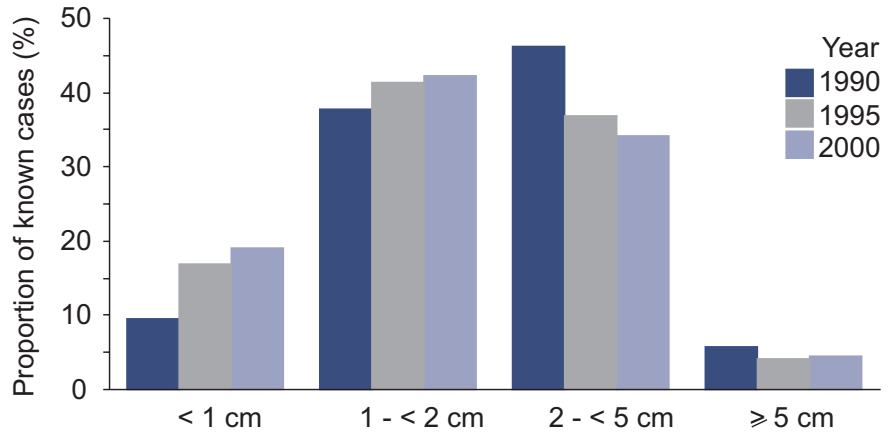
Figure 11 shows trends in tumour size with increasing proportions of smaller breast tumours, which are more amenable to treatment. The proportion of small tumours (<1 cm diameter) has increased from 10 to 19% during the first decade of screening.

The effect of mammographic screening on rates of in situ carcinoma of the breast is shown in Figure 12.

Figure 13 shows diagnoses by age group in Victorian women. The graph shows the relative numbers of breast cancers diagnosed by screening and other methods. Over half (56%) of cancers diagnosed in women in the BreastScreen target age group, 50–69, were detected by screening, and of these, 15% were in situ carcinoma and 27% were small tumours (<1 cm diameter).

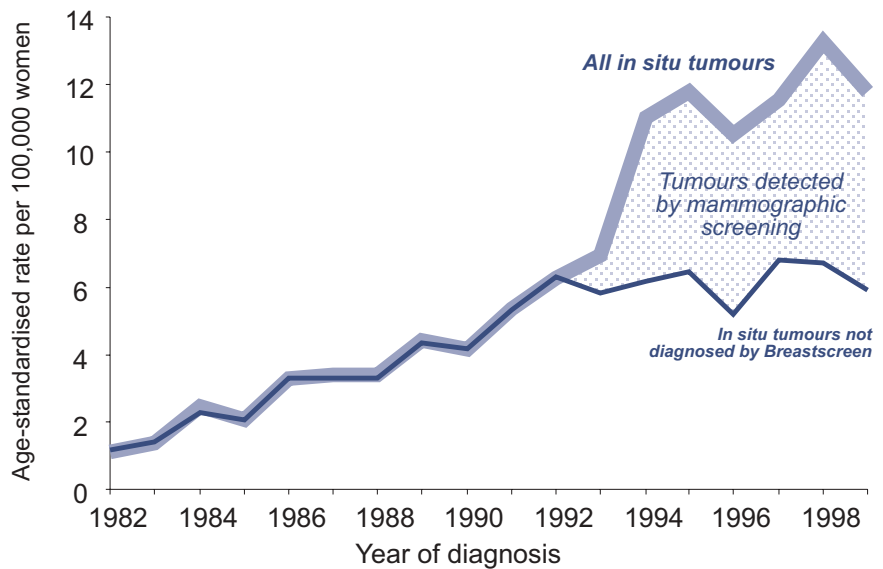
**Figure 11: Trends in tumour size, 1990–2000**

Diameter of breast cancers diagnosed in Victoria in 1990, 1995 and 2000. The bars show the proportion of tumours of known size for each year. Note that the proportion of tumours of unknown size fell from 39% in 1990 to 15% in 2000 due to improved reporting to the Victorian Cancer Registry.



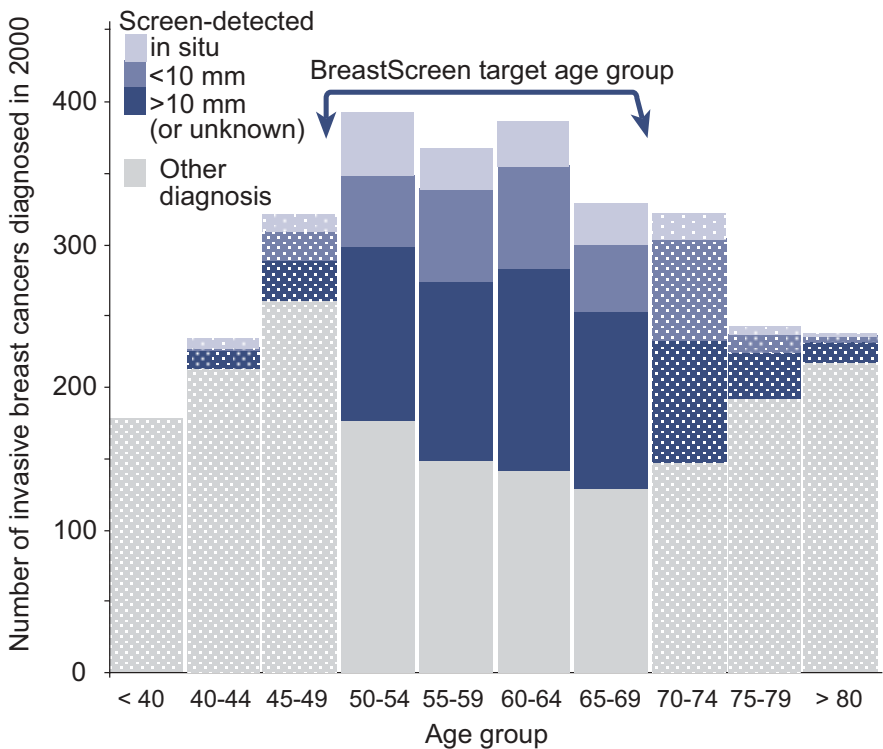
**Figure 12 Trends in the incidence of in situ breast cancer, Victoria 1982–2000**

The graph shows the effect of the BreastScreen mammographic screening program.



**Figure 13: Breast cancer incidence showing proportion of screen-detected tumours**

Victorian breast cancer incidence 1998 showing the proportions of small (<10 mm) and larger screen-detected tumours by age group.



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# Canstat



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The Cancer Council Victoria's  
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Name .....

Position held .....

Address .....

..... Postcode ...

Return to: Suzi Neumann

Cancer Epidemiology Centre

The Cancer Council Victoria

1 Rathdowne Street

Carlton Victoria 3053

Australia

Tel: (03) 9635 5154

Fax: (03) 9635 5330

Email: [Suzi.Neumann@cancervic.org.au](mailto:Suzi.Neumann@cancervic.org.au)