

Introduction

With the exception of non-melanocytic skin cancer, breast cancer is the most commonly diagnosed cancer in women in Australia. It is also the most common cause of death from cancer in women in Australia; in 1996 it resulted in approximately 31,000 woman-years of life lost before the age of 75 years.

The major risk factors for breast cancer are age (breast cancer rates typically increase with age from the third decade), family history of the disease, long duration of menstrual life, body size, late first birth, and low parity (Kricker & Jelfs 1996). Studies have shown that the risk of breast cancer is reduced by increased exercise (Friedenreich & Rohan 1995). There is no known means of preventing the disease, although early detection allows for intervention that may prevent deaths due to breast cancer. The principal means of detecting breast cancers early is mammography in an organised screening program.

Since the introduction of mammographic screening in Australia, both in the organised national program (BreastScreen Australia) and more widely in the community, the non-invasive form of breast cancer (in-situ breast cancer) has been increasingly diagnosed (State and Territory cancer registries, pers. comm., 1999). These cancers have not been uniformly notified to cancer registries and are not reported here.

This report updates *Breast Cancer in Australian Women 1921–1994* (Kricker & Jelfs 1996). The first report was based on cases of invasive breast cancer in women recorded by State and Territory cancer registries between 1982 and 1992 and on national statistics on deaths from breast cancer recorded between 1921 and 1994. It detailed the numbers of new cases of and deaths due to breast cancer, the changing patterns of incidence and mortality over time, variations between the States and Territories, and the risks to selected population groups. This current report updates the information on breast cancer incidence and mortality to 1996.

It is available on the Institute's web site (www.aihw.gov.au) and on the National Breast Cancer Centre's web site (www.nbcc.org.au).

Guide to this report

The information in this report is presented as graphs and tables with some descriptive text. Data on incidence and mortality and variations in these measures are presented side by side for ease of comparison. Tables A1 to A13 (Appendix 2) provide summaries of numbers of new cases and deaths and incidence and mortality rates.

Data sources and quality

Incidence

This report is based on the most recent data, published and unpublished from the National Cancer Statistics Clearing House. The Australasian Association of Cancer Registries, formed in November 1992, and the National Cancer Statistics Clearing House cooperate through the Australian Institute of Health and Welfare to compile, analyse and disseminate national statistics on cancer. While most cancer data are collected and coded in similar ways by State and Territory cancer registries, there are some differences in registration processes because the information comes from diverse sources, among them local hospitals, pathology laboratories, radiotherapy departments and private medical practitioners.

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 other evidence. Cancer registries report the percentage of cases with histopathological verification as a measure of data quality. For Australian registries, between 88% and 97% of breast cancers were reported to be histopathologically verified between 1988 and 1992 (Parkin et al. 1997).

For a small number of cases, registrations are based on death certificates only. The percentage of these cases is also used as an indicator of data quality in cancer registration. Breast cancer cases registered from a death certificate only accounted for 3% or less of breast cancer cases in Australian registries between 1988 and 1992 (Parkin et al. 1997).

Mortality

The primary sources of information about deaths from breast cancer are the State and Territory Registrars of Births, Deaths and Marriages. The Australian Bureau of Statistics is a secondary source and is responsible for coding cause of death. Variations have occurred over time in the collecting and coding of causes of death. The mortality data in this report (1982 to 1996) are analysed based on the year in which they occurred regardless of when they were registered. Further, the number of deaths in each State and Territory is based on the deceased's State or Territory of usual residence not where the death was registered.

New cases of and deaths from all cancers

The National Cancer Statistics Clearing House receives from individual State and Territory cancer registries data on cancers diagnosed in residents of Australia and compiles these data into a national database. This began with cases first diagnosed in 1982. National incidence data for breast cancer are available to 1996 because the cancer registries have been devoting more resources to breast cancer. National incidence data for all other cancers are available only to 1995. The most commonly diagnosed cancers and the leading causes of death from cancer in Australian women of all ages in 1995 are presented in pie charts and tables for comparison. The rankings are based on the absolute numbers of new cases and deaths, and the cancer sites are classified according to the ninth revision of the International Classification of Diseases (WHO 1977).

In this report the term 'cancer site' is used to represent cancers located in specific organs or tissues as well as cancers such as leukaemia and lymphoma.

Breast cancer incidence and mortality

The report presents data for women throughout Australia. The total numbers of new cases of and deaths from breast cancer are described for the period from 1982 to 1996. Age-standardised and age-specific incidence and mortality rates are also presented and attention is drawn to any important trends.

Mortality rates were estimated for deaths from breast cancer in women resident in each State and Territory from 1982 to 1996. These deaths were notified to the State and Territory Registrars of Births, Deaths and Marriages, and breast cancer was determined as the underlying cause by the Australian Bureau of Statistics. Women with breast cancer who died of other causes are not counted in these death statistics.

This report only provides information about breast cancer in women in Australia. Men do get breast cancer but the numbers of new cases and deaths are small: in 1995, there were 57 new cases of breast cancer diagnosed in men and 23 deaths from breast cancer in men.

Population data

Rates were calculated using estimated resident populations for Australia as a whole and the States and Territories, as published by the Australian Bureau of Statistics. Population estimates for urban and rural areas were derived from population data at the Statistical Local Area level.

Methods

Age-specific rates

Age-specific rates have been calculated for women in the Australian population in 5-year age groups (0-4, 5-9, ..., 80-84, 85+ years) by dividing the number of cases occurring in each age group by the number of women in that age group and expressing the result as a rate per 100,000 woman-years.

Age-standardised rates

Age-standardised rates are summary rates calculated to facilitate comparison between populations with different age structures. This report uses the direct standardisation method (Day 1992), which involves applying the age-specific rates in 5-year age groups for a particular year or period to a standard population to calculate a weighted average of age-specific rates. The age-standardised rates reflect the incidence and mortality that would have been expected if the populations of each area or period being compared had an identical age structure.

Standard populations

The age structure of the standard population can influence conclusions drawn from age-adjusted rates. The World Standard Population is frequently used for international comparisons; it was used to age-standardise rates in *Breast Cancer in Australian Women 1921–1994*.

In November 1995 the National Health Information Management Group, which manages the National Health Information Agreement*, agreed to accept the total estimated resident population of Australia at 30 June 1991 (hereafter referred to as the Australian 1991 Population Standard) as the population standard for comparing Australian rates over time. Accordingly the Australian Institute of Health and Welfare and the Australian Bureau of Statistics agreed to adopt the Australian 1991 Population Standard as the national standard until population estimates for 2001 become available.

To maintain consistency with *Breast Cancer in Australian Women 1921–1994*, other national and international reports and State and Territory cancer registry reports, most of the tables in this report include two rates that have been age-standardised separately to the World Standard Population and the Australian 1991 Population Standard (see Table A14 in Appendix 2). In these tables, rates age-standardised to the Australian 1991 Population Standard are labelled 'AS Rate (Aust 1991)', while those age-standardised to the World Standard Population are labelled 'AS Rate (World)'. Where age-standardised rates are referred to in the text or presented graphically, however, only rates age-standardised to the Australian 1991 Population Standard are provided.

Confidence intervals

A confidence interval gives an indication of how precisely the calculated rate estimates the true population value. Its calculation uses the standard error of the age-standardised rate. A 95% confidence interval indicates that the true population value is 95% likely to lie within the interval given. The 95% confidence intervals for age-standardised rates in this report were calculated using the Poisson method (Jensen et al. 1991).

* In May 1993 Commonwealth, State and Territory health authorities, the Australian Bureau of Statistics, and the Australian Institute of Health and Welfare signed an agreement to improve the quality of and cooperation in the development of national health information. This agreement, the National Health Information Agreement (NHIA), was developed under the auspices of the Australian Health Ministers' Advisory Council (AHMAC), which has continued to support the Agreement's development and operation.

Lifetime risk

'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 will develop the particular cancer in an average 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). Cumulative risks can also be calculated for narrower age bands.

The method makes two assumptions:

- that the prevailing patterns of cancer risk for each age group at the time of estimation apply throughout the woman's lifetime;
- that each woman survives to her 75th birthday.

Person-years of life lost

Person-years of life lost (PYLL) measures the number of years of life lost each year as a result of death from a specific cause (e.g. breast cancer). Age groups from 0–4 to 70–74 were used for the calculations in this report, because deaths before age 75 are generally regarded as premature. PYLL is calculated by aggregating the number of years between age at death and 75 for each person; thus a person dying at age 50 contributes 25 years to the PYLL measure. It should be noted that the choice of 74 years as the cut-off age is arbitrary. Further, PYLL can also be calculated by other methods such as using a life table approach. As this report only deals with breast cancer in women, PYLL may also be interpreted as woman-years of life lost.

Time periods

In certain instances data have been combined into three 5-year periods, 1982–1986, 1987–1991 and 1992–1996, to give adequate numbers for summary presentation and to examine changes over time.

Time trends

The annual percentage changes in incidence and mortality reported in the text were calculated as the geometric mean of the rates in the first and last period (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).

Urban and rural classification

The Rural, Remote and Metropolitan Areas (RRMA) classification (Department of Primary Industries and Energy & Department of Human Services and Health 1994) was used to compile breast cancer incidence data by urban and rural areas of usual residence. The RRMA classification classifies Statistical Local Areas in each State and Territory into three groups – metropolitan areas, rural zones and remote zones – using information from the 1991 Census. Metropolitan areas are allocated according to total population. Rural and remote zones are allocated according to their index of remoteness, which is based on population density and distance from large population centres.

Electronic files converting postcodes and Statistical Local Areas to the RRMA classification were used to classify breast cancer cases diagnosed between 1987 and 1996 and breast cancer deaths occurring in the same period to either

- an urban area of usual residence (i.e. a RRMA metropolitan area); or
- a rural area of usual residence (i.e. a RRMA rural or remote zone).

It was possible to classify all breast cancer deaths to an urban, rural or remote area of usual residence, although about 1% of breast cancer cases could not be classified and these were excluded from the analysis.

Appendixes

Appendixes 1 and 2 present lists of tables and figures, tables of breast cancer incidence and mortality, and the Australian 1991 and World Standard populations.

Most common cancers in women in Australia

Figure 1 and Table 1 show the most common sites of cancer, excluding non-melanocytic skin cancers (NMSC), diagnosed in women in Australia in 1995.

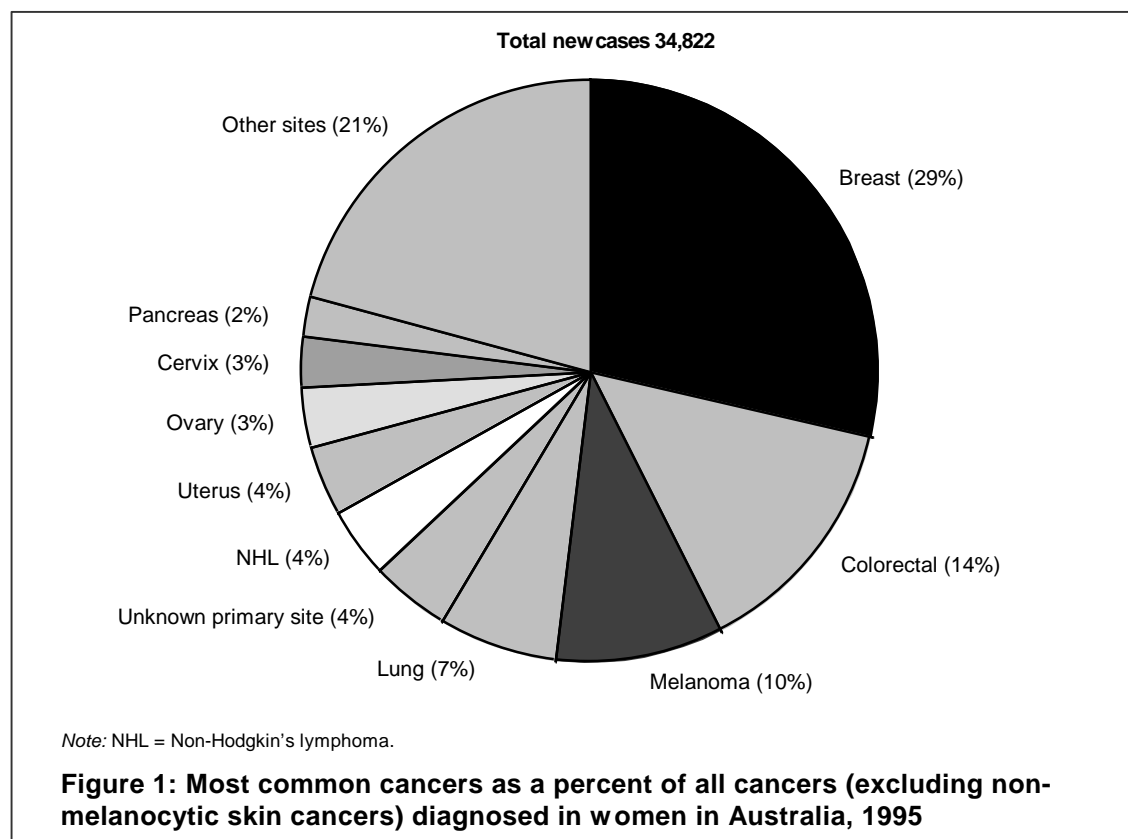


Table 1: Most common cancers diagnosed in women in Australia, 1995^(c)

Type of cancer	New cases				
	Number	Per cent of all new cancer cases	AS Rate ^(a) (Aust 1991)	AS Rate ^(a) (World)	Lifetime risk ^(b)
All cancers ^(c)	34,822	100.0	345.7	268.4	1 in 4
Breast	9,951	28.6	101.1	82.9	1 in 11
Colorectal	4,826	13.9	46.1	32.8	1 in 26
Melanoma	3,317	9.5	34.4	28.4	1 in 36
Lung	2,311	6.6	22.7	16.7	1 in 48
Unknown primary site	1,511	4.3	14.1	9.7	1 in 95
Non-Hodgkin's lymphoma	1,372	3.9	13.4	10.2	1 in 89
Uterus	1,356	3.9	13.6	10.7	1 in 76
Ovary	1,153	3.3	11.6	9.2	1 in 99
Cervix	947	2.7	9.9	8.1	1 in 122
Pancreas	789	2.3	7.2	4.7	1 in 192

(a) Age-standardised rates are expressed per 100,000 woman-years and are age-standardised to the Australian 1991 Population Standard (AS Rate (Aust 1991)) and the World Standard Population (AS Rate (World)). See 'Methods' pages 3 and 4.

(b) Calculated for ages 0–74 years.

(c) Excludes non-melanocytic skin cancers.

Deaths from common cancers in women in Australia

Figure 2 and Table 2 show the most common causes of death from cancer in women in Australia in 1995.

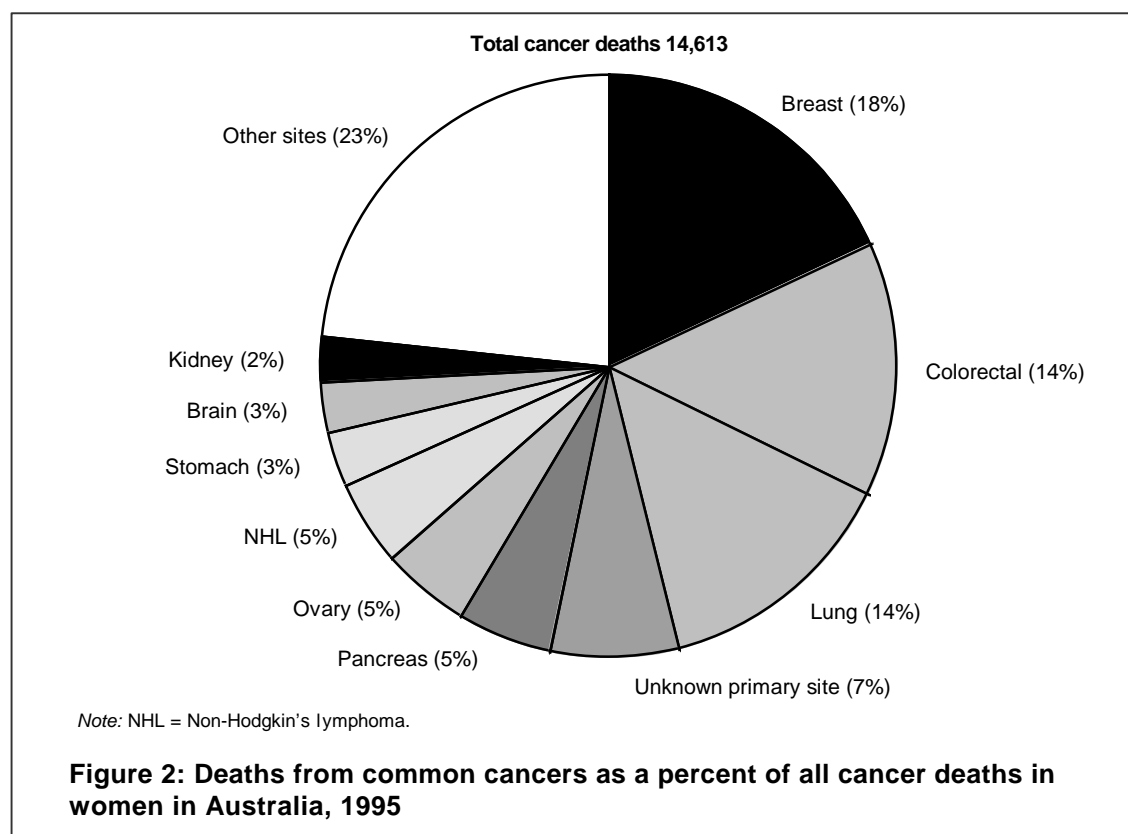


Table 2: Most common causes of death from cancer in women in Australia, 1995

Type of cancer	Deaths				
	Number	Per cent of all cancer deaths	AS Rate ^(a) (Aust 1991)	AS Rate ^(a) (World)	PYLL ^(b)
All cancers	14,613	100.0	138.1	97.8	118,508
Breast	2,634	18.0	25.6	19.6	31,273
Colorectal	2,090	14.3	19.3	13.1	13,020
Lung	1,998	13.7	19.3	13.7	13,968
Unknown primary site	1,084	7.4	9.8	6.5	5,518
Pancreas	757	5.2	6.9	4.5	7,638
Ovary	724	5.0	7.0	5.2	3,375
Non-Hodgkin's lymphoma	700	4.8	6.6	4.5	4,505
Stomach	458	3.1	4.2	2.7	5,135
Brain	399	2.7	4.1	3.3	3,565
Kidney	353	2.4	3.3	2.2	1,478

(a) Age-standardised rates are expressed per 100,000 woman-years and are age-standardised to the Australian 1991 Population Standard (AS Rate (Aust 1991)) and the World Standard Population (AS Rate (World)). See 'Methods' pages 3 and 4.

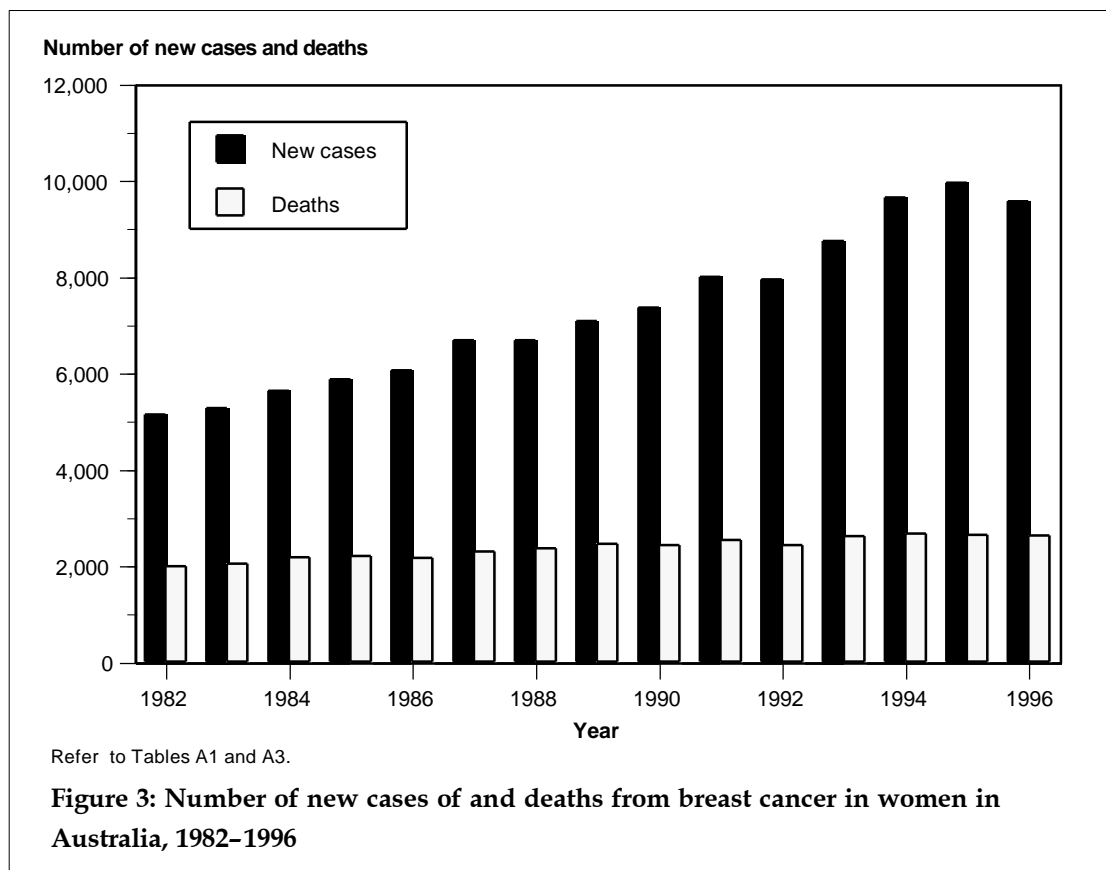
(b) PYLL refers to person-years of life lost and is calculated for ages 0–74 years.

New cases of breast cancer and deaths from breast cancer

Between 1982 and 1996 there were 109,584 new cases of breast cancer diagnosed in women in Australia (Figure 3). The average number of new cases per year in the last five years of the period (1992–1996) was greater (9,166 cases) than in 1982–1986 (5,593 cases). Numbers of new cases of breast cancer generally rose steadily until 1995, then fell in 1996.

In 1982–1996 approximately 28% of women with breast cancer were aged under 50 years, 44% were aged between 50 and 69 years, and 28% were aged 70 years and over (Table A2).

There were 35,569 deaths from breast cancer in women in Australia between 1982 and 1996. The number of deaths increased from 1,987 to 2,669 between 1982 and 1994. In 1995, however, there was a fall in the number of deaths (from 2,669 to 2,634); this was followed by a further fall in 1996 (2,623 deaths). On average, there were 2,111 deaths from breast cancer each year in 1982–1986, 2,410 deaths in 1987–1991, and 2,593 deaths in 1992–1996.



Risk of breast cancer by age

The risk of developing and dying from breast cancer increases with age (Table 3). Between 1992 and 1996 women aged less than 30 years had a 1 in 2,298 risk of developing breast cancer and those aged 30–39 years had a risk of 1 in 244. In contrast, women aged 70–79 years had a risk of 1 in 33. In the same period, the risk of death from breast cancer was 1 in 1,317 for women aged 30–39 years and 1 in 93 for women aged 70–79 years.

In nearly every age group the risk of developing breast cancer in 1992–1996 was greater than it was in either 1987–1991 or 1982–1986 (Table 3). In contrast, the risk of death in 1992–1996 was lower in each age group than it was in the earlier two periods.

Table 3: Risk^(a) of breast cancer incidence and risk of death from breast cancer women in Australia, by age, 1982–1986, 1987–1991 and 1992–1996

Age group	Incidence			Death		
	1982–1986	1987–1991	1992–1996	1982–1986	1987–1991	1992–1996
0–29	1 in 2,608	1 in 2,487	1 in 2,298	1 in 17,851	1 in 15,769	1 in 27,517
30–39	1 in 261	1 in 243	1 in 244	1 in 1,219	1 in 1,293	1 in 1,317
40–49	1 in 83	1 in 73	1 in 67	1 in 344	1 in 340	1 in 366
50–59	1 in 63	1 in 53	1 in 41	1 in 167	1 in 165	1 in 176
60–69	1 in 50	1 in 42	1 in 35	1 in 122	1 in 121	1 in 126
70–79	1 in 41	1 in 37	1 in 33	1 in 95	1 in 91	1 in 93
0–74	1 in 16	1 in 14	1 in 12	1 in 44	1 in 44	1 in 46

(a) In this table 'risk' is the probability of developing breast cancer or dying from breast cancer 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.