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BreastScreen Australia monitoring report 2008–2009

**Australian Institute of Health and Welfare and
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for BreastScreen Australia**

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Contents

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Abbreviations

ABS	Australian Bureau of Statistics
ACD	Australian Cancer Database
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
ASGC	Australian Standard Geographic Classification
CI	confidence interval
DCIS	ductal carcinoma in situ
DoHA	Australian Government Department of Health and Ageing
NAS	National Accreditation Standard/s
NBOCC	National Breast and Ovarian Cancer Centre
NQMC	National Quality Management Committee
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
RA	remoteness area
SA	South Australia
Tas	Tasmania
Vic	Victoria
WA	Western Australia
WHO	World Health Organization

Symbols

–	nil or rounded to zero
. .	not applicable
≤	less than or equal to
<	less than
>	greater than
n.a.	not available
n.p.	not published

Summary

BreastScreen Australia aims to reduce illness and death resulting from breast cancer in Australia. This is achieved through organised screening to detect cases of unsuspected breast cancer in women, enabling intervention at an early stage.

BreastScreen Australia operates as a joint program of the Australian and state and territory governments, targeting women aged 50–69 for 2-yearly screening mammograms (although women aged 40 and above are eligible to attend).

The following statistics refer to the latest data available for women in the target age group, 50–69.

How many women were diagnosed with, or died from, breast cancer?

In 2007, there were 6,297 new cases of breast cancer and 1,085 deaths. This is equivalent to 274 new cases and 47 deaths per 100,000 women.

In line with BreastScreen Australia's aim to reduce death resulting from breast cancer, mortality has decreased since the program was introduced in 1991.

Despite breast cancer incidence being lower in Aboriginal and Torres Strait Islander women (171 new cases per 100,000 women compared with the non-Indigenous rate of 259) for 2003–2007, mortality from breast cancer did not differ between Aboriginal and Torres Strait Islander women and non-Indigenous women in the same period.

How many women participated in BreastScreen Australia?

More than 1.3 million women had a screening mammogram through BreastScreen Australia in 2008 and 2009. This was 55% of women in the target age group.

BreastScreen Australia provided equitable access to women across remoteness areas, with only 6 percentage points separating participation in *Major cities* and *Very remote* locations in 2008 and 2009.

The difference between Aboriginal and Torres Strait Islander and non-Indigenous women was greater — 37% of Aboriginal and Torres Strait Islander women had a screening mammogram in 2008 and 2009, compared with 55% of non-Indigenous women.

How many women were recalled for further investigation?

In 2009, 11% of women screened for the first time were recalled for further investigation, whereas for women attending subsequent screens, 4% were recalled.

How many women had a breast cancer detected?

In 2009, for every 10,000 women screened for the first time, 80 had an invasive breast cancer detected, whereas for every 10,000 women attending subsequent screens, 45 had an invasive breast cancer detected.

Small breast cancers (≤15mm in diameter) are associated with better treatment options and improved survival. A high proportion of breast cancers detected through BreastScreen Australia in 2009 were small — half (51%) of breast cancers detected in women at their first screen, and nearly two-thirds (65%) of those in women attending subsequent screens.

Data at a glance

The following table provides a comparison of national data for BreastScreen Australia against key performance indicators for women in the target age group, 50–69. Summary statistics for the latest reporting period are compared with those from the previous reporting period. These data are also compared against the relevant BreastScreen Australia National Accreditation Standards (NAS), which provide a benchmark for the performance indicator.

Definitions for the performance indicators are provided in the relevant chapters of Section 2.

Summary table: Key performance indicators for BreastScreen Australia, women aged 50–69, previous and latest data

Performance Indicator	NAS	Previous data		Latest data	
		Reporting period	Statistic	Reporting period	Statistic
Participation	>70%	2006–2007	56.1%	2008–2009	55.2 %
Rescreening					
After first screening round	>75%	2006	49.9%	2007	55.9%
After second screening round	>90%	2006	58.5%	2007	62.6%
After third and subsequent screening rounds	>90%	2006	73.5%	2007	76.1%
Recall to assessment					
First screening round	<10%	2008	9.9%	2009	10.7%
Subsequent screening rounds	<5%	2008	4.1%	2009	4.2%
Invasive breast cancer detection					
After first screening round	>50	2008	75.5	2009	79.5
After second screening round	>35	2008	47.8	2009	45.4
Small size cancer detection	>25	2008	31.4	2009	30.5
Ductal carcinoma in situ detection					
After first screening round	≥12	2008	15.6	2009	19.6
After second screening round	≥7	2008	11.5	2009	11.7
Invasive breast cancer incidence	. .	2006	288.1	2007	274.3
Mortality	. .	2006	47.4	2007	47.0

National Accreditation Standards (NAS) were developed by the National Quality Management Committee (NQMC) and represent minimum standards that have been set to represent an individual BreastScreen service's ability to meet the aims and objectives of BreastScreen Australia. NAS are used as a guide to interpretation only, since this is a different purpose to that for which these standards were developed, and differences in definitions or data may exist.

Notes:

1. All rates are age-standardised and for women aged 50–69.
2. Participation is the per cent of eligible women in the population.
3. Rescreening is the per cent of women who rescreen within 27 months.
4. Recall to assessment is the per cent of women screened who are recalled for further investigation.
5. Invasive breast cancer detection and DCIS detection is the number of women diagnosed per 10,000 women screened.
6. Invasive breast cancer incidence is the number of new cases per 100,000 women; mortality is the number of deaths per 100,000 women.

Section 1 Introductory material

Structure of this report

This report provides the most up-to-date national data available for BreastScreen Australia.

The first section presents an overview of the natural history and burden of breast cancer in Australia. It also provides background on BreastScreen Australia, including how and why women are screened for breast cancer, as well as the structure and management of this program. This section also outlines the performance indicators used to monitor BreastScreen Australia, and provides a brief overview of technical issues that should be considered when interpreting data in this report.

The second section presents the latest national data for BreastScreen Australia against the program's performance indicators. The start of each chapter provides a summary of the relevant performance indicator that includes the definition and rationale of each indicator, followed by key results to provide readers with an indication of the main findings. More detailed analyses, as well as background information where appropriate, follow this summary material.

More detailed data than those shown in this report are available in the *BreastScreen Australia monitoring report 2008–2009: supplementary data tables*.

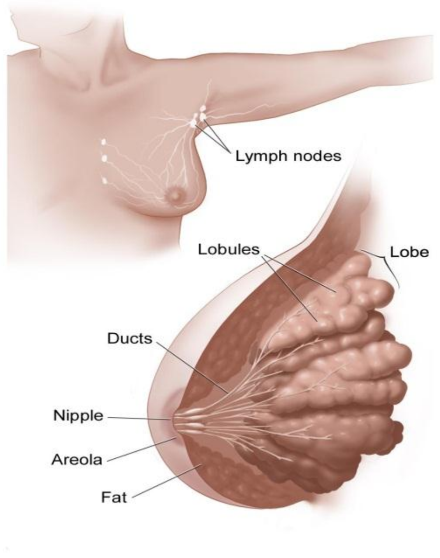
Overview of breast cancer and breast cancer screening

What is breast cancer?

Breast cancer occurs when abnormal cells grow and multiply out of control. Breast cancer most commonly originates in the ducts of the breast (which carry milk from the lobules to the nipple) but can also originate in the lobules (small lobes of the breast that produce milk), and can be classified as either non-invasive or invasive.

Breast cancer that remains confined within the ducts or lobules is called non-invasive breast cancer, or carcinoma in situ. There are two types of non-invasive breast cancer: the most common type, ductal carcinoma in situ (DCIS), is confined to the ducts of the breast, while lobular carcinoma in situ is confined to the lobules.

Invasive breast cancer occurs when the cancer cells spread beyond the lobules or ducts and invade surrounding breast tissue.



Source: Reproduced with permission from the National Cancer Institute.

Illustration S1.1: Anatomy: the breast and adjacent lymph nodes

How common is breast cancer in Australia?

Breast cancer is the most common cancer affecting Australian women (excluding basal and squamous cell carcinoma of the skin). In 2007, 12,567 new cases were diagnosed (109 cases per 100,000 women). It is also the second most common cause of cancer mortality in Australian women behind lung cancer, with 2,680 deaths (22 deaths per 100,000 women) in 2007 (AIHW & AACR 2010).

Breast cancer incidence is significantly lower in Aboriginal and Torres Strait Islander women. Despite this difference, mortality does not differ significantly between Aboriginal and Torres Strait Islander and non-Indigenous women ((AIHW & AACR 2010) and Indicators 7 and 8 in Section 2 of this report).

Terminology

Incidence: the number of new cases of breast cancer diagnosed per 100,000 women in a year

Morbidity*:* illness

Mortality: the number of deaths from breast cancer per 100,000 women in a year

What causes breast cancer?

Many risk factors, both established and probable, have been identified for breast cancer in women. The greatest risk factor is age, with most breast cancers occurring in women over the age of 50. A family history of breast cancer can also increase a woman's risk, although most women who develop breast cancer do not have a family history of the disease. Other factors that may increase a woman's risk of developing breast cancer include not having carried or given birth to any children, late age at birth of first child, early menstruation and late menopause. Oral contraception use can cause a small increase in the risk of breast cancer, as can hormone replacement therapy, which causes an increase in risk consistent with late menopause (McPherson et al. 2000).

Family history of breast cancer

Women are considered to have about twice the risk of breast cancer if they have a first-degree relative (mother, sister or daughter) diagnosed with breast cancer before the age of 50 (McPherson et al. 2000). The risk increases with a greater number of relatives with breast cancer, and younger age of breast cancer in affected relatives, as well as other factors such as family history of bilateral breast cancer, breast cancer before the age of 40 and male breast cancer (NBCC 2006).

Genetic predisposition accounts for up to 10% of breast cancers in Western countries (McPherson et al. 2000). Harmful mutations in two identified breast cancer genes called BRCA1 and BRCA2 are involved in many cases of hereditary breast cancer, and a woman's risk of developing breast cancer is greatly increased if she inherits a harmful BRCA1 or BRCA2 mutation (McPherson et al. 2000).

How do we screen for breast cancer?

Mammography (X-ray of the breast) is the screening test used in breast cancer screening. In screening mammography, two views are performed on each breast, and the images are reviewed by two independent radiologists to look for suspicious characteristics that require further investigation. Screening mammography, like the screening tests used in other programs such as bowel and cervical screening, is not diagnostic. Diagnostic mammography is able to target a specific area of the breast using multiple views, which makes it appropriate for women with symptoms that may indicate the presence of breast cancer.

Why screen for breast cancer?

The aim of organised breast cancer screening is to detect cases of unsuspected breast cancer in women, which enables intervention when the cancer is at an early stage. Finding breast cancer early often means that the cancer is small, which is associated with increased treatment options (NBOCC 2009) and improved survival (AIHW & NBCC 2007).

Compared with breast cancers detected outside BreastScreen Australia of which 28% are small, just over half (54%) of those detected by Australia's breast cancer screening program have been shown to be small in size. Likewise, treatment of breast cancers detected through BreastScreen Australia is more likely to be breast-conserving surgery (74% compared with 56% outside the program) (NBOCC 2009), which is associated with decreased morbidity.

Breast cancer screening using mammography has been demonstrated to reduce mortality from breast cancer; it was recently estimated that 8.8 and 5.7 breast cancer deaths were prevented per 1,000 women screened using data from the Swedish Two-Country Trial and England's breast cancer screening program, respectively (Duffy et al. 2010), and a recent evaluation of BreastScreen Australia estimated that breast cancer mortality has been reduced by 21–28% (BreastScreen Australia EAC 2009a).

How is breast cancer screening managed in Australia?

Australia's national breast cancer screening program was established in 1991 as the National Program for the Early Detection of Breast Cancer. This program is now known as BreastScreen Australia, and is a joint program of the Australian and state and territory governments. BreastScreen Australia aims to reduce mortality and morbidity from breast cancer. A list of its aims and objectives is in Box S1.1.

BreastScreen Australia provides free breast cancer screening to women through dedicated screening and assessment services, each consisting of one assessment centre and one or more screening units. Women have a screening mammogram performed at a screening unit (which may be fixed, relocatable or mobile). If any images are found to be suspicious for breast cancer, these women will be recalled for further investigation by a multidisciplinary team at an assessment centre. Further investigation may include clinical examination, mammography, ultrasound and biopsy procedures. Most women who are recalled for assessment are found not to have breast cancer.

Who is eligible to participate in BreastScreen Australia?

BreastScreen Australia actively invites women aged 50–69 to have free breast cancer screening. Women aged 40–49 and 70 or over are also eligible to attend for free screening through the program. Women aged 50–69 are targeted because they have a relatively high incidence of breast cancer, and screening mammography is known to be effective in reducing mortality in this age group (BreastScreen Australia 2004). Screening mammography is less effective in women aged under 50. Biological differences in the breast tissue of pre-menopausal women result in more investigations and missed breast cancers (false negative results) due to the lower sensitivity of screening mammography in this age group (Irwig et al. 1997).

See <www.cancerscreening.gov.au> for further information about BreastScreen Australia.

Box S1.1 Aims and objectives of BreastScreen Australia

Aims

To ensure that the program is implemented in such a way that statistically significant reductions can be achieved in morbidity and mortality attributable to breast cancer.

To maximise the early detection of breast cancer in the target population.

To ensure that screening for breast cancer in Australia is provided in dedicated and accredited screening and assessment services as part of the BreastScreen Australia Program.

To ensure equitable access for women aged 50−69 years to the program.

To ensure that services are acceptable and appropriate to the needs of the eligible population.

To achieve high standards of program management, service delivery, monitoring and evaluation, and accountability.

Objectives

To achieve a 70 per cent participation rate in the BreastScreen Australia Program by women in the target group (50–69) and access to the program for women aged 40–49 years and 70–79 years.

To rescreen all women in the program at two-yearly intervals.

To achieve agreed performance outcomes which minimise recall rates, retake images, invasive procedures, 'false negatives' and 'false positives', and maximise the number of cancers detected, particularly the number of small cancers.

To refer to appropriate treatment services and collect information about the outcome of treatment.

To fund, through state coordination units, screening and assessment services which are accredited according to agreed National Accreditation Standards and to ensure that those standards are monitored and reviewed by appropriate national and state and territory accreditation committees.

To recognise the real costs to women of participation in the program and to minimise those costs. This includes the provision of services at minimal or no charge, and free to eligible women who would not attend if there was a charge.

To make information about mammographic screening and the BreastScreen Australia program available in a variety of easily comprehensible and appropriate forms, to women and health-care providers in particular.

To achieve patterns of participation in the program which are representative of the socioeconomic, ethnic and cultural profiles of the target population.

To provide services in accessible, non-threatening and comfortable environments by staff with appropriate expertise, experience and training.

To provide appropriate service in that: the provision of counselling, education and information is an integral part of the program; sensitive procedures for notification of recall are in place; and the time between the initial screen and assessment is minimised.

To achieve high levels of participation in the development and management of the program by members of significant professional and client groups.

To collect and analyse data sufficient to monitor the implementation of the program, to evaluate its effectiveness and efficiency and to provide the basis for future policy and program development decisions. (BreastScreen Australia 2004).

How is BreastScreen Australia monitored?

Performance indicators

For a population-based cancer screening program such as BreastScreen Australia, there is a need to assess its performance as this relates to the underlying aims of the program. This is achieved by reporting national data against a series of performance indicators to allow screening outcomes to be monitored, and positive and negative trends identified early.

BreastScreen Australia has been monitored since 1996–1997 using performance indicators developed and endorsed by the former National Screening Information Advisory Group and by state and territory BreastScreen programs. They represent key measures of BreastScreen Australia's progress towards achieving reductions in morbidity and mortality from breast cancer. Table S1.1 lists the current performance indicators of BreastScreen Australia (more information about each indicator is available in Section 2 of this report).

Table S1.1: BreastScreen Australia performance indicators

BreastScreen Australia performance indicators	Description
1 Participation	The percentage of women aged 50–69 who have a screening mammogram through BreastScreen Australia in a 2-year period
2 Rescreening	The proportion of women screened who return for a rescreen within 27 months
3 Recall to assessment	The proportion of women screened who are recalled for further investigation
4 Invasive breast cancer detection	The number of women with invasive breast cancer detected through BreastScreen Australia
5 Ductal carcinoma in situ detection	The number of women with ductal carcinoma in situ detected through BreastScreen Australia
6 Sensitivity	The ability of screening mammography to successfully detect cancers
6a Interval cancers	
6b Program sensitivity	
7 Incidence	The number of new cases of invasive breast cancer or DCIS
7a Invasive breast cancer incidence	
7b Ductal carcinoma in situ incidence	
8 Mortality	The number of deaths from invasive breast cancer

Accreditation standards

National Accreditation Standards (NAS) were developed by the National Quality Management Committee (NQMC). Each BreastScreen Australia service is accredited against 173 NAS. These represent minimum standards to measure a service's performance against the aims and objectives of BreastScreen Australia (BreastScreen Australia 2004). A number of NAS are consistent with the performance indicators in this report. For this reason, where appropriate, the data in this report are benchmarked against the NAS.

These are used as a guide to interpretation only, since the NAS were not designed to be used as standards for the BreastScreen Australia performance indicators, and while they provide very useful benchmarks that aid in the interpretation of data presented, differences in definitions or data may exist.

Data considerations

Data sources

The main sources of data used to monitor the program against the BreastScreen Australia performance indicators are the state and territory BreastScreen registers. Analyses of these data allow monitoring of participation, rescreening, recall to assessment, detection of invasive breast cancer, detection of ductal carcinoma in situ, and sensitivity (Indicators 1 to 6 in Table S1.1).

Additional to these sources are the Australian Cancer Database, which is the source of breast cancer incidence data (Indicator 7a), the state and territory cancer registries, which are the source of ductal carcinoma in situ incidence data (Indicator 7b), and the National Mortality Database, which is the source of breast cancer mortality data (Indicator 8). More detail on these data sources and classifications is provided in Appendix C.

Aboriginal and Torres Strait Islander women

Of the performance indicators used to monitor BreastScreen Australia that have BreastScreen register data as their source, only participation is disaggregated by Aboriginal and Torres Strait Islander status.

Women who attend for a screening mammogram at a BreastScreen Australia service are asked to complete a form that includes personal and demographic details, as well as personal and family history of breast cancer. The form also includes a question on Aboriginal and Torres Strait Islander status where women are able to identify as 'Aboriginal', 'Torres Strait Islander', 'both Aboriginal and Torres Strait Islander', or 'neither Aboriginal nor Torres Strait Islander'. This information is recorded by the state and territory BreastScreen registers, with the responses aggregated into the categories of 'Aboriginal and Torres Strait Islander' and 'non-Indigenous', with a third 'not stated' category for women who choose not to answer this question (see Appendix B for data definitions and quality concerns).

Other performance indicators based on BreastScreen register data are not routinely disaggregated by Aboriginal and Torres Strait Islander status due to concerns about stability and comparability of rates from small numbers. However, further data on Aboriginal and Torres Strait Islander women can be found in a more detailed analysis of BreastScreen Australia performance indicators conducted to inform the BreastScreen Australia Evaluation (BreastScreen Australia EAC 2009b).

Reporting women with symptoms

In principle, women who have symptoms that could indicate the presence of invasive breast cancer or ductal carcinoma in situ (such as a lump, or clear or bloody discharge from the nipple) at the time of a breast cancer screen should be excluded from all performance indicators reported, since these women are more likely to have a breast cancer detected by the screening process.

In practice, data in this report include both symptomatic and asymptomatic women.

Further, the management policy of women with symptoms is not uniform across states and territories, which may affect the comparability of data.

Terminology and concepts used in this report

Reporting epochs

This report presents monitoring data in 1-year, 2-year, 3-year and 5-year epochs. Participation data are in 2-year epochs in line with the recommended 2-year screening interval of BreastScreen Australia. Most other data are presented for a single calendar year, with the exception of interval cancer and program sensitivity data, which are in 3-year epochs, and some incidence and mortality data, which are in 5-year epochs, to improve stability and comparability of rates due to small numbers.

Trends

This report presents data for the most recent year (or epoch), as well at data for the previous year, and 5 and 10 years before the most recent year (where available). This allows the most recent data to be readily compared with more historic data.

Age groups

Data are presented for women aged 50–69 who, as the target age group of BreastScreen Australia, are actively invited to participate in the program. Where appropriate, data are also presented for women aged 40–49 and 70+, who are also eligible to have free screening mammograms through the program. Crude and age-standardised rates for women aged 50–69 and women aged 40 and over are also presented in the *BreastScreen Australia monitoring report 2008–2009: supplementary data tables*.

Statistical significance

Statistical analyses are useful tools that aid in the interpretation of data. In this report, 95% confidence intervals have been used to determine if a statistically significant difference exists between compared values: where the confidence intervals do not overlap, the difference between rates is greater than that which could be explained by chance and is regarded as statistically significant.

It is important to note that overlapping confidence intervals does not imply that the difference between two rates is definitely due to chance. Instead, overlapping confidence intervals represent a difference in rates that is too small to allow differentiation between a real difference and one that is due to chance variation. It can therefore only be stated that no statistically significant differences were found, and not that no differences exist.

Differences that are described as ‘significant’ refer to a statistically significant difference. Judgment should, however, be exercised in deciding whether or not the difference is of any practical or clinical significance. This is particularly relevant to a national dataset, the analysis of which can result in statistically significant differences that may not be of any clinical significance or policy relevance.

Note that, although the approximate comparisons presented might understate the statistical significance of some differences, they are sufficiently accurate for the purposes of this report. For more information on the calculation and interpretation of confidence intervals, see Appendix D.

Section 2 Performance indicators

Indicator 1 Participation

What do we mean by participation?

Definition: The percentage of women screened through BreastScreen Australia in a 2-year period for women aged 50–69.

Rationale: BreastScreen Australia aims to maximise the early detection of breast cancer in the target population, women aged 50–69. High attendance for screening by women in this age group maximises the reductions in mortality from breast cancer (BreastScreen Australia 2004). The NAS recommends that at least 70% of women aged 50–69 participate in screening in the most recent 24–month period (NAS 1.1.1) (BreastScreen Australia 2004).

Guide to interpretation: Participation is measured over 2 years to align with the recommended screening interval of BreastScreen Australia. Participation is based on the number of women screened, and not the number of screening mammograms performed.

Data are presented for women aged 50–69 (the target age group), as well as for women aged 40–49 years and 70+ where appropriate.

No attempt has been made to adjust the population for women who have previously had breast cancer and are therefore not eligible for breast cancer screening through BreastScreen Australia. It should be noted that states and territories have different policies on screening women who have previously been diagnosed with breast cancer.

State and territory BreastScreen registers are the source of participation data.

The most recent participation data are for women who had a screening mammogram in 2008 and 2009.

Key results

2008–2009

- In 2008–2009, 1,683,779 women participated in BreastScreen Australia, of whom 1,319,771 (78.4%) were aged 50–69.
- This is 55.5% of women in the target age group, which, when age-standardised to allow analysis of trends and differentials, equates to a participation rate of 55.2% for 2008–2009.
- Participation of Aboriginal and Torres Strait Islander women remained lower than that of non-Indigenous women—with the age-standardised participation rate being 36.5% for Aboriginal and Torres Strait Islander women compared with 55.2% for non-Indigenous women in 2008–2009.

Trends

- Participation in BreastScreen Australia has remained steady between 55% and 57% for most years from 1996–1997, when reporting began, to 2008–2009, despite a steady increase in the actual number of women participating over this time.

Detailed analyses

Participation in 2008–2009

In 2008–2009, 1,683,779 women participated in BreastScreen Australia (that is, had at least one screening mammogram over the 2 years), of which 1,319,771 were aged 50–69.

This is 55.5% of women in the target age group, which, when age-standardised to allow analysis of trends and differentials, equates to a participation rate of 55.2% for 2008–2009.

Participation trends

Table 1.1 shows the trend in participation in BreastScreen Australia nationally from 1996–1997, when reporting began, to 2008–2009, the most recent national data available.

Table 1.1: Number and age-standardised rate of women aged 50–69 participating in BreastScreen Australia, 1996–1997 to 2008–2009

Reporting period	Participants[(a)]	Population[(b)]	AS rate[(c)]	95% CI
1996–1997	845,143	1,645,331	51.5	51.4–51.6
1997–1998	927,735	1,700,951	54.6	54.5–54.7
1998–1999	976,182	1,754,254	55.7	55.6–55.8
1999–2000	1,012,184	1,809,735	55.9	55.8–56.1
2000–2001	1,064,246	1,868,832	57.0	56.8–57.1
2001–2002	1,102,642	1,928,878	57.1	57.0–57.3
2002–2003	1,118,823	1,989,802	56.2	56.1–56.3
2003–2004	1,144,008	2,051,480	55.7	55.6–55.8
2004–2005	1,188,955	2,114,036	56.1	56.0–56.2
2005–2006	1,242,210	2,177,660	56.9	56.8–57.0
2006–2007	1,262,334	2,242,133	56.1	56.0–56.2
2007–2008	1,273,317	2,308,680	54.9	54.8–55.0
2008–2009	1,319,771	2,376,559	55.2	55.1–55.3

(a) Participants are the number of women screened through BreastScreen Australia in each 2-year reporting period.

(b) Population is the average of the ABS estimated resident population for women aged 50–69 for the two reporting years.

(c) Age-standardised (AS) rate is the number of women aged 50–69 screened in each 2-year reporting period as a percentage of the ABS estimated resident population for women aged 50–69, age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of BreastScreen Australia data.

The age-standardised rate of participation for women aged 50–69 in BreastScreen Australia was 51.5% in 1996–1997 when reporting began. This increased to a peak of 57.1% in 2001–2002 and thereafter remained steady at about 56%, before decreasing slightly to about 55% in 2007–2008 and 2008–2009 (Table 1.1).

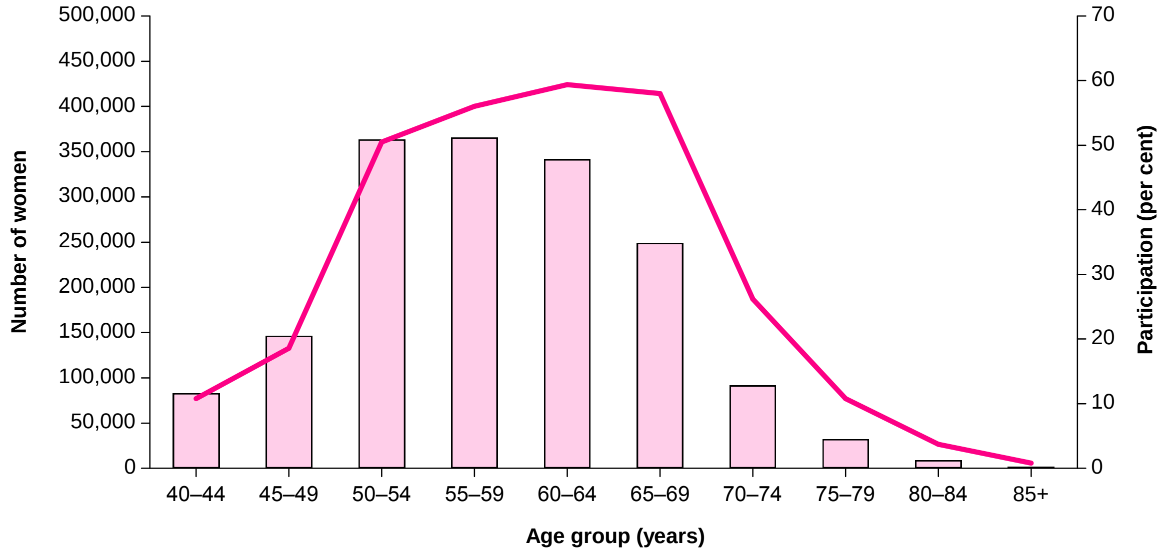
A predicted reduction in breast cancer mortality of 16% was originally expected to result from 70% participation. Despite BreastScreen Australia not reaching this benchmark, significant reductions in mortality have been observed with the current participation rate of 55%, attributed in part to the early detection of invasive breast cancer through BreastScreen Australia, along with advances in the management and treatment of invasive breast cancer (BreastScreen Australia EAC 2009a).

Table 1.1 also shows that the number of women participating in BreastScreen Australia has increased for every 2-year reporting period from 1996–1997 to 2008–2009. However, this does not always translate to an increase in the participation rate since this measure is also dependent on the population. This is well illustrated by the decrease in participation rate from 56.1% in 2006–2007 (the previous non-overlapping reporting period) to 55.2% in 2008–2009, that occurred despite a 4.6% increase in the number of women participating. This is because the concurrent 6.0% increase in the number of women in the population was greater than the increase in the number of women participating.

Participation by age

In 2008–2009, the proportion of women screened was highest in women aged 50–69, in line with BreastScreen Australia's aim to maximise the proportion of women aged 50–69 who are screened every 2 years. Further, the proportion of women participating was above 50% for all 5-year age groups within the target age group, peaking at 59.4% in women aged 60–64 (Figure 1.1).

The proportion of women screened outside the target age group dropped away steeply, with 14.7% of women aged 40–49 and 11.8% of women aged 70 and over screening in 2008–2009, compared with 55.5% of women aged 50–69 (all crude rates) (Figure 1.1).

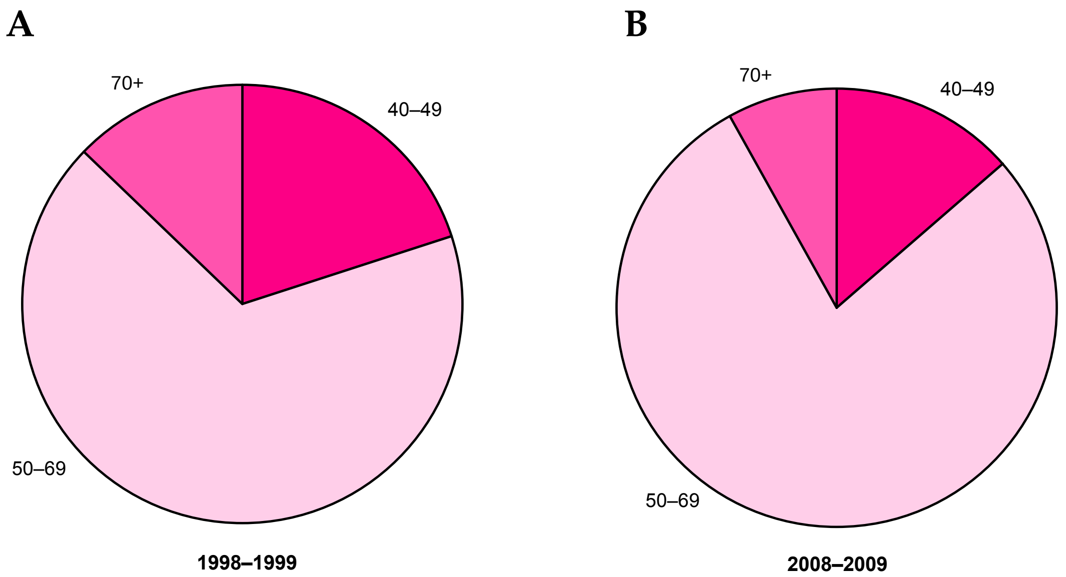


Source: AIHW analysis of BreastScreen Australia data.

Figure 1.1: Participation in BreastScreen Australia, by age group, females, 2008–2009

The breakdown of women screened into the age groups 40–49, 50–69 and 70 and over is shown in Figure 1.2 for the reporting periods 1998–1999 and 2008–2009.

In the 10 years between 1998–1999 and 2008–2009, women in the target age group have comprised an increasing proportion of all women screened, from 67.2% in 1998–1999 to 78.4% in 2008–2009. Concurrent to this increase has been a decrease in the 40–49 and 70 and over age groups. For women aged 40–49, the decrease was from 20.0% in 1998–1999 to 13.6% of women screened in 2008–2009. For women aged 70 and over, the decrease was from 12.8% to 8.0% (Figure 1.2).



Source: AIHW analysis of BreastScreen Australia data.

Figure 1.2: Age distribution of women aged 40 or over screened by BreastScreen Australia, 1998–1999 (A) and 2008–2009 (B)

Participation by state and territory

The decrease in the national rate between 2006–2007 and 2008–2009 was not reflected in all states and territories; while half demonstrated a decrease in participation rate, the other half demonstrated either an increase or no change (Table 1.2).

Table 1.2: Participation of women aged 50–69 in BreastScreen Australia, by state and territory, 1998–1999, 2003–2004, 2006–2007 and 2008–2009

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
					(per cent)				
1998–1999	53.2	56.9	56.3	53.2	62.2	59.4	61.3	47.8	55.7
2003–2004	50.4	58.9	57.9	56.7	62.9	57.3	53.2	42.6	55.7
2006–2007	56.0	56.1	56.6	57.5	55.9	54.2	57.5	40.6	56.1
2008–2009	53.9	53.2	58.3	56.7	58.7	57.4	53.8	41.0	55.2

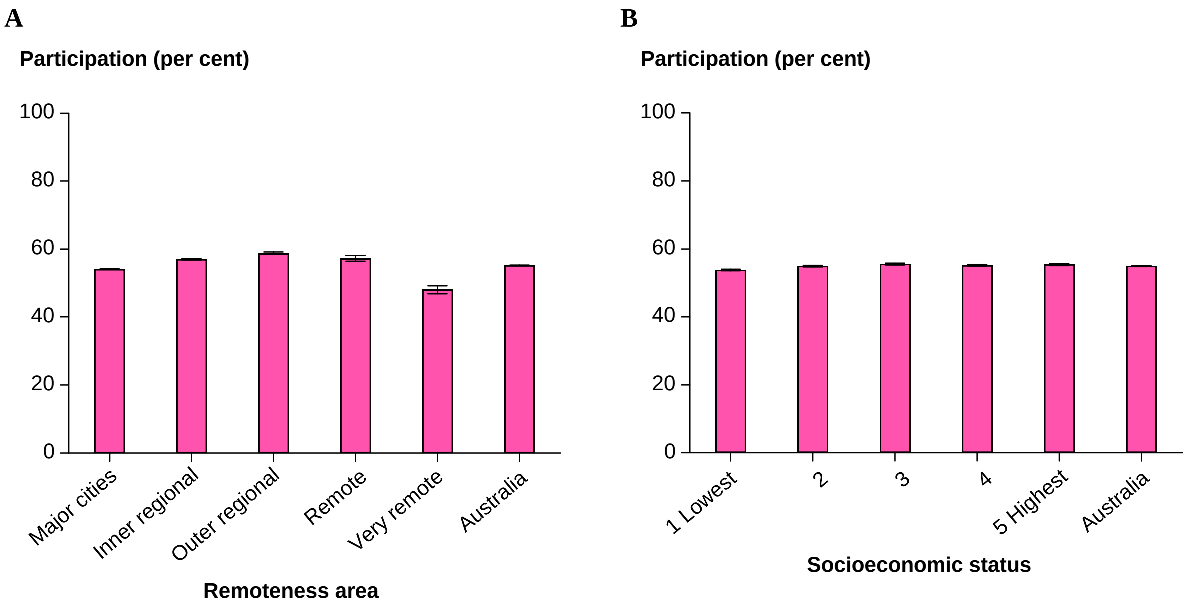
Notes

1. Participants are the number of women screened through BreastScreen Australia in each 2-year reporting period. Periods cover 1 January 1998 to 31 December 1999, 1 January 2003 to 31 December 2004, 1 January 2006 to 31 December 2007 and 1 January 2008 to 31 December 2009.
2. Rates are the number of women screened as a percentage of the eligible female population calculated as the average of the ABS's estimated resident population and age-standardised to the Australian population at 30 June 2001.
3. Direct comparisons between the states and territories of Australia are not advised due to the substantial differences that exist between the jurisdictions, including population, area, geographic structure, policies and other factors.
4. Confidence intervals for this table are presented in Appendix table A1.1.

Source: AIHW analysis of BreastScreen Australia data.

Participation by location of residence

In 2008–2009, participation in BreastScreen Australia was highest in *Outer regional* (58.7%) and lowest in *Very remote* locations (48.0%) (Figure 1.3A; Table 1.3). Participation was also lowest for women residing in areas of lowest socioeconomic status (Figure 1.3B; Table 1.3).



Note: Bars represent 95% confidence intervals.

Source: AIHW analysis of BreastScreen Australia data.

Figure 1.3: Participation of women aged 50–69 by remoteness area (A) and by socioeconomic status (B), 2008–2009

To improve access for women in *Remote* and *Very remote* locations, states and territories use relocatable screening services, mobile screening vans and community buses to overcome transport barriers. A first of its kind 4WD digital mobile screening service was introduced in 2010, providing better access to BreastScreen Australia for women in isolated and hard-to-reach locations in Queensland.

Table 1.3: Participation of women aged 50–69 in BreastScreen Australia, by remoteness area 2008–2009

	Major cities	Inner regional	Outer regional	Remote	Very remote	Australia
			(per cent)			
2008–2009	54.1	57.0	58.7	57.2	48.0	55.2
95% CI	54.0–54.2	56.8–57.2	58.4–59.0	56.4–58.1	46.8–49.2	55.1–55.3

Notes

1. Rates are the number of women screened as a percentage of the eligible female population calculated as the average of the ABS's estimated resident population and age-standardised to the Australian population at 30 June 2001.
2. Remoteness areas were assigned using the woman's residential postcode according to the Australian Standard Geographic Classification for 2006.
3. Period covers 1 January 2008 to 31 December 2009.

Source: AIHW analysis of BreastScreen Australia data.

Table 1.4: Participation of women aged 50–69 in BreastScreen Australia, by socioeconomic status, 2008–2009

	1 (lowest)	2	3	4	5 (highest)	Australia
			(per cent)			
2008–2009	53.8	55.0	55.6	55.2	55.4	55.2
95% CI	53.6–54.0	54.8–55.2	55.4–55.8	55.0–55.4	55.2–55.7	55.1–55.3

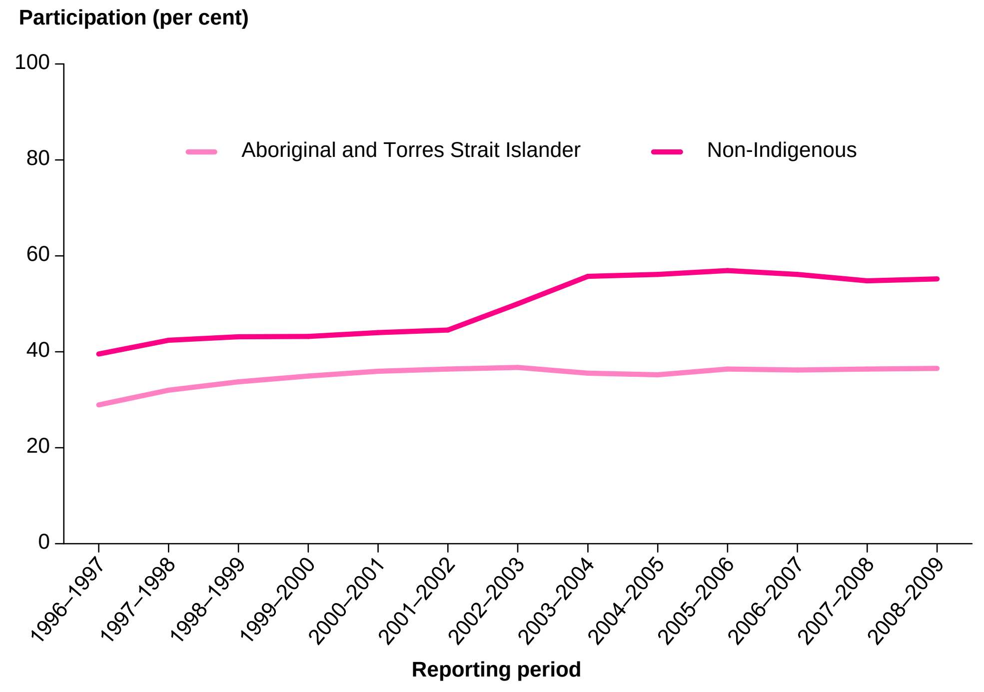
Notes

1. Rates are the number of women screened as a percentage of the eligible female population calculated as the average of the ABS's estimated resident population and age-standardised to the Australian population at 30 June 2001.
2. Socioeconomic status was assigned using the woman's residential postcode according to the Socioeconomic Index for Areas (SEIFA) Index of Relative Socioeconomic Disadvantage for 2006.
3. 1 (lowest socioeconomic group) corresponds to the most disadvantaged socioeconomic status and 5 (highest socioeconomic group) to the least disadvantaged socioeconomic status.
4. Period covers 1 January 2008 to 31 December 2009.

Source: AIHW analysis of BreastScreen Australia data.

Participation by Aboriginal and Torres Strait Islander status

Aboriginal and Torres Strait Islander women participate in BreastScreen Australia at a lower rate than non-Indigenous women. This was true for all reporting periods between 1996–1997 and 2008–2009 (Figure 1.4).



Source: AIHW analysis of BreastScreen Australia data.

Figure 1.4: Participation of women aged 50–69 in BreastScreen Australia, by Aboriginal and Torres Strait Islander status, 1996–1997 to 2008–2009

Box 1.1 How does self-reporting of Aboriginal and Torres Strait Islander status affect participation rates?

In BreastScreen Australia, of the 1,319,771 women aged 50–69 who participated in BreastScreen Australia in the 2008–2009 reporting period, 10,902 (0.8%) identified as Aboriginal or Torres Strait Islander. This is an increase from the 1998–1999 reporting period, when 0.6% (5,965) of women screened self-identified as Aboriginal or Torres Strait Islander.

A greater proportion of women identifying as Aboriginal or Torres Strait Islander in the 2008–2009 reporting period compared with the 1998–1999 reporting period may influence the trends described (since the estimated number of Aboriginal or Torres Strait Islander women in the Australian population is the denominator for the calculation of Aboriginal and Torres Strait Islander participation, a greater denominator in later years would be associated with an apparent decrease in participation, all else being equal).

Additionally, as shown in Figure 1.5, below, there has been a marked reduction in women being allocated to the 'not stated' category for Aboriginal and Torres Strait Islander, which adds further complexity when interpreting trends in participation of Aboriginal and Torres Strait Islander women in BreastScreen Australia.

Source: AIHW analysis of BreastScreen Australia data.

Figure 1.5: Proportion of women aged 50–69 screened by BreastScreen Australia, by Aboriginal and Torres Strait Islander status, 1998–1999 (A) and 2008–2009 (B)

In 2008–2009, participation of Aboriginal and Torres Strait Islander women aged 50–69 in BreastScreen Australia was 36.5% compared to the non-Indigenous participation of 55.2% — nearly 19 percentage points difference (Table 1.5).

Many of the state and territory BreastScreen programs have developed, and continue to develop, strategies and initiatives to encourage greater participation by Aboriginal and Torres Strait Islander women. These are based on research to ensure that strategies and initiatives are sensitive and appropriate to the knowledge, attitudes and beliefs of Aboriginal and Torres Strait Islander women.

Strategies to encourage participation include dedicated and appropriate communication resources, and block and group bookings for breast cancer screening for Aboriginal and Torres Strait Islander women. BreastScreen programs also liaise closely with Aboriginal Health Workers and Aboriginal and Torres Strait Islander community groups to increase acceptance of screening.

Table 1.5: Participation of women aged 50–69 in BreastScreen Australia, by Aboriginal and Torres Strait Islander status, 1998–1999, 2003–2004, 2006–2007 and 2008–2009

	Aboriginal and Torres Strait Islander	Non-Indigenous	Australia[(a)]
		(per cent)	
1998–1999	33.7	43.1	55.7
2003–2004	35.4	55.7	55.7
2006–2007	36.2	56.1	56.1
2008–2009	36.5	55.2	55.2

(a) Includes women in the 'not stated' category for Aboriginal and Torres Strait Islander status.

Notes

1. Some jurisdictions do not use the 'not stated' category. Therefore there are likely to be some Aboriginal and Torres Strait Islander women incorrectly assigned to non-Indigenous status. Limitations of Aboriginal and Torres Strait Islander data are detailed in Appendix B.
2. Rates are the number of women screened as a percentage of the eligible female population calculated as the average of the ABS's estimated resident population and age-standardised to the Australian population at 30 June 2001.
3. Periods cover 1 January 1998 to 31 December 1999, 1 January 2003 to 31 December 2004, 1 January 2006 to 31 December 2007 and 1 January 2008 to 31 December 2009.
4. Confidence intervals for this report are in Appendix table A1.1.

Source: AIHW analysis of BreastScreen Australia data.

Participation by main language spoken at home

In 2006–2007, the difference in participation between English-speaking women and those who reported that they speak a language other than English at home was 11.6 percentage points. This increased to 12.5 percentage points in 2008–2009 (Table 1.6).

Table 1.6: Participation of women aged 50–69 in BreastScreen Australia, by main language spoken at home, 1998–1999, 2003–2004, 2006–2007 and 2008–2009

	English-speaking	Non-English-speaking	Australia[(a)]
		(per cent)	
1998–1999	58.2	42.2	55.7
2003–2004	58.3	42.5	55.7
2006–2007	57.9	46.3	56.1
2008–2009	57.2	44.7	55.2

(a) Includes women in the 'not stated' category for main language other than English spoken at home.

Notes

1. Some jurisdictions do not use the 'not stated' category and there may be difference in how these data are collected. This means that the analysis based upon main language spoken at home should be interpreted with caution. Limitations are detailed in Appendix B.
2. Rates are the number of women screened as a percentage of the eligible female population calculated as the average of the ABS's estimated resident population and age-standardised to the Australian population at 30 June 2001.
3. Periods cover 1 January 1998 to 31 December 1999, 1 January 2003 to 31 December 2004, 1 January 2006 to 31 December 2007 and 1 January 2008 to 31 December 2009.
4. Confidence intervals for this table are in Appendix table A1.1.

Source: AIHW analysis of BreastScreen Australia data.

Indicator 2 Rescreening

What do we mean by rescreening?

Definition: The proportion of all women screened in a given year, whose screening outcome was a recommendation to return for screening in 2 years, and who returned for a screen within 27 months.

Rationale: A high rescreen rate is important to increase the likelihood of breast cancers being detected early in screened women and to maintain overall participation. The NAS for rescreening require that at least 75% of women aged 50–67 who attend for their first screening round are rescreened within 27 months (NAS 1.2.1). The NAS also recommend that at least 90% of women aged 50–67 who attend for their second and subsequent screens are rescreened within 27 months of their previous screening episode (NAS 1.2.2) (BreastScreen Australia 2004).

Guide to interpretation: The screening interval of 27 months is used instead of the recommended screening interval of 2 years to allow for potential delays in screening availability and data transfer.

Note that, although the BreastScreen Australia target age group is 50–69, only women aged 50–67 are reported for the rescreen rate because women aged 68–69 in the index year will be outside the target age group 27 months after their index screen.

The denominator (the number of women screened in each index year) has not been adjusted to remove women who died or developed an interval cancer after their screen in the index year and therefore would not go on to rescreen.

State and territory BreastScreen registers are the source of rescreening data.

The most recent rescreening data are for women screened in the index years 2006 or 2007 (usually only one index year is reported, but as previously unpublished data for both 2006 and 2007 were available at the time of report production, two separate index years are shown). Rescreening data are several years behind participation, recall and detection data, as 27 months needs to have passed after a woman's last screen to know whether or not she rescreened within this interval.

Key results

Women rescreening after a screen in 2006

- The proportion of women aged 50–67 who screened in 2006 and rescreened within 27 months ranged from 49.9% after the first screening round to 58.5% after the second screening round and 73.5% after third and subsequent screening rounds.

Women rescreening after a screen in 2007

- The proportion of women aged 50–67 who screened in 2007 and rescreened within 27 months ranged from 55.9% after the first screening round to 62.6% after the second screening round and 76.1% after third and subsequent screening rounds.

Background information

The rescreening indicator measures the proportion of women who return for screening at a BreastScreen Australia service within the recommended screening interval. The interval between screens is an important factor influencing the level of detection of cancers within BreastScreen Australia. BreastScreen Australia national policy states that women should be screened every 2 years. It has been shown that screening intervals longer than 2 years reduce mortality benefits from screening and result in an increase in interval cancers (BreastScreen Australia 2004). This is because increased time between screening may allow a tumour to grow to the point where symptoms become evident, thus eliminating the advantage of screening.

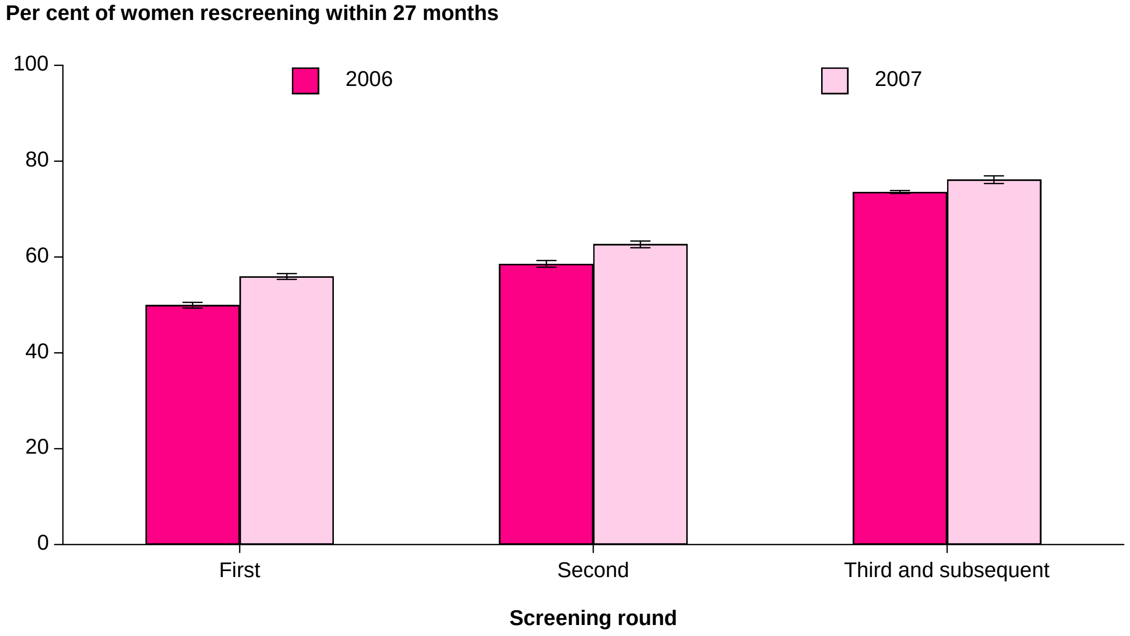
Terminology

Screening round: the first screening round is a woman's first visit to a mammography screening service; a subsequent screening round is any visit to a mammography screening service after this first visit (that is, a subsequent screening round means that she has been screened before).

Detailed analyses

Rescreening after a screen in 2006 or 2007

The proportion of women aged 50–67 who returned for a rescreen within 27 months increased with the number of screens or 'screening rounds' (see the terminology box above) previously attended (Figure 2.1).



Source: AIHW analysis of BreastScreen Australia data

Figure 2.1: Proportion of women rescreened aged 50–67, by screening round, 2006 and 2007

The proportion of women in this age group who were screened in 2006 and returned within 27 months increased from 49.9% after the first screening round to 58.5% after the second screening round, and finally to 73.5% after the third and subsequent screening rounds. In comparison, the most recent data show that the proportion of women aged 50–67 who were screened in 2007 and returned within 27 months increased from 55.9% after the first screening round to 62.6% after the second screening round, and to 76.1% after the third and subsequent screening rounds (Figure 2.1).

The NAS for rescreening have not been met at the national level (*NAS 1.2.1 being that at least 75% of women aged 50–67 who attend for their first screening round are rescreened within 27 months, and NAS 1.2.2 being that at least 90% of women aged 50–67 who attend for their second and subsequent screens are rescreened within 27 months*).

Rescreening trends

The rate of women aged 50–67 rescreening within 27 months decreased from 2001 to 2006 for each screening round reported, with a small increase between 2006 and 2007. In these latter years, rescreening in women aged 50–67 increased from 49.9% to 55.9% after a woman's first screen, from 58.5% to 62.6% after a second screen, and from 73.5% to 76.1% after a third or subsequent screen (Table 2.1).

Table 2.1: Rescreen rate for women aged 50–67, screened during 2001, 2005, 2006 and 2007

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
					(per cent)				
First screening round									
2001	55.4	65.1	72.8	62.0	64.4	72.6	47.8	39.9	62.8
2005	58.5	57.4	63.4	62.5	47.1	52.0	63.6	52.8	59.3
2006	46.1	41.3	62.0	54.8	55.5	57.7	52.3	45.6	49.9
2007	54.9	45.3	63.5	55.8	63.3	67.7	54.9	55.5	55.9
Second screening round									
2001	63.1	74.0	81.1	66.3	75.1	78.7	58.3	62.3	71.9
2005	67.2	63.5	71.3	71.6	54.3	58.0	70.8	55.6	66.8
2006	52.1	53.1	71.5	64.0	61.1	61.8	60.3	55.3	58.5
2007	58.9	55.2	73.6	61.2	66.9	76.4	63.5	61.5	62.6
Third and subsequent screening rounds									
2001	74.2	85.0	88.5	82.2	87.3	88.3	73.6	77.3	81.9
2005	78.1	76.2	83.0	84.8	69.9	67.5	82.2	74.6	78.4
2006	67.1	69.9	83.6	77.2	77.0	74.5	74.4	71.4	73.5
2007	71.5	70.7	84.5	75.4	83.2	84.8	78.7	82.0	76.1

Notes:

1 Rates are the number of rescreening within 27 months as a percentage of women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008.

2. Confidence intervals for this table are in Appendix table A1.1.

Source: AIHW analysis of BreastScreen Australia data.

This indicator only reports the proportion of women who rescreen within 27 months – it does not provide information on women who returned for a rescreen outside the 27 months. The proportion of women who rescreen at intervals greater than 27 months was analysed in a recent report, in which it was found that there was an increase in the proportion of women rescreening within 28–36 months relative to women rescreening within 27 months. This means that the decrease in rescreening rate may not be a true decline in women rescreening, but rather a redistribution of women rescreening from within 27 months to 28–36 months, (BreastScreen Australia EAC 2009b).

Rescreening by age

For women screened for the first time in 2006 and in 2007, the highest rescreen rates were for women aged 50–67, followed by women aged 40–49. However, rescreen rates were similar for women aged 50–67 and 40–49 following second or third and subsequent screening rounds for both 2006 and 2007 (Table 2.2).

Women aged 70 and over had far lower rescreen rates regardless of screening round (Table 2.2).

Table 2.2: Rescreen rate for women aged 50–67, screened during 2001, 2005, 2006 and 2007

	40–49 years	50–67 years	70+ years
		(per cent)	
First screening round			
2006	42.4	49.9	21.3
2007	44.1	55.9	23.2
Second screening round			
2006	60.1	58.5	31.6
2007	62.4	62.6	33.0
Third and subsequent screening rounds			
2006	73.7	73.5	37.6
2007	77.5	76.1	38.5

Note: Rates are the number of rescreening within 27 months as a percentage of women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008 and 2009.

Source: AIHW analysis of BreastScreen Australia data.

In 2007, of the women rescreening after the first screening round 61.1% were aged 50–67, of those rescreening after the second screening round 70.8% were aged 50–67, and of the women rescreening after third and subsequent screening rounds 83.0% were aged 50–67 (see *BreastScreen Australia monitoring report 2008–2009 supplementary data tables*).

Rescreening by state and territory

Although there was some variation among the states and territories, all mirrored the national trend of increasing rescreen rates with increased number of screens previously attended for women rescreening after a screen in 2007 (Table 2.1).

Indicator 3 Recall to assessment

What do we mean by recall to assessment?

Definition: The proportion of women screened in a given year who are recalled for assessment for mammographic reasons.

Rationale: BreastScreen Australia aims to maximise the number of cancers detected while minimising the number of unnecessary investigations. Recall to assessment can cause anxiety as a result of uncertainty experienced by women and the requirement to undergo additional procedures. The NAS recommend that less than 10% of women aged 50–69 who attend for their first screen are recalled for assessment (NAS 2.6.1), and that less than 5% of women aged 50–69 who attend for their second or subsequent screen are recalled for assessment (NAS 2.6.2) (BreastScreen Australia 2004).

Guide to interpretation: Recall to assessment is disaggregated into first and subsequent screening rounds because a woman is more likely to be recalled to assessment the first time she visits a BreastScreen service than at subsequent visits. This is because a woman is more likely to have an invasive breast cancer detected on her first visit, and also because, with no previous images with which to compare her first screening mammography images, it is more difficult to decipher between what might be normal and what might be suspicious and therefore require further investigation (BreastScreen WA 2008).

Changes to recall to assessment rates cannot be considered in the absence of corresponding invasive cancer detection rates. This is because the two are inter-related, with invasive cancer being detected at assessment; thus a higher recall to assessment rate may be considered acceptable if it leads to higher breast cancer detection rates.

State and territory BreastScreen registers are the source of recall to assessment data.

The most recent recall to assessment data are for women screened in 2009.

Key results

2009

- In 2009, for women aged 50–69, 10.7% of women screened for the first time were recalled to assessment, while 4.2% attending subsequent screens were recalled.

Trends

- Recall to assessment for a woman's first screening visit increased from 5.8% of women screened in 1996 to 10.7% in 2009.
- Recall to assessment for a woman's subsequent screens was about 4% of women screened for most years between 1996 and 2009.

Background information

Recall to assessment for mammographic reasons means a woman is recalled because her screening mammography images are found to be suspicious for breast cancer.

Assessment of women recalled involves further investigation by a multidisciplinary team at an assessment centre. This may include clinical examination, additional mammography, ultrasound and, if required, a biopsy. Most women recalled to assessment are found not to have breast cancer (BreastScreen SA 2010).

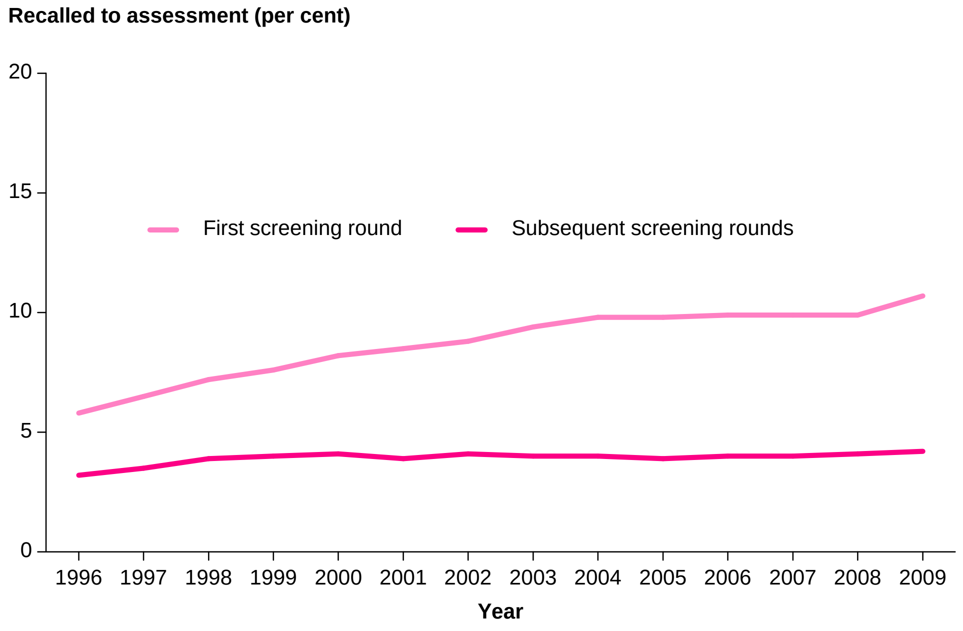
Detailed analyses

Recall to assessment in 2009

In 2009, of the 84,223 women aged 50–69 attending their first screen, 9,454 (11.2%) were recalled to assessment. When age-standardised to allow analysis of trends and differentials, this equates to 10.7%. Of the 611,295 women aged 50–69 attending a subsequent screen in 2009, 25,164 (4.1%) were recalled to assessment (4.2% age-standardised).

Recall to assessment trends

Recall to assessment rates for women screened for the first time increased, while this remained constant for women attending a subsequent screening round (Figure 3.1).



Source: AIHW analysis of BreastScreen Australia data.

Figure 3.1: Recall to assessment rate for women aged 50–69, mammographic reasons, first and subsequent screening rounds, 1996 to 2009

For women aged 50–69 attending for the first time, recall to assessment reached 10.7% of women screened in 2009, after increasing from 5.8% in 1996 (Table 3.1). This is the first time that recall to assessment rates have exceeded the recommended target within the NAS at the national level (*NAS 2.6.1 being that less than 10% of women aged 50–69 who attend for their first screen are recalled for assessment*).

Recall to assessment for women aged 50–69 attending subsequent screening rounds, while initially increasing from 3.2% of women screened in 1996 to 4.0% in 1998, remained at about 4% of women screened for all years between 1998 and 2009 (Table 3.1).

These rates were well within the NAS for all years between 1996 and 2009 (*NAS 2.6.2 being that less than 5% of women aged 50–69 who attend for their second or subsequent screen are recalled for assessment*).

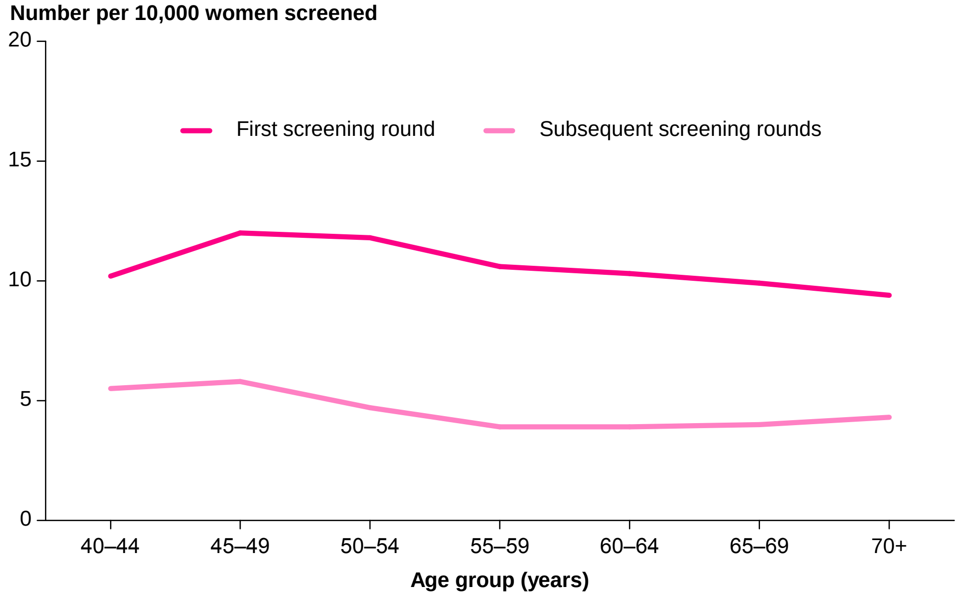
Table 3.1: Recall to assessment rate for women aged 50–69, mammographic reasons, first and subsequent screening rounds, 1996 to 2009

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
							(per cent)							
First screening round														
AS rate	5.8	6.5	7.2	7.6	8.2	8.5	8.8	9.4	9.8	9.8	9.9	9.9	9.9	10.7
95%CI	5.7–5.9	6.4–6.7	7.0–7.4	7.4–7.8	8.0–8.5	8.2–8.7	8.5–9.0	9.1–9.6	9.6–10.1	9.5–10.1	9.7–10.2	9.6–10.1	9.7–10.1	10.4–11.0
Subsequent screening rounds														
AS rate	3.2	3.5	3.9	4.0	4.1	3.9	4.1	4.0	4.0	3.9	4.0	4.0	4.1	4.2
95%CI	3.1–3.2	3.4–3.6	3.9–4.0	3.9–4.0	4.0–4.1	3.9–4.0	4.0–4.1	4.0–4.1	4.0–4.1	3.9–4.0	3.9–4.0	3.9–4.0	4.1–4.2	4.1–4.2

Note: Rates are the number of women recalled for assessment as a percentage of women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Recall to assessment by age



Source: AIHW analysis of BreastScreen Australia data.

Figure 3.2: Recall to assessment rate, mammographic reasons, by age, first and subsequent screening rounds, 2009

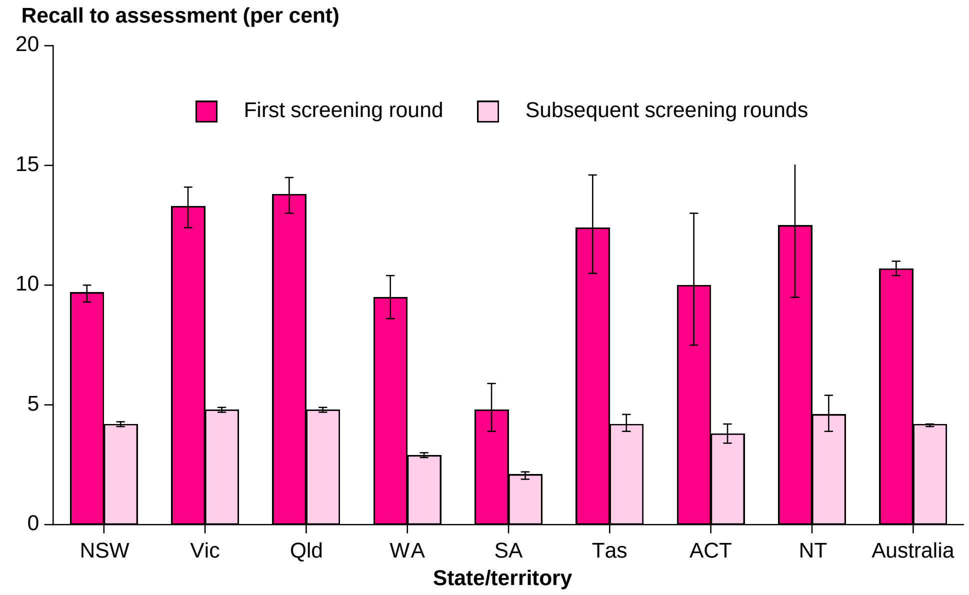
In 2009, the proportion of women recalled to assessment was higher in younger age groups and lower in older age groups, although with a slightly different trend for the first screening round compared with subsequent screening rounds (Figure 3.2). For the first screening round, recall to assessment was highest for women aged 45–49 at 12.0% of women screened and lowest for women aged 70 and over at 9.5%. In subsequent screening rounds, recall to assessment was again highest for women aged 45–49 at 5.8% and lowest for women aged 55–59 and 60–64 at 3.9% (Figure 3.2).

Recall to assessment rates were highest in women aged 40–49 regardless of the screening round. This may be because younger women tend to have denser breasts that make screening mammography images more difficult to interpret (BreastScreen WA 2008).

Recall to assessment by state and territory

In 2009, recall to assessment for women aged 50–69 varied considerably across states and territories (Figure 3.3), although almost all had rates of ≥10% of women screened for the first screening round. A notable exception is South Australia, with a recall to assessment rate of 4.8% of women aged 50–69 (Table 3.2).

Recall to assessment for women aged 50–69 in subsequent screening rounds ranged between 2.1% and 4.8% in 2009 (Table 3.2).



Note: Bars on columns represent 95% confidence intervals.

Source: AIHW analysis of BreastScreen Australia data.

Figure 3.3: Recall to assessment rate for women aged 50–69, mammographic reasons, by state and territory, first and subsequent screening rounds, 2009

Table 3.2: Recall to assessment rate for women aged 50–69, mammographic reasons, by state and territory, first and subsequent screening rounds, 1999, 2004, 2008 and 2009

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
					(per cent)				
First screening round									
1999	7.3	8.7	7.8	10.2	4.7	9.6	6.0	2.6	7.6
2004	9.7	11.1	10.4	8.6	6.4	10.2	8.0	15.1	9.8
2008	8.4	13.0	13.2	10.2	6.3	12.8	11.5	11.9	9.9
2009	9.7	13.3	13.8	9.5	4.8	12.4	10.0	12.5	10.7
Subsequent screening rounds									
1999	3.9	4.1	4.4	5.2	2.1	5.2	3.6	2.4	4.0
2004	4.5	4.2	4.1	2.9	2.3	6.1	4.0	3.2	4.0
2008	4.1	4.9	4.5	3.1	2.1	4.4	3.2	4.4	4.1
2009	4.2	4.8	4.8	2.9	2.1	4.2	3.8	4.6	4.2

Notes:

1. Rates are the number of women recalled for assessment as a percentage of women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008.
2. Confidence intervals for this table are presented in Appendix table A3.1.

Source: AIHW analysis of BreastScreen Australia data.

Indicator 4 Invasive breast cancer detection

What do we mean by invasive breast cancer detection?

Definition: The number of women with invasive breast cancer detected through BreastScreen Australia per 10,000 women screened. The invasive breast cancer detection rate is reported for breast cancers of all sizes, as well as for a subset of breast cancers that are small (having a diameter less than or equal to 15 mm)

Rationale: The overarching aim of BreastScreen Australia is to reduce morbidity and mortality from breast cancer. This can be achieved by detecting cases of unsuspected breast cancer in women before they have symptoms, which enables intervention when the cancer is at an early stage. BreastScreen Australia strives to maximise the detection of invasive breast cancers, and particularly small cancers, to achieve the desired reductions in morbidity and mortality.

The NAS outlines that at least 50 per 10,000 women screened aged 50–69 who attend for their first screen are diagnosed with invasive breast cancer (NAS 2.1.1), at least 35 women per 10,000 women screened aged 50–69 who attend for subsequent screens are diagnosed with invasive breast cancer (NAS 2.1.2), and that at least 25 women per 10,000 women screened aged 50–69 who attend for screening are diagnosed with small (≤15 mm) invasive breast cancer (NAS 2.2.1) (BreastScreen Australia 2004).

Guide to interpretation: Detection of invasive cancers is disaggregated into first and subsequent screening rounds because a woman is more likely to have a breast cancer detected the first time she visits a BreastScreen service than in subsequent visits, since her first visit detects prevalent cancers that may have been present for some time rather than incident cancers that have grown between screens (Kavanagh et al. 1999). Detection of small invasive cancers is presented for all screening rounds combined.

State and territory BreastScreen registers are the source of breast cancer detection data.

The most recent all-size and small cancer detection data are for women screened in 2009.

Key results

2009

- In 2009, 79.5 women aged 50–69 were diagnosed with invasive breast cancer per 10,000 women screened in the first screening round, and 45.4 per 10,000 women screened were diagnosed in subsequent screening rounds.
- In 2009, 30.5 women aged 50–69 were diagnosed with small (≤15 mm) invasive breast cancer per 10,000 women screened (all screening rounds combined).

Trends

- Between 1996 and 2009, detection of invasive breast cancer in the first screening round increased from 56.6 to 79.5 women diagnosed per 10,000 women screened.
- Between 1996 and 2009, detection of invasive breast cancer in subsequent screening rounds increased from 35.4 to 45.4 per 10,000 women screened.
- Detection of small (≤15 mm) invasive breast cancers for all screening rounds combined was 28 to 30 per 10,000 women screened for most years between 1996 and 2009.

Detailed analyses

Invasive breast cancer detection in 2009

In 2009, 4,405 women were diagnosed with invasive breast cancer, of which 3,408 (77.4%) were aged 50–69, 361 (8.2%) were 40–49 and 636 (14.4%) were 70 or over.

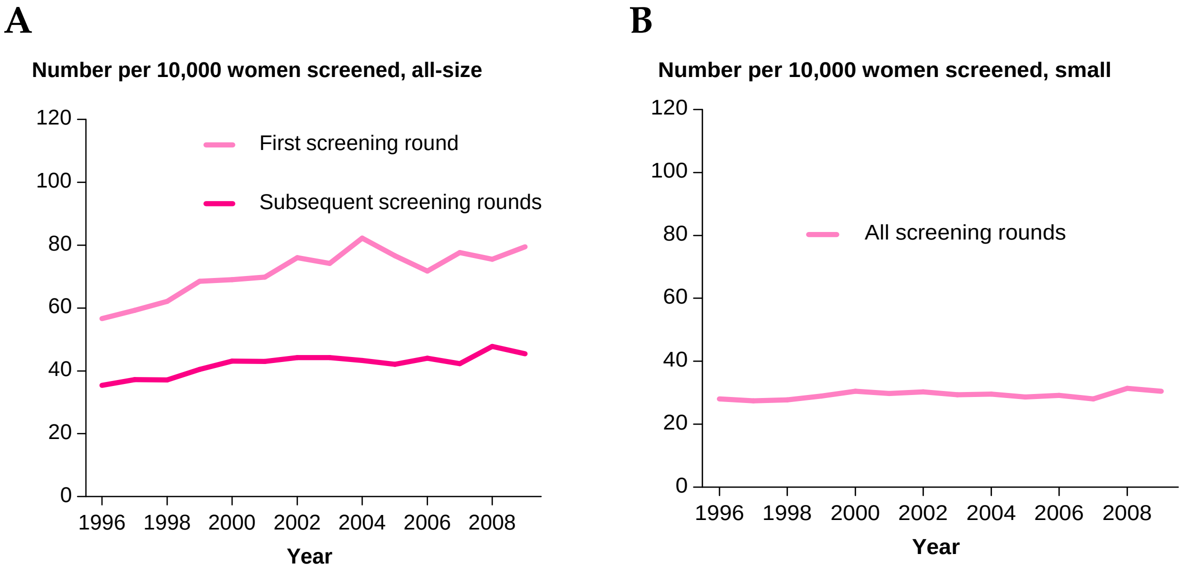
Of the women aged 50–69 diagnosed with invasive breast cancer, 549 were attending their first screen, which is equivalent to 65.2 women diagnosed per 10,000 women screened, and 2,859 were attending a subsequent screen, which is equivalent to 46.8 per 10,000 women screened. When age-standardised to allow analysis of trends and differentials, these rates are 79.5 per 10,000 women screened in the first screening round, and 45.4 per 10,000 women screened in subsequent screening rounds.

Of the 3,408 women aged 50–69 diagnosed with invasive breast cancer, 2,132 had a small (≤15 mm) cancer diagnosed (30.7 per 10,000 women screened). Age-standardised, this is 30.5 per 10,000 women screened.

These met the NAS for the detection of invasive breast cancer (*NAS 2.1.1 being that at least 50 women per 10,000 women screened aged 50–69 who attend for their first screen are diagnosed with invasive breast cancer, and NAS 2.1.2 being that at least 35 women per 10,000 women screened aged 50–69 who attend for their first screen are diagnosed with invasive breast cancer)*, as well as the NAS for the detection of small invasive breast cancer (*NAS 2.2.1 being that at least 25 women per 10,000 women screened aged 50–69 who attend for screening are diagnosed with small (≤15 mm) invasive breast cancer)*.

Invasive breast cancer detection trends

Detection of invasive breast cancers through BreastScreen Australia has increased over time (Figure 4.1).



Source: AIHW analysis of BreastScreen Australia data.

Figure 4.1: All-size (A) and small (≤15 mm, B) invasive breast cancer detection in women aged 50–69, first and subsequent screening rounds for all-size, and all screening rounds for small cancers, 1996 to 2009

Detection of invasive breast cancer in the first screening round increased from 56.6 women diagnosed per 10,000 women screened in 1996, to 82.2 in 2004, thereafter remaining steady at between about 72 and 80 per 10,000 women screened (Figure 4.1A and Table 4.1).

Detection of invasive breast cancer in subsequent screening rounds increased from 35.4 per 10,000 women screened in 1996 to remain steady at about 42 to 45 women diagnosed per 10,000 women screened between 2000 and 2009 (Table 4.1).

Table 4.1: All-size invasive breast cancer detection in women aged 50–69, first and subsequent screening rounds, 1996 to 2009

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
First screening round														
AS rate	56.6	59.3	62.1	68.5	69.0	69.8	76.0	74.2	82.2	76.6	71.8	77.6	75.5	79.5
95% CI	52.8–60.6	54.7–64.2	57.0–67.4	62.1–75.3	62.2–76.2	63.1–76.9	68.3–84.2	66.0–82.9	73.3–91.8	68.4–85.4	63.8–80.4	69.8–86.0	68.5–82.9	71.7–87.7
Subsequent screening rounds														
AS rate	35.4	37.2	37.1	40.5	43.1	43.0	44.2	44.2	43.3	42.1	44.0	42.3	47.8	45.4
95% CI	33.1–37.8	35.1–39.3	35.2–39.1	38.6–42.5	41.2–45.1	41.2–44.9	42.4–46.1	42.4–46.1	41.5–45.1	40.5–43.9	42.3–45.7	40.7–44.0	46.0–49.6	43.8–47.1

Note: Rates are the number of women with invasive breast cancer detected per 10,000 women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Detection of small cancers for all screening rounds combined was 28 to 30 per 10,000 women screened for most years between 1996 and 2009 (Table 4.2).

Table 4.2: Small (≤15 mm) invasive breast cancer detection rates in women aged 50–69, all screening rounds, 1996 to 2009

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
All screening rounds														
AS rate	28.0	27.4	27.7	29.0	30.5	29.8	30.3	29.4	29.6	28.7	29.2	28.0	31.4	30.5
95% CI	26.4–29.7	25.9–29.0	26.2–29.2	27.5–30.5	29.0–32.0	28.4–31.3	28.9–31.8	28.0–30.9	28.3–31.0	27.4–30.1	27.9–30.5	26.7–29.3	30.1–32.8	29.2–31.8

Note: Rates are the number of women with small invasive breast cancer detected per 10,000 women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

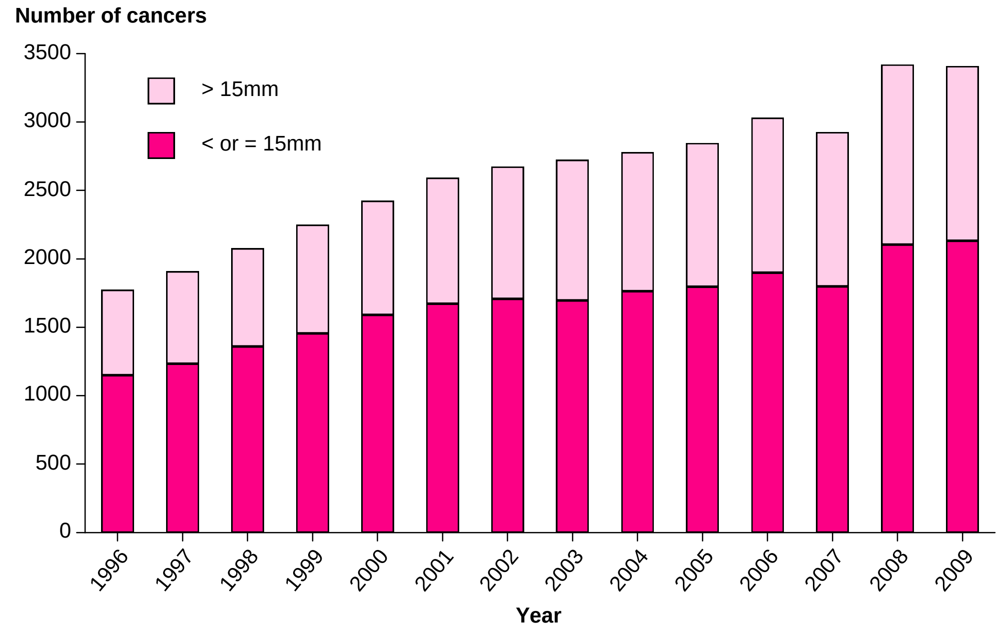
More than half of all invasive breast cancers detected through BreastScreen Australia were small (≤15 mm), with rates above 60% recorded for all years between 1996 and 2009 (Table 4.3; Figure 4.2).

Table 4.3: Proportion of invasive breast cancers detected in women aged 50–69 years that were small (≤15 mm), all screening rounds, 1996 to 2009

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Per cent	64.8	64.6	65.5	64.7	65.6	64.5	63.8	62.2	63.5	63.1	62.6	61.4	61.5	62.6

Note: Rates are the number of women with small invasive breast cancer detected as a proportion of the number of women with invasive breast cancer detected.

Source: AIHW analysis of BreastScreen Australia data.



Source: AIHW analysis of BreastScreen Australia data.

Figure 4.2: Number of invasive breast cancers, showing the proportion of small size (≤15 mm) to other size (>15 mm), detected in women aged 50–69, all screening rounds, 1996 to 2009

A woman is more likely to be diagnosed with a small cancer in subsequent screening visits than her first visit, since her first screening mammogram detects prevalent cancers that may have been present for some time, whereas subsequent screens detect incident cancers that have grown between screens (Kavanagh et al. 1999). Because they have had less time to grow, incident cancers are more likely to be small.

Terminology

Prevalent cancers: the number of cases of invasive breast cancer that are present in the population at a given time

Incident cancers: the number of new cancers diagnosed in a given time period, in this case one year

This is reflected in the data in Table 4.4, which show that the proportion of small cancers detected in 2009 (as in previous years) was lower in the first screening round (51.4%) than in subsequent screening rounds (64.7%).

Table 4.4: Proportion of small (≤15 mm) invasive cancers detected in women aged 50–69, first and subsequent screening rounds, 1999, 2004, 2008 and 2009

	First screening round	Subsequent screening rounds
1999	55.8	67.4
2004	56.1	64.9
2008	54.4	62.9
2009	51.4	64.7

Note: Rates are the number of women with small invasive breast cancer detected as a proportion of the number of women with invasive breast cancer detected.

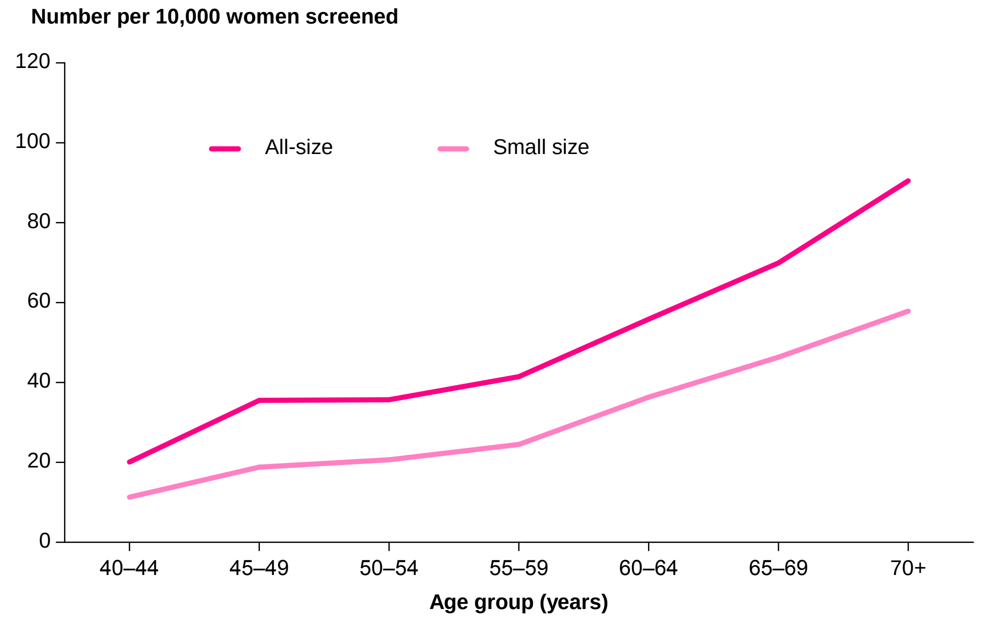
Source: AIHW analysis of BreastScreen Australia data.

The proportion of invasive breast cancers detected that were small was lower in younger age groups, being 53.7% of cancers detected for women aged 40–49, compared with 62.6% for women aged 50–69 and 63.7% for those 70 years and over in 2009. This may be related to greater breast density in younger women, which makes small invasive breast cancers more difficult to visualise using screening mammography (Irwig et al. 1997).

Invasive breast cancer detection by age

Detection of invasive breast cancers by BreastScreen Australia increased with age, reflecting the increase in breast cancer incidence that occurs with age, as described in Indicator 7a.

In 2009, invasive breast cancer detection increased from 20.1 per 10,000 women screened for women aged 40–44 to 90.5 for women aged 70 or over (Figure 4.3). Small invasive breast cancers increased in the same year, from 11.3 per 10,000 women screened in women aged 40–44 to 57.8 for women aged 70 or over (Figure 4.3).



Source: AIHW analysis of BreastScreen Australia data.

Figure 4.3: All-size and small (≤15 mm) invasive breast cancer detection, by age, all screening rounds, 2009

Table 4.5: All-size invasive breast cancer detection rates, by age, all screening rounds, 1999, 2004, 2008 and 2009

	Age group (years)						
	40–44	**45–49**	**50–54**	**55–59**	**60–64**	**65–69**	**70+**
1999	18.1	24.2	33.0	42.2	49.9	57.7	66.3
2004	19.6	29.1	37.0	44.5	50.6	58.6	72.2
2008	24.2	31.0	40.4	44.7	56.4	69.4	83.2
2009	20.1	35.5	35.7	41.4	55.8	69.9	90.5

Notes:

1. Rates are the number of women with invasive breast cancer detected per 10,000 women screened.
2. Confidence intervals for this table are presented in Appendix table A4.1.

Source: AIHW analysis of BreastScreen Australia data.

Table 4.6: Small (≤15 mm) invasive breast cancer detection rates, by age, all screening rounds, 1999, 2004, 2008 and 2009

	Age group (years)						
	40–44	**45–49**	**50–54**	**55–59**	**60–64**	**65–69**	**70+**
1999	9.8	13.0	19.2	28.2	33.1	39.0	45.8
2004	11.1	16.1	21.9	28.9	32.4	38.3	48.1
2008	13.2	15.5	24.1	26.0	35.6	44.8	50.6
2009	11.3	18.8	20.6	24.5	36.3	46.3	57.8

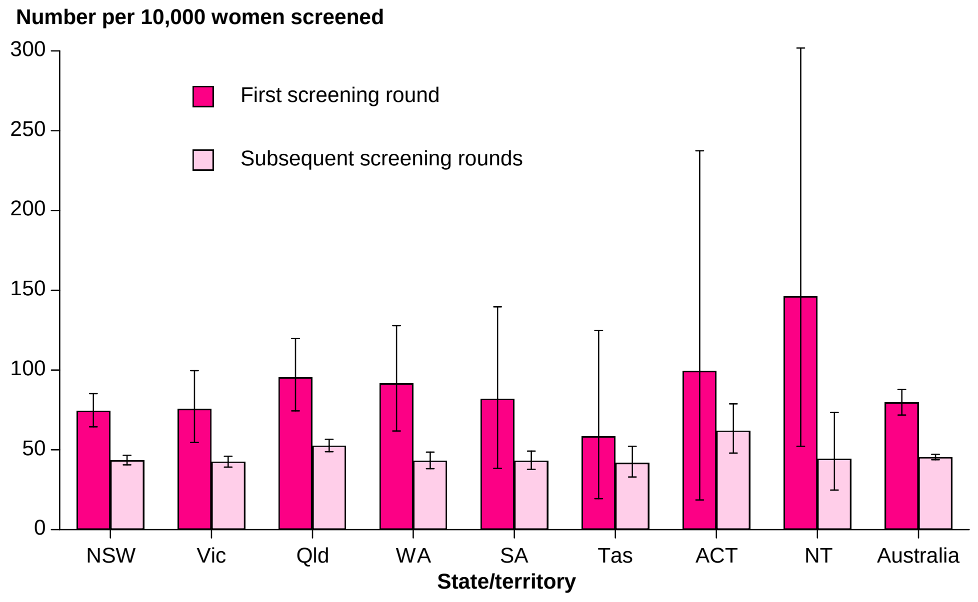
Notes:

1. Rates are the number of women with invasive breast cancer detected per 10,000 women screened.
2. Confidence intervals for this table are presented in Appendix table A4.1.

Source: AIHW analysis of BreastScreen Australia data.

Invasive breast cancer detection by state and territory

The number of women with invasive breast cancer diagnosed per 10,000 women screened showed considerable variation among states and territories. These data should be interpreted with caution because, due to small numbers, none of the observed differences were significant (Figure 4.4).



Note: Bars on columns represent 95% confidence intervals.

Source: AIHW analysis of BreastScreen Australia data.

Figure 4.4: All-size invasive breast cancer detection in women aged 50–69, by state and territory, first and subsequent screening rounds, 2009

Variation was also apparent within states and territories in previous years, although these were rarely significant (Table 4.7).

Table 4.7: All-size and small (≤15 mm) invasive breast cancer detection rates in women aged 50–69, by state and territory, 1999, 2004, 2008 and 2009

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
All-size, first screening round									
1999	54.2	75.3	77.8	70.4	99.5	53.7	81.6	6.3	68.5
2004	78.2	93.7	90.9	63.2	95.3	75.1	64.1	91.4	82.2
2008	66.1	81.2	91.2	99.0	117.2	95.6	114.6	62.9	75.5
2009	74.3	75.5	95.3	91.5	82.0	58.3	99.4	146.1	79.5
All-size, subsequent screening rounds									
1999	36.8	40.2	42.5	50.1	40.2	40.0	47.7	33.1	40.5
2004	45.5	39.6	43.0	45.1	42.5	48.0	54.6	48.0	43.3
2008	45.7	49.3	49.8	47.8	45.6	41.9	54.8	48.4	47.8
2009 rate	43.4	42.5	52.5	43.2	43.1	41.8	62.0	44.4	45.4
Small, all screening rounds									
1999	25.2	28.7	31.8	34.9	31.8	26.5	34.2	19.1	29.0
2004	30.1	26.6	30.5	30.5	28.9	36.7	42.6	41.3	29.6
2008	30.6	31.1	32.8	32.2	32.4	29.3	33.5	16.3	31.4
2009	29.5	27.7	35.5	27.4	31.9	30.1	38.8	30.4	30.5

Notes

1. Rates are the number of women with invasive breast cancer detected per 10,000 women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008; rates based on numbers less than 20 should be interpreted with caution.
2. State and territory differences, along with the size of the 95% confidence intervals (particularly in the smaller states and territories), need to be taken into consideration when interpreting cancer detection results.
3. In some states and territories, the age-standardised rates vary considerably from the crude rates. Crude rates are available in the BreastScreen Australia monitoring report 2008–2009 Supplementary report.
4. Confidence intervals for this table are in Appendix table A4.2.

Source: AIHW analysis of BreastScreen Australia data.

Indicator 5 Ductal carcinoma in situ detection

What do we mean by ductal carcinoma in situ?

Definition: The number of women with ductal carcinoma in situ (DCIS) detected through BreastScreen Australia per 10,000 women screened.

Rationale: It has been recognised for some time that women with DCIS are at an increased risk of subsequent development of invasive breast cancer. Although much is not yet understood about the natural history of DCIS, there is evidence that DCIS may progress to invasive breast cancer if left untreated (WHO & IARC 2002). Invasive breast cancer may also occur after treated cases of DCIS, either in the opposite breast or independently of the original DCIS in the same breast (Kerlikowske et al. 2010).

It is not currently possible to predict which DCIS cases might progress to invasive breast cancer. However, given the increased risk of invasive breast cancer after a diagnosis of DCIS, and that the detection and subsequent treatment of high-grade DCIS is likely to prevent deaths from invasive breast cancer (Eusebi et al. 1994), BreastScreen Australia aims to maximise the detection of DCIS. This is reflected in the NAS for detection of DCIS that requires that, for women aged 50–69, at least 12 women per 10,000 women screened who attend their first screen are diagnosed with DCIS (NAS 2.3.1), and that at least 7 women per 10,000 women screened who attend for subsequent screens are diagnosed with DCIS (NAS 2.3.2) (BreastScreen Australia 2004).

Guide to interpretation: DCIS is disaggregated into first and subsequent screening rounds because a woman is more likely to have DCIS diagnosed at her first screen than subsequent screens, since her first visit detects prevalent cases, not just incident cases.

To produce comparable rates from the relatively small number of DCIS cases, detection of DCIS is reported by 10-year age groups.

State and territory BreastScreen registers are the source of DCIS detection data.

The most recent DCIS detection data are for women screened in 2009.

Key results

2009

- In 2009, 19.6 women aged 50–69 were diagnosed with DCIS per 10,000 women screened in the first screening round, and 11.7 per 10,000 women screened in subsequent screening rounds.

Trends

- Between 1996 and 2009, detection of DCIS increased from 12.3 to 19.6 per 10,000 women screened in first screens, and from 7.3 to 11.7 women diagnosed in subsequent screens.

Background information

Ductal carcinoma in situ (DCIS) is a non-invasive tumour that arises from the lining of the ducts that carry milk from the milk-producing lobules to the nipple. The changes to the cells lining the milk ducts seen in DCIS are similar to those in invasive breast cancer. However, unlike breast cancer, DCIS does not invade the surrounding breast tissue, and is instead contained entirely within the milk duct.

Most cases of DCIS are asymptomatic. They are usually detected as a change on a mammogram or as a chance finding on a breast biopsy for another condition (BreastScreen Australia 2004). DCIS was rarely discovered before the introduction of screening mammography, and the introduction and progressive expansion of national organised screening mammography from 1991 in the form of BreastScreen Australia and predecessors resulted in a substantial increase in its detection (Luke et al. 2006; NBBC et al. 2000).

It has been recognised for some time that women with DCIS are at an increased risk of subsequent development of invasive breast cancer. Although much is not yet understood about the natural history of DCIS, there is evidence it may progress to invasive breast cancer if left untreated (WHO & IARC 2002). Further, invasive breast cancer may also occur after treated cases of DCIS, either in the opposite breast or arising independently of the original DCIS in the same breast (Kerlikowske et al. 2010). BreastScreen Australia therefore aims to maximise the detection of DCIS in Australian women.

Detailed analyses

DCIS detection in 2009

In 2009, there were 1,136 women diagnosed with DCIS by BreastScreen Australia, of which 875 (77.0%) were aged 50–69.

Of the women aged 50–69 diagnosed with DCIS, 152 were attending their first screen, which is equivalent to 18.0 women diagnosed per 10,000 women screened, and 723 were attending a subsequent screen, which is equivalent to 11.8 per 10,000 women screened.

When age-standardised to allow analysis of trends and differentials, these rates are 19.6 per 10,000 women screened in the first screening round, and 11.7 per 10,000 women screened in subsequent screening rounds.

These met the NAS for the detection of DCIS (*NAS 2.3.1 being that at least 12 women per 10,000 women screened aged 50–69 who attend their first screen are diagnosed with DCIS, and NAS 2.3.2 being that at least 7 women per 10,000 women screened aged 50–69 who attend for subsequent screens are diagnosed with DCIS*).

DCIS detection trends for 1996 to 2009

Detection of DCIS in women aged 50–69 in the first screening round increased from 12.3 women diagnosed per 10,000 women screened in 1996 to 19.6 women in 2009 (Table 5.1), but rates were variable with relatively broad confidence intervals.

Detection of DCIS in women aged 50–69 in subsequent screening rounds increased from about 7 women diagnosed with DCIS per 10,000 women screened in 1996 to about 12 per 10,000 in 2009 (Table 5.1).

Table 5.1: Ductal carcinoma in situ detection in women aged 50–69, first and subsequent screening rounds, 1996 to 2009

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
First screening round														
AS rate	12.3	12.1	13.4	15.8	14.9	19.5	21.4	16.7	20.4	14.5	18.8	21.3	15.6	19.6
95% CI	10.6–14.2	10.1–14.3	11.2–16.0	12.9–19.2	11.9–18.4	16.1–23.3	17.6–25.8	13.0–21.0	16.1–25.4	11.2–18.4	14.9–23.3	17.3–25.7	12.7–18.8	16.0–23.6
Subsequent screening rounds														
AS rate	7.3	6.9	9.0	8.9	10.4	10.2	9.3	10.3	10.7	11.0	9.7	11.1	11.5	11.7
95% CI	6.3–8.4	6.1–7.9	8.0–10.0	8.1–9.9	9.5–11.4	9.3–11.1	8.5–10.2	9.4–11.2	9.8–11.6	10.2–11.9	8.9–10.6	10.3–12.0	10.7–12.4	10.9–12.6

Note: Rates are the number of women with DCIS detected per 10,000 women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Detection of DCIS by age

Similar to invasive breast cancer detection, DCIS detection increases with age. In 2009, the rate of women diagnosed with DCIS per 10,000 women screened increased from 10.3 for women aged 40–49 to 11.9 for women aged 50–59, 13.4 for women aged 60–69 and 19.6 for women aged 70 and over (Table 5.2)

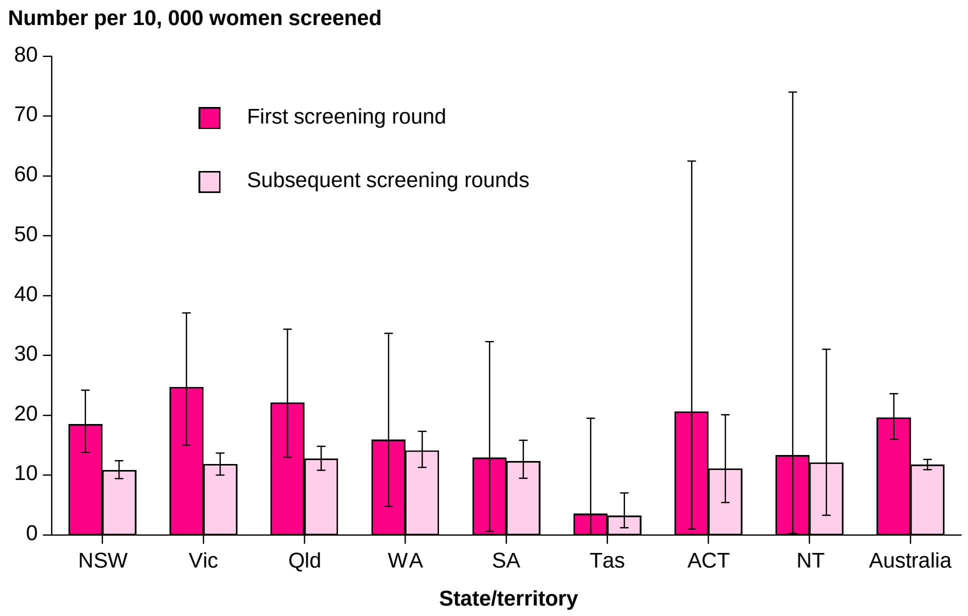
Table 5.2: Age-specific detection rates for ductal carcinoma in situ, by age, 1999, 2004, 2008 and 2009

	Age group (years)			
	40–49	**50–59**	**60–69**	**70+**
1999	6.4	9.1	11.1	11.3
2004	8.2	10.4	12.9	13.4
2008	9.6	11.1	13.8	15.6
2009	10.3	11.9	13.4	19.6

Note: Rates are the number of women with DCIS detected per 10,000 women screened

Source: AIHW Australian Cancer Database.

Detection of DCIS by state and territory



Source: AIHW analysis of BreastScreen Australia data.

Figure 5.1: Ductal carcinoma in situ detection in women aged 50–69, by state and territory, first and subsequent screening rounds, 2009

DCIS detection across states and territories for first and subsequent screening rounds in 2009 is shown in Figure 5.1, with trends for all screening rounds combined shown in Table 5.3.

Table 5.3: Ductal carcinoma in situ detection in women aged 50–69, by state and territory, all screening rounds, 1999, 2004, 2008 and 2009

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
1999	9.5	9.6	10.5	10.9	9.1	14.4	13.8	0.0	10.0
2004	11.0	10.4	12.8	12.8	11.2	13.8	12.1	15.0	11.5
2008	10.6	13.9	11.7	15.9	10.8	15.0	7.3	24.0	12.3
2009	12.0	12.9	13.3	14.3	13.2	3.6	13.4	13.0	12.6

Notes:

1. Rates are the number of women with DCIS detected per 10,000 women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008; rates based on numbers less than 20 should be interpreted with caution.
2. State and territory differences, along with the size of the 95% confidence intervals (particularly in the smaller states and territories), need to be taken into consideration when interpreting cancer detection results.
3. In some states and territories, the age-standardised rates vary considerably from the crude rates. Crude rate are available in the BreastScreen Australia monitoring report 2008–2009 Supplementary report.
4. Confidence intervals for this table are in Appendix table A5.1

Source: AIHW analysis of BreastScreen Australia data.

Indicator 6a Interval cancers

What do we mean by interval cancers?

Definition: The number of invasive breast cancers detected in women who have been screened through BreastScreen Australia that arise during an interval between two screening rounds, per 10,000 women-years.

Rationale: The ability of screening mammography to successfully detect invasive breast cancer in women in the target age group can be assessed by considering the relative number of:

- invasive breast cancers detected at screening episodes;
- invasive breast cancers diagnosed 0–12 months after a screening episode detected no cancer; and
- invasive breast cancers diagnosed 13–24 months after a screening episode detected no cancer.

BreastScreen Australia's goal is to have a high proportion of invasive breast cancers detected within screening episodes and a low proportion diagnosed after a screening episode detected no cancer (interval cancers).

This is reflected in the NAS for interval breast cancers that requires that less than 7.5 interval cancers per 10,000 women aged 50–69 are diagnosed in women who attend for screening less than 12 months after a negative screening episode (NAS 2.4.2(a)) (BreastScreen Australia 2004).

Guide to interpretation: Interval cancer rates are disaggregated into time since screening (0–12 months, 13–24 months and 0–24 months) and screening round (first and subsequent).

To produce comparable rates from the relatively small number of cases, interval cancer rates are reported by 10-year age groups, and aggregated over three years.

State and territory BreastScreen registers are the source of interval cancer data.

The most recent interval cancer data are for women screened in the index years 2004, 2005 and 2006 combined. Interval cancer data are several years behind participation, recall and detection data, as 2 years need to have passed to know whether a woman was diagnosed with an interval cancer in the 2 years after her last screen.

Key results

Interval cancers for the index years 2004, 2005 and 2006

- For the index years 2004, 2005 and 2006 combined, in the 0–12 months after a woman's first negative screening episode, there were 5.5 interval cancers per 10,000 women-years. In the 0–12 months after subsequent negative screening episodes, there were 6.7 interval cancers per 10,000 women-years.
- For the index years 2004, 2005 and 2006 combined, in the 13–24 months after a woman's first negative screening episode, there were 13.3 interval cancers per 10,000 women-years. In the 13–24 months after subsequent negative screening episodes, there were 12.5 interval cancers per 10,000 women-years.

Background information

Invasive breast cancers that are diagnosed after a screening episode detected no cancer and before the next scheduled screening episode are known as 'interval' cancers (Kavanagh et al. 1999). An interval cancer may

- be an aggressive breast cancer that emerges and grows very rapidly in the period between scheduled screening episodes
- be a breast cancer that, due to the characteristics of the cancer or the breast tissue, is not visible on screening mammography and therefore not able to be detected
- be a breast cancer that can be retrospectively detected on the previous screening mammogram (BreastScreen SA 2010).

The first two are true interval cancers, and therefore do not represent any failure in detection, whereas the third type represents a failure of the screening process. Through the BreastScreen accreditation process, state and territory BreastScreen programs are required to audit interval cancers. On investigation, more than 80% are found to be true interval cancers.

State and territory BreastScreen programs source information about breast cancers diagnosed outside the program from state and territory cancer registries to aid in the identification of interval cancers (Kavanagh et al. 1999).

Detailed analyses

Interval cancers for the index years 2004, 2005 and 2006

For the index years 2004, 2005 and 2006 combined, in the 0–12 months after a woman's first negative screening episode, there were 5.5 interval cancers per 10,000 women-years, and in the 0–12 months after subsequent negative screening episodes there were 6.7 interval cancers per 10,000 women-years (Table 6.1).

These rates are well within the NAS (*NAS 2.4.2(a) being that less than 7.5 interval cancers per 10,000 women aged 50–69 are diagnosed in women who attend for screening less than 12 months after a negative screening episode*).

The interval rate was higher in the 13–24 months after a negative screening episode than in the 0–12 months after a negative screening episode.

For the index years 2004, 2005 and 2006 combined, in the 13–24 months after a woman's first negative screening episode, there were 13.3 interval cancers per 10,000 women-years, and in the 13–24 months after subsequent negative screening episodes there were 12.5 interval cancers per 10,000 women-years (Table 6.2).

In index years 2004, 2005 and 2006 combined, there were no appreciable differences in the interval cancer rate between first and subsequent screening rounds for either 0–12 months or 13–24 after a negative screening episode. This indicates that, although women are more likely to have an invasive breast cancer detected in their first screening round compared with subsequent screening rounds, they are no more likely to have an interval cancer diagnosed after their first screen than after any other screen at a BreastScreen Australia service.

Table 6.1: Interval cancer rate for women aged 50–69, screened in index years 2001–2003 and 2004–2006, by state and territory, first and subsequent screening rounds, 0–12 months follow-up

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
First screening round									
Index years 2001–2003									
AS rate	6.4	7.2	7.5	4.8	3.5	22.7	n.p.	n.p.	6.9
95% CI	4.6–8.6	4.9–10.0	4.8–11.1	2.2–8.8	1.6–6.6	7.6–49.5	. .	. .	5.7–8.2
Index years 2004–2006									
AS rate	5.9	5.6	5.9	2.4	4.0	n.p.	n.p.	0.0	5.5
95% CI	4.1–8.1	3.3–8.6	3.6–9.2	1.0–4.7	1.8–7.6	. .	. .	0.0–0.0	4.4–6.7
Subsequent screening rounds									
Index years 2001–2003									
AS rate	7.3	6.9	7.1	6.6	6.7	7.0	6.0	n.p.	7.0
95% CI	6.5–8.1	6.1–7.8	6.2–8.2	5.3–8.1	5.5–8.2	4.8–10.1	3.3–10.1	. .	6.6–7.4
Index years 2004–2006									
AS rate	6.6	7.0	7.1	5.9	5.9	9.7	6.3	4.0	6.7
95% CI	5.9–7.3	6.2–7.8	6.2–8.1	4.8–7.1	4.7–7.2	7.0–13.1	3.6–10.3	0.8–11.7	6.3–7.1

n.p. not published (rates based on numbers of 1 or 2 are not reported).

Note: Rates are the number of interval cancers detected per 10,000 women-years and age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Table 6.2: Interval cancer rate for women aged 50–69, screened in index years 2001–2003 and 2004–2006, by state and territory, first and subsequent screening rounds, 13–24 months follow-up

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
First screening round									
Index years 2001–2003									
AS rate	9.9	10.0	17.4	14.2	9.4	11.9	12.1	n.p.	11.9
95% CI	7.7–12.6	7.3–13.3	13.0–22.8	7.8–22.7	4.0–17.1	4.4–25.8	3.9–28.3	. .	10.3–13.6
Index years 2004–2006									
AS rate	12.0	19.0	11.9	19.1	4.6	4.7	n.p.	0.0	13.3
95% CI	9.0–15.6	13.3–25.7	7.8–17.2	10.6–30.3	2.2–8.4	1.0–13.6	. .	. .	11.3–15.6
Subsequent screening rounds									
Index years 2001–2003									
AS rate	11.5	13.5	14.0	11.3	12.0	11.1	8.6	17.7	12.5
95% CI	10.5–12.5	12.3–14.7	12.6–15.4	9.5–13.5	10.2–14.0	8.0–14.9	5.1–13.6	7.7–34.3	11.9–13.1
Index years 2004–2006									
AS rate	12.2	12.7	14.2	10.8	12.9	12.1	6.9	6.6	12.5
95% CI	11.2–13.3	11.6–13.9	12.6–15.9	9.2–12.6	11.0–14.9	9.0–16.0	3.9–11.4	2.1–15.5	11.9–13.1

n.p. not published (rates based on numbers of 1 or 2 are not reported).

Notes

1. Rates are the number of interval cancers detected per 10,000 women-years and age-standardised to the population of women attending a BreastScreen Australia service in 2008.
2. Interval cancer data for New South Wales are incomplete for the index year 2006; interval cancer data for Queensland are based on the index years 2004 and 2005 only.

Source: AIHW analysis of BreastScreen Australia data.

Table 6.3: Interval cancer rate for women aged 50–69, screened in index years 2001–2003 and 2004–2006, first and subsequent screening rounds, 0–24 months follow-up

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
First screening round									
Index years 2001–2003									
AS rate	8.1	8.6	12.4	9.2	6.4	17.1	7.1	n.p.	9.3
95% CI	6.6–9.8	6.8–10.7	9.8–15.4	5.8–13.5	3.5–10.3	8.2–30.6	2.6–15.5	. .	8.3–10.4
Index years 2004–2006									
AS rate	8.7	12.3	8.4	10.3	4.3	5.2	n.p.	0.0	9.1
95% CI	6.9–10.6	9.2–15.9	6.1–11.1	6.2–15.6	2.6–6.7	1.2–13.2	. .	. .	8.0–10.3
Subsequent screening rounds									
Index years 2001–2003									
AS rate	9.3	10.2	10.5	8.7	9.3	9.0	7.2	8.5	9.6
95% CI	8.6–9.9	9.5–10.9	9.6–11.4	7.6–9.9	8.2–10.5	7.0–11.3	4.9–10.2	3.9–15.9	9.3–10.0
Index years 2004–2006									
AS rate	9.1	9.8	9.9	8.1	9.2	10.8	6.6	5.2	9.3
95% CI	8.5–9.7	9.2–10.5	9.1–10.8	7.2–9.2	8.1–10.4	8.7–13.3	4.5–9.4	2.2–10.4	9.0–9.7

n.p. not published (rates based on numbers of 1 or 2 are not reported).

Notes

1. Rates are the number of interval cancers detected per 10,000 women-years and age-standardised to the population of women attending a BreastScreen Australia service in 2008.
2. Interval cancer data for New South Wales are incomplete for the index year 2006; interval cancer data for Queensland are based on the index years 2004 and 2005 only.

Source: AIHW analysis of BreastScreen Australia data.

Interval cancer trends

Apparent decreases in the interval cancer rate 0–12 months and 13–24 months after a negative screening episode between the index years 2001–2003 and 2004–2006 were not found to be significant (Table 6.1)

Interval cancer by age

Interval cancers in the first 0–12 months were more likely to be diagnosed in women aged 40–49. In 2004–2006, with all screening rounds combined, interval cancer rates in the 0–12 months after a negative screening interval decreased with age, from 7.4 per 10,000 women-years in women aged 40–49 to 6.5 and 6.8 for women aged 50–59 and 60–69 respectively, and 6.1 for women aged 70 or over. This trend was not apparent in the 13–24 months after a negative screening episode.

Relatively high interval cancer rates for women aged 40–49 in the 0–12 months, but not the 13–24 months, after a negative screening round may be due to younger women being more likely to have aggressive breast cancers that present with symptoms in the 12 months immediately after a previous screen (Erbas et al. 2004).

Interval cancer by state and territory

Interval cancer rates are shown for states and territories in Tables 6.1, 6.2 and 6.3.

It should be noted that differences in state and territory policies for the management of women with symptoms may affect interval cancer rates.

Indicator 6b Program sensitivity

What do we mean by program sensitivity?

Definition: Program sensitivity is directly related to interval cancers. It is the proportion of invasive breast cancers detected by BreastScreen Australia (screen-detected cancers) out of all invasive breast cancers (interval cancers plus screen-detected cancers) diagnosed in program-screened women in the screening interval.

Rationale: High program sensitivity indicates that few cancers in women screened are missed by BreastScreen Australia — that is, most breast cancers are detected by BreastScreen Australia as reported in Indicator 4 rather than as interval cancers.

While there are no NAS that directly relate to the program sensitivity indicator, high sensitivity is desirable.

Guide to interpretation: Program sensitivity is disaggregated into time since screening (0–12 months and 0–24 months) and screening round (first and subsequent).

To produce comparable rates from the relatively small number of cases, interval cancer rates are reported by 10-year age groups, and aggregated over three years.

State and territory BreastScreen registers are the source of sensitivity data.

The most recent program sensitivity data are for women screened in the index years 2004, 2005 and 2006 combined. Program sensitivity data are several years behind participation, recall and detection data, as 2 years need to have passed to know whether a woman was diagnosed with an interval cancer in the 2 years after her last screen.

Key results

Program sensitivity for the index years 2004, 2005 and 2006

- For the index years 2004–2006, program sensitivity for 0–12 months was 92.5% for the first screening round and 86.3% for subsequent screening rounds. For the same years, program sensitivity for 0–24 months was 79.9% for the first screening round and 70.2% for subsequent screening rounds.
- In 2004–2006, with all screening rounds combined, program sensitivity for 0–12 months increased with age, from 78.5% in women aged 40–49 to 85.5% and 89.4% for women aged 50–59 and 60–69 respectively, and 92.4% for women aged 70 or over. Lower sensitivity means that BreastScreen Australia is less able to detect invasive breast cancers in women aged 40–49 who attend for screening.

Detailed analyses

Program sensitivity for the index years 2004, 2005 and 2006

For the index years 2004–2006, program sensitivity for 0–12 months was 92.5% for the first screening round and 86.3% for subsequent screening rounds (Table 6.4). Overall program sensitivity (0–24 months) was 79.9% for the first screening round and 70.2% for subsequent screening rounds (Table 6.5).

For the index years 2004–2006, no significant difference was found in program sensitivity between the first screening round and subsequent screening rounds for 0–12 months, but program sensitivity was significantly lower for subsequent screening rounds than for the first screening round for overall program sensitivity (0–24 months) (Tables 6.4 and 6.5).

Program sensitivity trends

The apparent increase in program sensitivity between 2001–2003 and 2004–2006 was not found to be statistically significant for either the first or subsequent screening intervals (Table 6.4).

Table 6.4: Program sensitivity for women aged 50–69, screened in index years 2001–2003 and 2004–2006, by state and territory, first and subsequent screening rounds, 0–12 months follow-up

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
First screening round									
Index years 2001–2003									
AS rate	90.8	89.4	90.2	92.7	94.7	82.5	96.0	88.9	90.4
95% CI	82.5–99.6	79.6–100.0	79.6–100.0	75.7–100.0	76.0–100.0	56.8–100.0	53.7–100.0	29.3–100.0	85.6–95.5
Index years 2004–2006									
AS rate	91.4	91.8	92.7	96.6	94.0	93.7	97.7	100.0	92.5
95% CI	82.9–100.0	80.0–100.0	81.9–100.0	77.7–100.0	71.8–100.0	63.2–100.0	61.9–100.0	45.5–100.0	87.3–97.9
Subsequent screening round									
Index years 2001–2003									
AS rates	85.6	84.2	86.6	87.3	87.4	86.9	86.8	96.6	86.0
95% CI	81.9–89.4	79.8–88.7	82.1–91.4	80.9–94.0	81.0–94.2	75.1–99.9	70.1–100.0	64.7–100.0	83.9–88.1
Index years 2004–2006									
AS rates	86.5	85.1	86.1	87.9	88.7	80.9	87.4	91.4	86.3
95% CI	82.9–90.1	81.0–89.4	81.7–90.6	81.7–94.5	82.0–95.8	69.8–93.3	72.2–100.0	62.7–100.0	84.3–88.3

Note: Rates are the number of screen-detected cancers as a percentage of all cancers (screen-detected and interval cancers) and age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Table 6.5: Program sensitivity for women aged 50–69, screened in index years 2001–2003 and 2004–2006, by state and territory, first screening round, 0–24 months follow-up

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
First screening round									
Index years 2001–2003									
AS rates	79.6	78.3	74.8	78.9	85.4	73.0	82.4	81.4	78.2
95%CI	72.3–87.4	69.6–87.7	65.9–84.4	64.6–95.0	68.0–100.0	50.0–100.0	43.6–100.0	25.0–100.0	74.0–82.7
Index years 2004–2006									
AS rates	80.6	74.6	80.2	79.3	88.6	87.0	95.5	100.0	79.9
95%CI	73.2–88.6	65.0–85.1	69.1–92.6	64.2–96.4	67.0–100.0	58.4–100.0	60.1–100.0	46.4–100.0	75.2–84.7
Subsequent screening round									
Index years 2001–2003									
AS rates	71.1	64.7	69.6	74.0	72.7	72.9	74.4	74.4	69.9
95%CI	68.1–74.3	61.4–68.2	66.0–73.5	68.6–79.7	67.3–78.3	63.1–83.8	60.1–91.0	49.8–100.0	68.2–71.6
Index years 2004–2006									
AS rates	72.4	67.0	66.9	74.2	71.6	67.0	78.6	80.8	70.2
95%CI	69.4–75.4	63.7–70.3	62.6–71.3	68.9–79.7	66.2–77.3	57.9–77.2	65.0–94.2	56.0–100.0	68.5–71.9

Notes:

1. Rates are the number of screen-detected cancers as a percentage of all cancers (screen-detected and interval cancers) and age-standardised to the population of women attending a BreastScreen Australia service in 2008.
2. Program sensitivity data for New South Wales are incomplete for the index year 2006; program sensitivity data for Queensland are based on the index years 2004 and 2005 only.

Source: AIHW analysis of BreastScreen Australia data.

Program sensitivity by age

Consistent with the higher interval cancer rates in women aged 40–49 noted earlier, program sensitivity was lowest in women aged 40–49, thereafter increasing with age.

In 2004–2006, with all screening rounds combined, program sensitivity for 0–12 months increased with age, from 78.5% in women aged 40–49 to 85.5% and 89.4% for women aged 50–59 and 60–69 respectively, and 92.4% for women aged 70 or over. Lower sensitivity means that BreastScreen Australia is less able to detect invasive breast cancers in women aged 40–49 who attend for screening.

Program sensitivity by state and territory

Program sensitivity is shown for states and territories in Tables 6.4 and 6.5.

As noted for the interval cancer indicator, both interval cancers and sensitivity rates in each state and territory are affected by the varying policies for the management of symptomatic women in jurisdictions. This affects the comparability of this indicator between jurisdictions.

Indicator 7a Invasive breast cancer incidence

What do we mean by invasive breast cancer?

Definition: The number of new cases of invasive breast cancer per 100,000 estimated resident female population in a 12-month period.

Rationale: Incidence data provide information about the underlying level of invasive breast cancer in Australia. Annual monitoring of these data with various stratifications (such as age or location) may reveal findings of concern or positive trends that can be used to inform BreastScreen Australia as well as broader policies for breast cancer in Australian women.

Guide to interpretation: These data include both screen-detected breast cancers (through BreastScreen Australia) and breast cancers detected outside the screening program.

Incidence data are reported per 100,000 women in the population.

Invasive breast cancer incidence by state and territory, remoteness area and Aboriginal and Torres Strait Islander status is reported over a 5-year instead of a 12-month period to improve the stability and comparability of rates due to the small number of new cases in less populated areas and in Aboriginal and Torres Strait Islander women.

The Australian Cancer Database is the source of breast cancer incidence data.

The most recent invasive breast cancer incidence data are for new cases diagnosed in 2007.

Key results

Invasive breast cancer incidence in 2007

- In 2007, there were 6,297 new cases of breast cancer in women aged 50–69, the target population of BreastScreen Australia, or 274.3 new cases per 100,000 women. There were 12,567 new cases, or 109.2 new cases per 100,000 women, in women of all ages.
- In 2007, new cases of invasive breast cancer diagnosed in women aged 50–69 comprised 50.1% of all invasive breast cancers diagnosed in that year.

Invasive breast cancer incidence across remoteness areas

- In 2003–2007, the incidence of invasive breast cancer decreased with increasing remoteness, being highest (286.1 new cases per 100,000 women) in *Major cities* and lowest (220.9 new cases per 100,000 women) in *Very remote* areas.

Invasive breast cancer incidence in Aboriginal and Torres Strait islander women

- In 2003–2007, invasive breast cancer incidence in Aboriginal and Torres Strait Islander women from Queensland, Western Australia, South Australia and the Northern Territory was significantly lower than non-Indigenous women from these states and territories, at 171.4 new cases per 100,000 women compared with the non-Indigenous rate of 259.3 new cases per 100,000 women for women aged 50–69.

Background information

Registration of cancer cases is required by law in each of the states and territories. Data are collected by state and territory cancer registries and compiled in the national Australian Cancer Database (ACD, formerly the National Cancer Statistics Clearing House), held by the AIHW. The data include clinical and demographic information about people with newly diagnosed cancer.

Invasive breast cancer incidence measures the number of new cases of breast cancer diagnosed each year, sourced from the ACD. Only primary breast cancers are included—secondary breast cancers and breast cancers that are a reoccurrence of a primary breast cancer are not counted. Note that incidence data refer to the number of new cases diagnosed and not number of women diagnosed (although it is rare for a woman to be diagnosed with more than one primary breast cancer in the same year).

Detailed analysis

Invasive breast cancer incidence in 2007

In 2007, there were 12,567 new cases of breast cancer in Australian women. This is equivalent to 118.6 new cases for every 100,000 women in the population, which, when age-standardised to allow analysis of trends and differentials, equates to an incidence rate of 109.2 for 2007.

Of the 12,567 new cases, 6,297 were in women aged 50–69, the target population of BreastScreen Australia. These 6,297 new cases represent 50.1% of all invasive breast cancers diagnosed in that year, and 276.8 new cases for every 100,000 women in the population. When age-standardised to allow analysis of trends and differentials, this equates to an incidence rate of 274.3 for 2007 for women aged 50–69.

In 2007, it was estimated that about 45% of invasive breast cancers diagnosed in women aged 50–69, and around a third of all breast cancers, were detected through BreastScreen Australia.

In the broader context of cancers diagnosed in Australian women (and excluding basal cell and squamous cell carcinoma of the skin), breast cancer was the most commonly diagnosed cancer in Australian women in 2007, comprising 27.1% of all cancers diagnosed in women that year, as well as being the most prevalent (AIHW & AACR 2010).

Also in 2007, the mean age at diagnosis was 60.3, and the risk of being diagnosed with breast cancer was 1 in 11 by age 75 and 1 in 9 by age 85 (AIHW & AACR 2010).

Invasive breast cancer incidence trends

The incidence of invasive breast cancer increased over time. The number of new breast cancer cases in women aged 50–69 has more than doubled over the 25 years from 2,438 new cases in 1982 (the year in which national incidence data were first available) to 6,297 new cases in 2007 (Figure 7.1; Table 7.1). For all age groups combined, the overall increase in the number of new cases of invasive breast cancer more than doubled from 5,291 in 1982 to 12,567 in 2007, an increase of 137.4% (Table 7.1).

Table 7.1: Incidence of breast cancer, 1982 to 2007

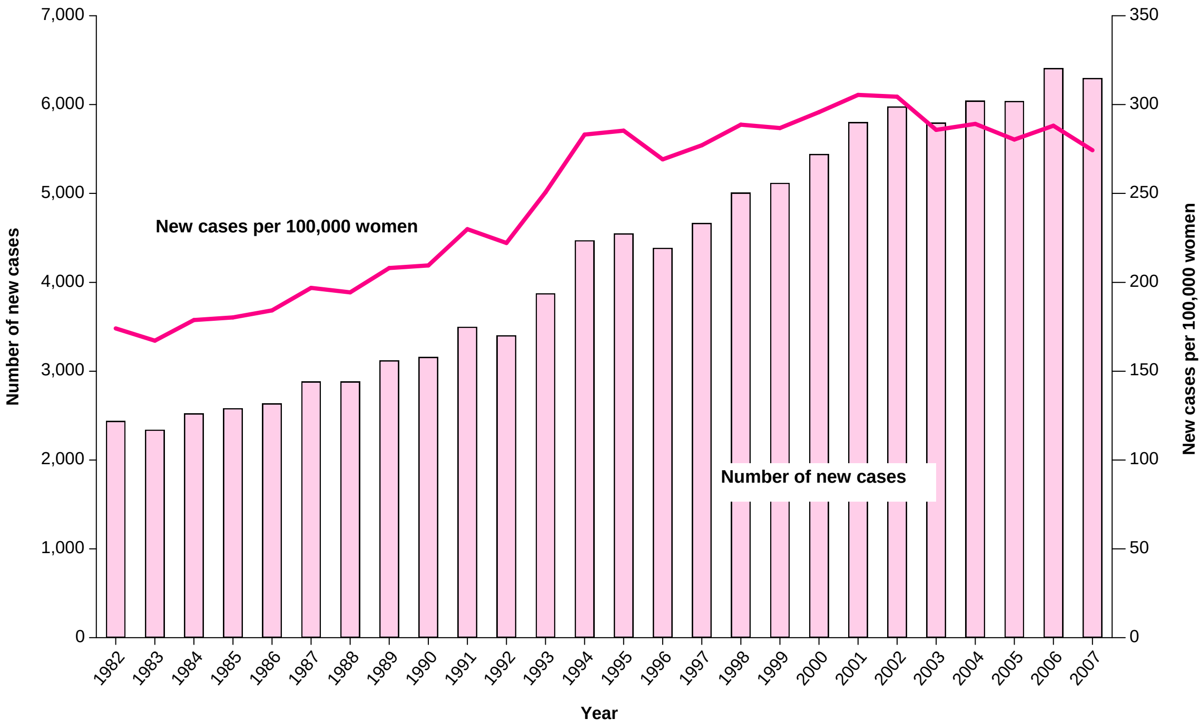
		Age group (years)		
Year of diagnosis	**All ages**	**<50**	**50–69**	**70+**
1982	80.8	33.7	174.1	249.9
1983	80.6	34.3	167.1	257.7
1984	83.4	34.0	178.8	266.4
1985	84.1	34.7	180.3	265.4
1986	85.1	33.1	184.2	279.8
1987	91.1	38.3	196.9	278.7
1988	89.6	36.8	194.4	278.7
1989	93.5	37.5	208.0	286.8
1990	94.8	38.2	209.5	292.1
1991	100.4	38.8	229.9	304.7
1992	98.2	39.9	222.1	289.6
1993	105.3	40.4	250.6	301.6
1994	114.2	41.4	283.1	322.3
1995	115.6	41.6	285.3	331.4
1996	109.3	40.1	269.2	307.4
1997	111.5	39.6	277.1	319.2
1998	114.6	40.4	288.7	322.6
1999	111.2	39.1	286.8	298.9
2000	115.9	40.9	295.7	316.8
2001	117.6	40.6	305.4	317.1
2002	117.3	41.4	304.5	309.6
2003	112.4	41.2	285.8	297.9
2004	113.3	40.6	289.2	305.0
2005	111.4	42.5	280.4	288.1
2006	112.7	41.9	288.1	290.3
2007	109.2	41.0	274.3	288.8

Note: Rates are the number of new cases of invasive breast cancer per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database.

While the age-standardised incidence rate for women aged 50–69 had been increasing steadily before BreastScreen Australia commenced, from 174.1 new cases per 100,000 women in 1982 (the first year for which data are available) to 209.5 in 1990, incidence increased more sharply from 229.9 in 1991 when BreastScreen Australia commenced to a peak of 305.4 new cases per 100,000 women in 2001 (Figure 7.1).

Thereafter, age-standardised incidence rates of invasive breast cancer in women aged 50–69 decreased between 2002 and 2007 from 304.5 to 274.3 new cases per 100,000 (Figure 7.1).



Note: Rates are the number of new cases of invasive breast cancer per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of BreastScreen Australia data.

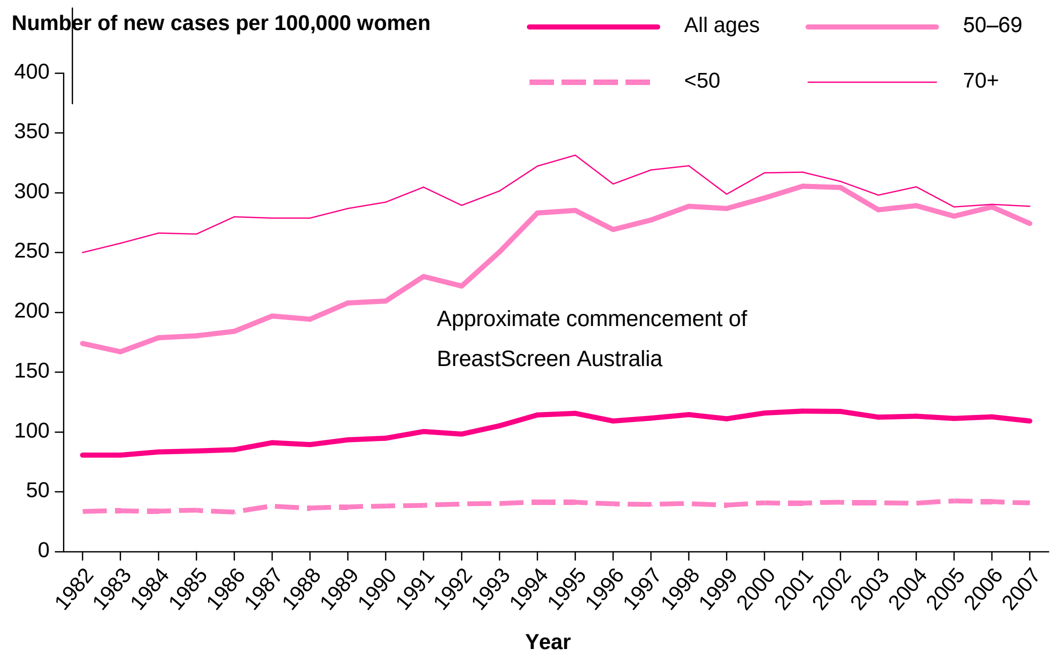
Figure 7.1: Incidence of breast cancer in women aged 50–69, 1982 to 2007

Invasive breast cancer incidence by age

When comparing trends in the incidence of invasive breast cancer across broad age groups, the pattern of incidence for women aged 50–69 appears to be mirrored in women aged 70 and over (Figure 7.2).

While incidence was historically highest in women aged 70 and over, incidence was indistinguishable from that in women aged 50–69 since 2005 (Figure 7.2). Incidence for women aged under 50 remained steady at between about 39 and 42 new cases per 100,000 women between 1991 and 2007 (Figure 7.2).

In 2007, new cases of invasive breast cancer diagnosed in women aged 50–69 comprised 50.1% of all invasive breast cancers. This is an increase from 45.8% in 1997, and 43.1% in 1987.



Note: Rates are the number of new cases of invasive breast cancer per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database.

Figure 7.2: Incidence of breast cancer, by age, 1982–2007

Analysis of 5-year age groups reveals that, in 2007, the highest incidence of invasive breast cancer was for women aged 60–64 and 65–69, at 320.0 and 332.9 new cases per 100,000 women respectively (Table 7.2).

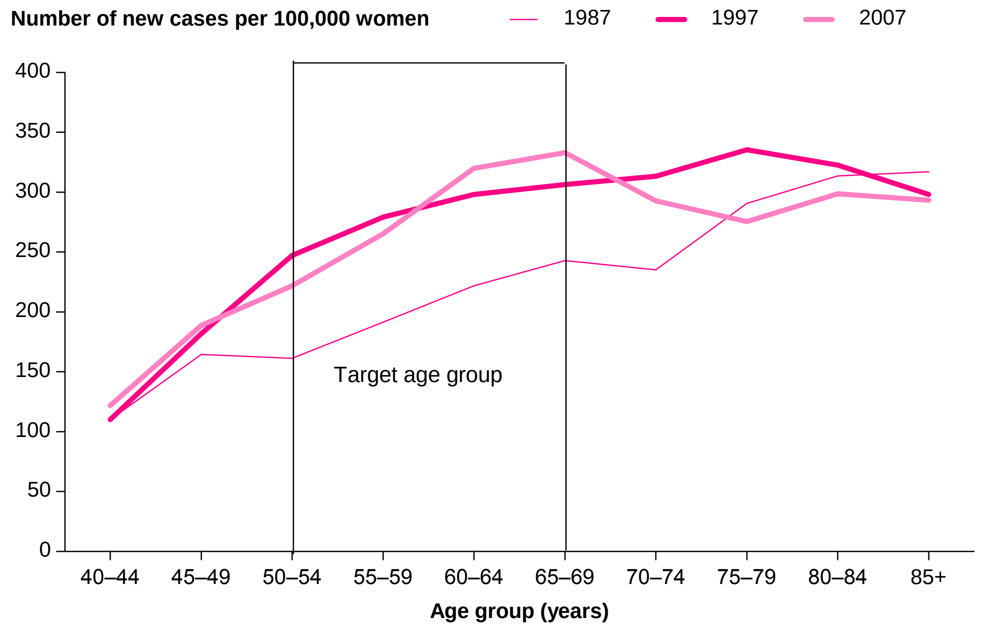
Table 7.2: Age-specific incidence of breast cancer, by age, 2007

	Age group (years)									
	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+
New cases	933	1,453	1,550	1,688	1,701	1,358	981	823	725	672
Crude rate	121.7	188.7	221.8	265.1	320.0	332.9	292.7	275.4	298.6	293.3

Note: Rates are the number of new cases of invasive breast cancers per 100,000 women.

Source: AIHW Australian Cancer Database.

While these two age groups also had the highest incidence 5 years in 2002, the trend was notably different 10 years earlier in 1997, with the highest incidence in women aged 75–79 (Figure 7.3). Going back another 10 years to 1987, before BreastScreen Australia began, incidence was lower in 1987 than in 2007 for all age groups from 40–44 to 70–74, but greater than the age groups from 75–79 to 85 and over (Figure 7.3).



Source: AIHW Australian Cancer Database.

Figure 7.3: Age-specific incidence rates for breast cancer, by age, 1987, 1997 and 2007

Invasive breast cancer incidence by state and territory

In 2003–2007, the incidence of invasive breast cancers for women aged 50–69 was relatively stable across states and territories, with most around the national rate of 283.4 new cases per 100,000 women.

The exceptions were the Australian Capital Territory, with a higher incidence of 321.5 new cases per 10,000 women, and the Northern Territory, with a notably lower incidence of 205.2. (Table 7.3). It should be noted, however, that the data for the two least-populated jurisdictions are open to variation due to smaller numbers, even with 5 years of data combined.

Table 7.3: Incidence of breast cancer, women aged 50–69, by state and territory, 2003–2007

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
New cases	10,290	7,296	5,994	2,935	2,594	784	534	156	30,583
AS rate	287.5	273.4	286.6	282.2	292.8	276.5	321.5	205.2	283.4
95% CI	281.9–293.1	267.1–279.7	279.3–293.9	272.1–292.6	281.6–304.3	257.4–296.6	294.6–350.1	173.3–241.1	280.3–286.6

Note: Rates are the number of new cases of invasive breast cancer per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database.

Trends across states and territories from 1993–1997, to 1998–2002 and 2003–2007 are shown in Figure 7.4.

Note: Bars on columns represent 95% confidence intervals.

Source: AIHW Australian Cancer Database.

Figure 7.4: Incidence of breast cancer, women aged 50–69, by state and territory, 1993–1997, 1998–2002 and 2003–2007

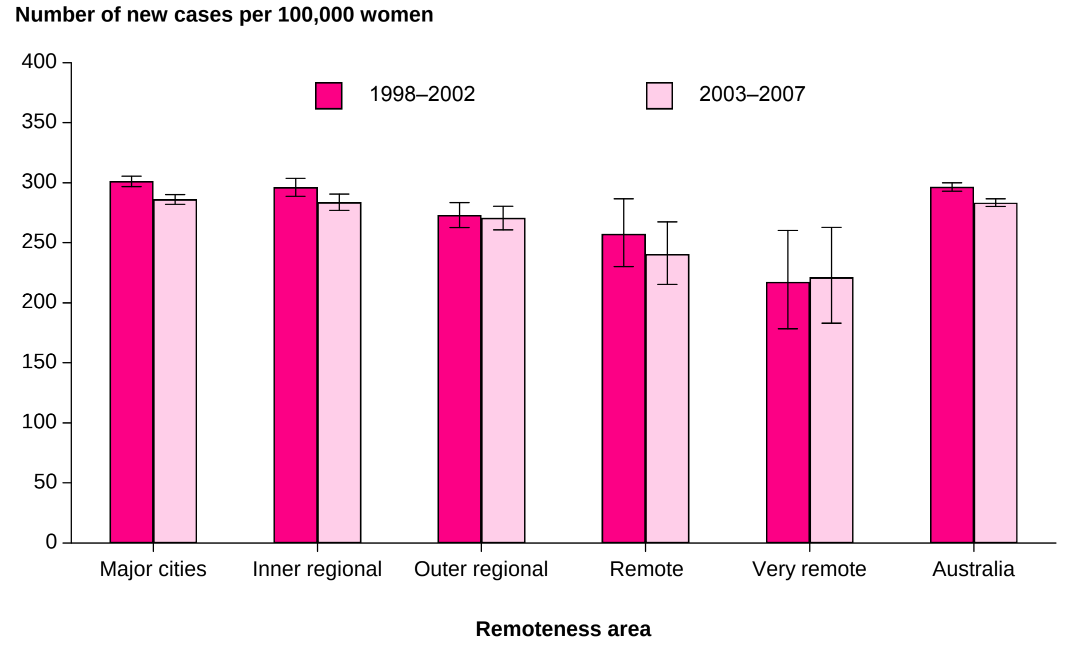
Incidence of invasive breast cancer by remoteness area

The incidence of invasive breast cancer in women aged 50–69 decreased with increasing level of remoteness. In 2003–2007, it decreased from 286.1 new cases per 100,000 women in *Major cities* to 220.9 in *Very remote* locations (Table 7.4), a trend that is unchanged from the previous 5-year period of 1998–2002
(Figure 7.5).

Table 7.4: Incidence of breast cancer, women aged 50–69, by remoteness area, 2003–2007

	Major cities	Inner regional	Outer regional	Remote	Very remote	Australia
New cases	20,537	6,650	2,905	339	126	30,583
AS rate	286.1	283.7	270.5	240.4	220.9	283.4
95% CI	282.2–290.1	276.9–290.6	260.7–280.6	215.4–267.5	183.2–262.9	280.3–286.6

Note: Rates are the number of new cases of invasive breast cancer per 100,000 women and age-standardised to the Australian population at 30 June 2001.



Note: Bars on columns represent 95% confidence intervals.

Source: AIHW Australian Cancer Database.

Figure 7.5: Incidence of breast cancer in women aged 50–69, by remoteness area, 1998–2002 and 2003–2007

Invasive breast cancer incidence by Aboriginal and Torres Strait Islander status

The collection of reliable information by the state and territory cancer registries on the Aboriginal and Torres Strait Islander status of individuals diagnosed with cancer is problematic, since primary cancer diagnosis information is sourced from pathology forms which in most states and territories currently do not have the capacity to record this information. The registries collect this information from additional sources such as hospitals records and death records, which affects the completeness and correctness of these data.

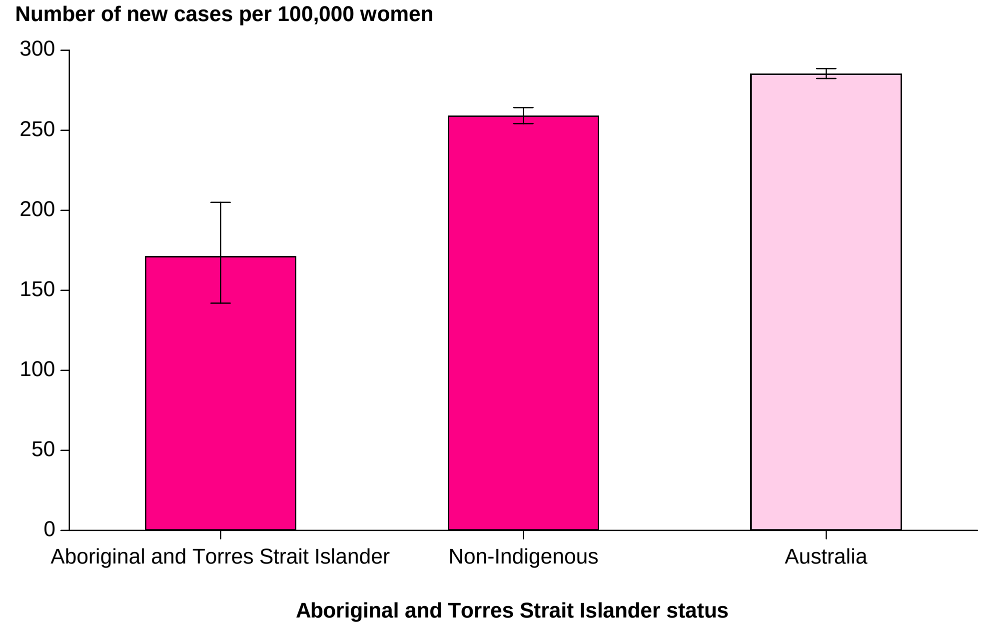
This means that reliable national data on the incidence of cancer for Aboriginal and Torres Strait Islander Australians are not available, because in some jurisdictions the level of identification of Aboriginal and Torres Strait Islander status is not considered sufficient to enable analysis. In this report, data for four states and territories — Queensland, Western Australia, South Australia and the Northern Territory — are considered of sufficient quality, and have been used to examine the incidence of invasive breast cancer by Aboriginal and Torres Strait Islander status. While the majority (60%) of Australian Aboriginal and Torres Strait Islander people reside in these four jurisdictions (ABS 2009a), the degree to which these data are representative of data for all Aboriginal and Torres Strait Islander people is unknown. Further, even for these jurisdictions the level of missing data on Aboriginal and Torres Strait Islander status for invasive breast cancers diagnosed between 2003 and 2007 was 9.5% (AIHW & AACR 2010). This means that for about for 1 in 10 women diagnosed with invasive breast cancer over the 5-year period 2003–2007, information on Aboriginal and Torres Strait Islander status was not recorded. This level of missing data should be taken into account when interpreting these data. Nevertheless, it is considered that the benefits of reporting these incidence data outweigh the risk of including imperfect and incomplete data.

Invasive breast cancer incidence by Aboriginal and Torres Strait Islander status for Queensland, Western Australia, South Australia and the Northern Territory is presented here for the first time for the most recent 5-year period, 2003–2007.

It was found that, over the 5-year period 2003–2007, Aboriginal and Torres Strait Islander women in Queensland, Western Australia, South Australia and the Northern Territory had a significantly lower incidence of invasive breast cancer compared with non-Indigenous women from these states and territories at 171.4 new cases per 100,000 women compared with the non-Indigenous rate of 259.3 (Table 7.5, Figure 7.6).

This was also true for Aboriginal and Torres Strait Islander women of all ages, with an age-standardised incidence of 68.0 new cases per 100,000 women compared with the non-Indigenous rate of 102.5.

Despite a lower rate, breast cancer is the most commonly diagnosed cancer for Aboriginal and Torres Strait Islander women in Queensland, Western Australia, South Australia and the Northern Territory (AIHW & NBOCC 2009).



Notes:

1. The rates were age-standardised to the Australian population as at 30 June 2001.
2. The bars on the columns represent 95% confidence intervals.

Source: AIHW Australian Cancer Database.

Figure 7.6: Incidence of breast cancer (Queensland, Western Australia, South Australia and Northern Territory), by Aboriginal and Torres Strait Islander status, women 50–69, 2003–2007

Table 7.5: Incidence of breast cancer (Queensland, Western Australia, South Australia and Northern Territory) by Aboriginal and Torres Strait Islander status, women aged 50–69, 2003–2007

	New South Wales, Queensland, Western Australia, South Australia and the Northern Territory[(a)]			Australia[(c)]
	Aboriginal and Torres Strait Islander	Non-Indigenous	Total[(b)]	
New cases	122	10,417	11,679	30,583
Crude rate	167.1	260.0	286.2	284.9
AS rate	171.4	259.3	285.5	283.4
95% CI	141.9–205.0	254.3–264.3	280.3–290.7	280.3–286.6

(a) ‘Aboriginal and Torres Strait Islander’ and ‘non-Indigenous’ and ‘total’ are for Queensland, Western Australia, South Australia and the Northern Territory only. Data from these jurisdictions were considered to have adequate levels of Indigenous identification in cancer registration data at the time this report was prepared.

(b) ‘Total’ includes Aboriginal and Torres Strait Islander, non-Indigenous and women in the ‘not-stated’ category for Aboriginal and Torres Strait Islander status for Queensland, Western Australia, South Australia and the Northern Territory only.

(c) All women in Australia aged 50–59.

Notes

1. Crude rates are the number of new cases of invasive breast cancer per 100,000 women.
2. Age-standardised rates are the number of new cases of invasive breast cancer per 100,000 women, age-standardised to the Australian population at 30 June 2001.

Source: Australian Cancer Database (AIHW).

Indicator 7b Ductal carcinoma in situ incidence

What do we mean by ductal carcinoma in situ?

Definition: The number of new cases of ductal carcinoma in situ (DCIS) per 100,000 estimated resident female population in a 12-month period.

Rationale: DCIS incidence data provide information about the underlying level of ductal carcinoma in situ in Australia. DCIS was rarely detected before breast screening was introduced. Since the introduction of screening mammography, detection of DCIS has increased. Annual monitoring of these data with various stratifications (such as age or location) may reveal findings of concern or positive trends that can be used to inform BreastScreen Australia as well as broader policies for DCIS in Australian women.

Guide to interpretation: These data include both screen-detected DCIS cases (through BreastScreen Australia) and DCIS cases detected outside the screening program.

Incidence data are reported per 100,000 women in the population.

Incidence of DCIS by state and territory is reported over a 5-year instead of a 12-month period to improve the stability and comparability of rates due to the small number of new cases in less-populated areas. Further, to produce comparable rates from the relatively small number of DCIS cases, incidence of DCIS is reported by 10-year age groups.

State and territory cancer registries are the source of DCIS incidence data.

The most recent incidence of DCIS data are for new cases diagnosed in 2007.

Key results

Ductal carcinoma in situ incidence in 2007

- In 2007, for women aged 50–69, there were 1,005 new cases of DCIS, or 44.0 new cases per 100,000 women. In the same year, there were 1,608 new cases, or 14.1 new cases per 100,000 women, for women of all ages.

Background information

Incidence of DCIS measures the number of new cases of DCIS diagnosed each year. Because DCIS is an in situ carcinoma and not invasive, it is not included in the Australian Cancer Database. However, state and territory cancer registries have been collecting data on DCIS routinely for more than 10 years, and are the source of DCIS incidence data reported here. Similar to invasive breast cancer incidence data, DCIS data refer to the number of new cases diagnosed and not the number of women diagnosed. Further, if a woman is diagnosed with DCIS and invasive breast cancer, only the more serious diagnosis of invasive breast cancer is counted.

Detailed analyses

Ductal carcinoma in situ incidence 2007

In 2007 there were 1,608 new cases of DCIS in Australian women. This is equivalent to 15.2 new cases per 100,000 women in the population, which, when age-standardised to allow analysis of trends and differentials, equates to an incidence rate of 14.1 for 2007 (Table 7.5).

Of the 1,608 new cases, 1,005 were in women aged 50–69, the target population of BreastScreen Australia. These 1,005 new cases represent 62.5% of all DCIS cases in that year, and 44.2 new cases for every 100,000 women in the population. When age-standardised to allow analysis of trends and differentials, this equates to an incidence rate of 44.0 for 2007 for women aged 50–69.

In 2007, it was estimated that about 75% of DCIS cases diagnosed in women aged 50–69, and around two-thirds of all DCIS cases, were detected through BreastScreen Australia.

Ductal carcinoma in situ incidence trends

Incidence of DCIS has increased over time. For women aged 50–69, it has increased steadily from 29.9 new cases per 100,000 women in 1996 to a peak of 47.2 new cases in 2001, thereafter remaining steady at about 43 to 45. In 2007, the incidence in women aged 50–69 was 44.0 new cases per 100,000 (Table 7.6).

Table 7.6: Incidence of ductal carcinoma in situ, women aged 50–69, 1996 to 2007

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AS rate	29.9	33.4	37.3	38.5	42.4	47.2	43.6	42.8	45.5	44.3	43.6	44.0
95% CI	27.3–32.7	30.7–36.3	34.5–40.3	35.7–41.5	39.4–45.4	44.2–50.4	40.7–46.6	40.0–45.8	42.6–48.5	41.5–47.2	40.8–46.4	41.3–46.8

Note: Rates are the number of new cases of DCIS per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cancer registry data.

Ductal carcinoma in situ incidence by age

In 2007, the highest incidence of DCIS was for women aged 60–69, for which it was 49.0 new cases per 100,000 women, followed by 40.8 for women aged 50–59 (Table 7.7).

Table 7.7: Age-specific incidence rates for ductal carcinoma in situ, by age, 2007

	Age group (years)			
	40–49	50–59	60–69	70+
New cases	284	545	460	257
Crude rate	18.5	40.8	49.0	23.2

Note: Rates are the number of new cases of DCIS per 100,000 women.

Source: AIHW Australian Cancer Database.

Ductal carcinoma in situ incidence by state and territory

In 2003–2007, the incidence of DCIS across the states and territories for women aged 50–69 varied between 27.1 and 59.0 new cases per 100,000 women (Table 7.8), although caution should be used when interpreting rates from small numbers such as these. There was also little change in the DCIS incidence rates between 1998–2002 and 2003–2007 (Figure 7.7).

Table 7.8: Incidence of ductal carcinoma in situ, women aged 50–69, by state and territory 2003–2007

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
New cases	1,473	1,168	959	614	304	115	79	20	4,732
AS rate	41.4	44.0	46.0	59.0	34.5	41.1	48.0	27.1	44.0
95% CI	39.3–43.5	41.5–46.6	43.1–49.0	54.5–63.9	30.7–38.6	33.9–49.3	38.0–59.9	16.3–42.2	42.8–45.3

Note: Rates are the number of new cases of DCIS per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cancer registry data.

Note: Bars on columns represent 95% confidence intervals.

Source: AIHW analysis of state and territory cancer registry data.

Figure 7.7: Incidence of ductal carcinoma in situ in women aged 50–69, by state and territory, 1998–2002 and 2003–2007

Indicator 8 Mortality

What do we mean by mortality?

Definition: The number of deaths from breast cancer per 100,000 estimated resident female population in a 12-month period.

Rationale: BreastScreen Australia aims to reduce mortality from breast cancer.

Guide to interpretation: These data include mortality from all breast cancers, whether or not they were detected through BreastScreen Australia.

Mortality data are reported per 100,000 women in the population.

Mortality from breast cancer by state and territory, remoteness area, socioeconomic status and Aboriginal and Torres Strait Islander status is reported over a 5-year period to improve the stability and comparability of rates due to the small number of deaths in less populated areas and in Aboriginal and Torres Strait Islander women.

The National Mortality Database is the source of breast cancer mortality data.

The most recent data for mortality from breast cancer are for deaths in 2007.

Key results

Mortality in 2007

- In 2007, there were 1,083 deaths from breast cancer in women aged 50–69, the target population of BreastScreen Australia, or 47.0 deaths per 100,000 women. There were 2,680 deaths, or 22.1 deaths per 100,000 women, for women of all ages.

Mortality in Aboriginal and Torres Strait Islander women

- In 2003–2007, despite Aboriginal and Torres Strait Islander women experiencing a significantly lower incidence of invasive breast cancer, mortality from breast cancer was not found to be significantly different between Aboriginal and Torres Strait Islander and non-Indigenous women.

Background information

Mortality statistics are one of the most comprehensively collected national data sets in Australia. Registration of death is a legal requirement in Australia and, as a result, the dataset is virtually complete. Registration of deaths is the responsibility of the Registrar of Births, Deaths and Marriages in each state and territory. The registrars provide the mortality data to the Australian Bureau of Statistics (ABS) for coding the cause of death and compilation into national statistics. The AIHW holds a copy of these data in the AIHW National Mortality Database, from which the data presented here are sourced.

Mortality from breast cancer measures the number of deaths each year for which breast cancer was the underlying cause of death. Analyses are based on the year of death, except for 2007 (the latest year for which mortality data are available), which is based on year of registration of death. Note that about 5% of deaths are not registered until the year following the death (ABS 2007).

Detailed analyses

Mortality in 2007

In 2007, there were 2,680 deaths from breast cancer in Australian women. This is equivalent to 25.3 deaths for every 100,000 women in the population, which, when age-standardised to allow analysis of trends and differentials, equates to a mortality rate of 22.1 for 2007.

Of the 2,680 deaths, 1,083 were in women aged 50–69, the target population of BreastScreen Australia. These 1,083 deaths represent 40.4% of all breast cancer deaths in that year, and 47.6 deaths for every 100,000 women in the population. When age-standardised to allow analysis of trends and differentials, this equates to a mortality rate of 47.0 for 2007 for women aged 50–69.

In the broader context of cancer deaths in Australian women, breast cancer was the second most common cancer causing death in Australian women in 2007 (behind lung cancer), comprising 15.5% of all cancer deaths in women that year (AIHW & AACR 2010).

Also in 2007, the mean age of death of 67.8, and the risk of dying from breast cancer was 1 in 63 by age 75 and 1 in 37 by age 85 (AIHW & AACR 2010).

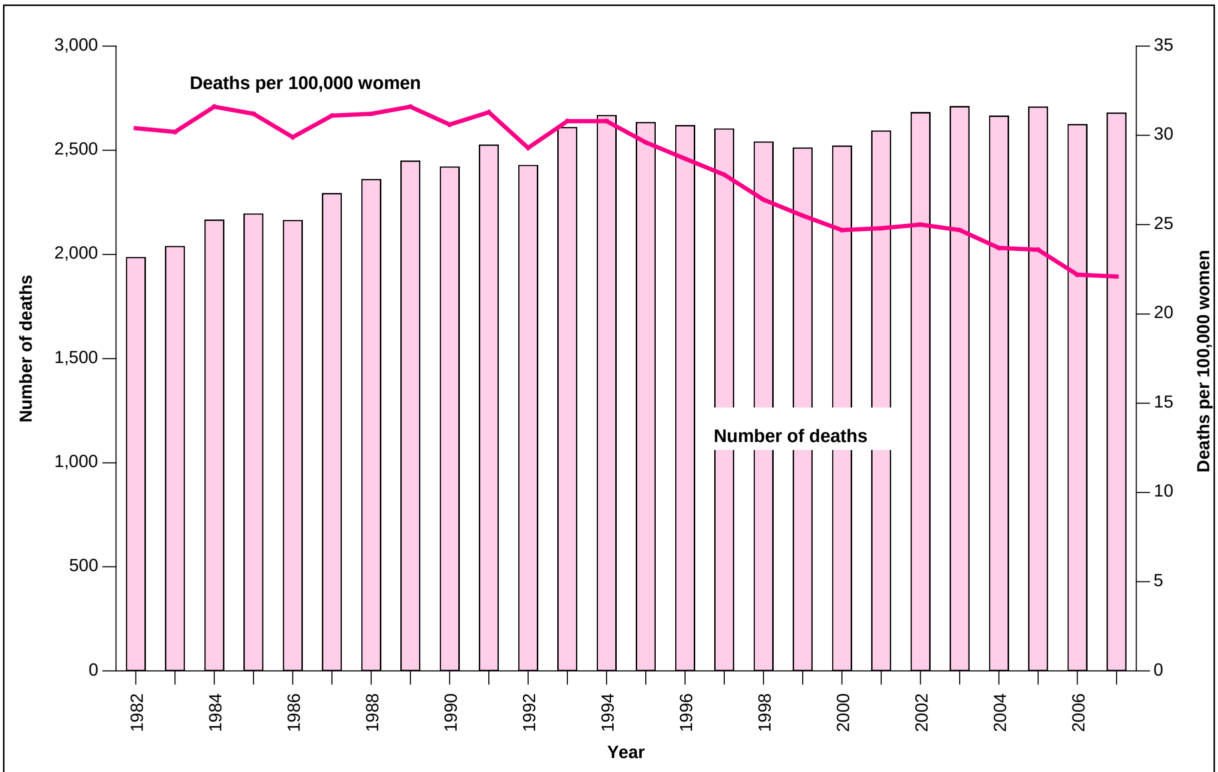
Mortality trends

Mortality from invasive breast cancer decreased over time.

For women aged 50–69, mortality remained relatively steady between 1982 (the first year for which data are available) and 1990 (the year prior to the introduction of BreastScreen Australia).

However, it decreased from 68.2 deaths per 100,000 women in 1991 when BreastScreen Australia commenced to 47.0 per 100,000 in 2007 (the latest year for which data are available) (Table 8.1; Figure 8.1). This represents a decrease of almost a third from the 1991 mortality rate to that observed in 2007 for women aged 50–69.

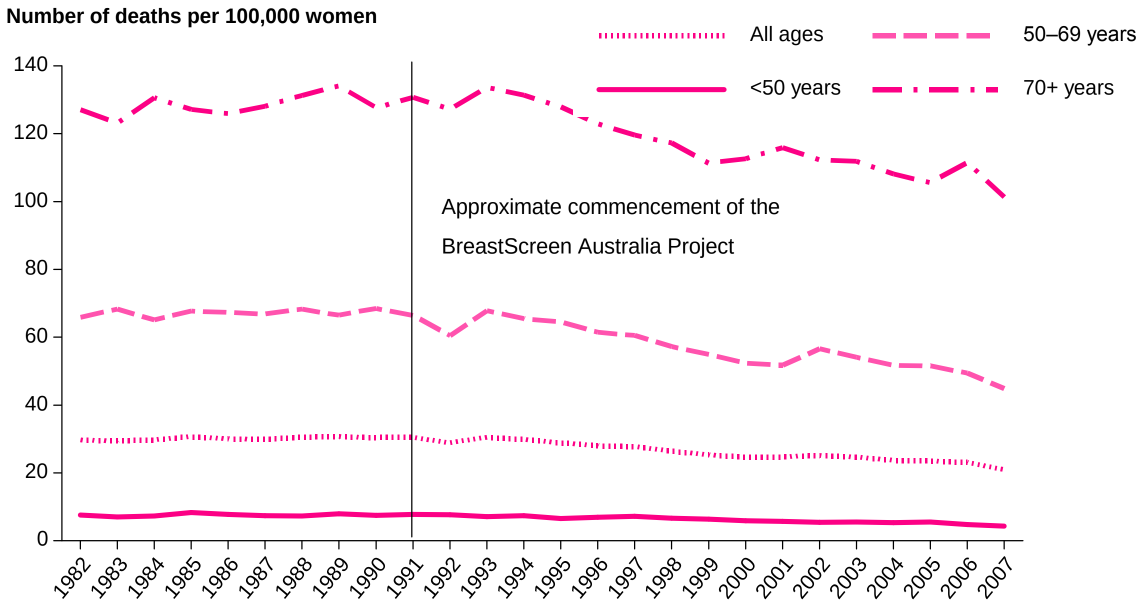
The decrease in mortality in women aged 50–69 has been attributed, in part, to the early detection of invasive breast cancer through BreastScreen Australia, along with advances in the management and treatment of invasive breast cancer (Commonwealth of Australia 2009).



Source: AIHW analysis of BreastScreen Australia data.

Figure 8.1: Mortality from breast cancer, women aged 50–69, 1982 to 2007

Breast cancer mortality by age



Note: Rates are the number of deaths from breast cancer per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW National Mortality Database.

Figure 8.2: Mortality from breast cancer, by age, 1982 to 2007

When comparing trends across broad age groups, mortality trends in women aged 50–69 appear to be mirrored in women aged 70 and over, except that for all years mortality in women aged 70 or over was about 60 deaths per 100,000 women (Figure 8.2).

Further (although difficult to see in Figure 8.2), the general trend described for women aged 50–69 was also true for women aged under 50. For these younger women, after a period of relative stability the mortality rate fell from 8.0 deaths per 100,000 women in 1991 to 4.6 in 2007 (Table 8.1).

For all age groups combined, mortality from breast cancer fell from 31.3 deaths per 100,000 women in 1991, when BreastScreen Australia was introduced, to 22.1 deaths per 100,000 women in 2007 (Table 8.1).

Table 8.1: Mortality from breast cancer, 1982 to 2007

	Age group (years)			
	All ages	**<50**	**50–69**	**70+**
1982	30.4	7.6	66.9	130.2
1983	30.2	7.1	69.9	126.8
1984	31.6	8.0	69.2	136.6
1985	31.2	8.4	68.8	128.9
1986	29.9	7.7	66.6	125.6
1987	31.1	7.8	69.4	132.4
1988	31.2	7.3	69.6	136.3
1989	31.6	8.2	69.0	135.5
1990	30.6	7.5	68.7	130.5
1991	31.3	8.0	68.2	134.4
1992	29.3	7.9	61.2	129.4
1993	30.8	7.1	68.8	135.1
1994	30.8	7.6	66.7	135.5
1995	29.6	6.6	66.4	130.8
1996	28.7	7.2	62.6	124.8
1997	27.8	7.2	60.6	118.6
1998	26.4	6.4	56.6	118.1
1999	25.5	6.4	55.8	110.1
2000	24.7	5.9	51.7	114.7
2001	24.8	5.8	52.3	115.4
2002	25.0	5.3	56.5	112.0
2003	24.7	5.5	54.1	111.9
2004	23.7	5.3	51.8	108.1
2005	23.6	5.5	51.6	105.5
2006	22.2	4.5	47.4	106.9
2007	22.1	4.6	47.0	106.1

Note: Rates are the number of deaths from breast cancer per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW National Mortality Database.

In 2007, deaths from invasive breast cancer in women aged 50–69 comprised 40.4% of all breast cancer deaths. This has changed little from the 39.6% of breast cancer deaths in 1997, but represents a fall from the 44.0% of all breast cancer deaths in 1987.

Analysis of 5-year age groups reveals that, in 2007, mortality increased with age, from 12.8 deaths per 100,000 women for women aged 40–44 to 179.8 for women aged 85 and over (Table 8.2).

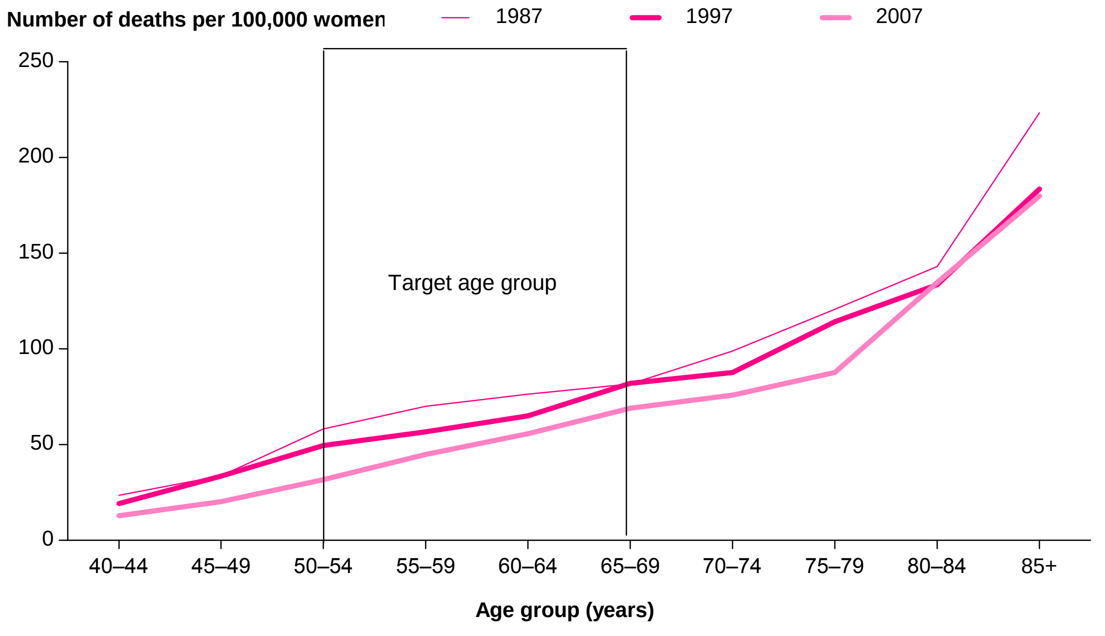
Table 8.2: Age-specific mortality rates for breast cancer, 2007

	Age group (years)									
	40–44	**45–49**	**50–54**	**55–59**	**60–64**	**65–69**	**70–74**	**75–79**	**80–84**	**85+**
Deaths	98	155	221	285	296	281	254	262	327	412
Crude rate	12.8	20.1	31.6	44.8	55.7	68.9	75.8	87.7	134.7	179.8

Note: Rates are the number of deaths from breast cancer per 100,000 women.

Source: AIHW National Mortality Database.

The trend described in 2007 was similar both 10 and 20 years earlier in 1997 and 1987, respectively (Figure 8.3).



Note: Rates are the number of deaths from breast cancer per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW National Mortality Database.

Figure 8.3: Age-specific mortality rates for breast cancer, 1987, 1997 and 2007

Mortality from invasive breast cancer by state and territory

In 2003–2007, mortality from breast cancer for women aged 50–69 was relatively similar across states and territories to the national rate of 50.3 deaths per 100,000 women (Table 8.3).

Table 8.3: Mortality from breast cancer, women aged 50–69 and women of all ages, by state and territory, 2003–2007

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
50–69 years									
Deaths	1,799	1,377	1,045	502	475	132	76	36	5,442
AS rate	50.1	51.5	49.8	48.1	53.5	46.6	45.9	46.8	50.3
95% CI	47.8–52.5	48.8–54.3	46.8–52.9	44.0–52.5	48.8–58.5	39.0–55.3	36.1–57.5	32.3–65.3	48.9–51.6
All ages									
Deaths	4,577	3,467	2,367	1,182	1,216	339	183	58	13,389
AS rate	23.4	23.8	22.2	22.2	24.4	22.6	23.3	19.0	23.2
95% CI	22.8–24.1	23.0–24.7	21.3–23.1	21.0–23.6	23.0–25.8	20.2–25.1	20.0–27.0	13.7–25.5	22.8–23.6

Note: Rates are the number of deaths from breast cancer per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW National Mortality Database.

Apparent decreases in mortality between 1998–2002 and 2003–2007 across the states and territories were not found to be statistically significant for women aged 50–69, although decreases in mortality from the earlier period of 1993–1997 were statistically significant in the more populated states and territories (Figure 8.4).

Note: Bars on columns represent 95% confidence intervals.

Source: AIHW National Mortality Database.

Figure 8.4: Mortality from breast cancer, women aged 50–69, by state and territory, 1993–1997, 1998–2002 and 2003–2007

Mortality from invasive breast cancer by remoteness area

In 2003–2007, mortality from invasive breast cancer for women aged 50–69 was relatively similar across remoteness areas to the national rate (Table 8.4).

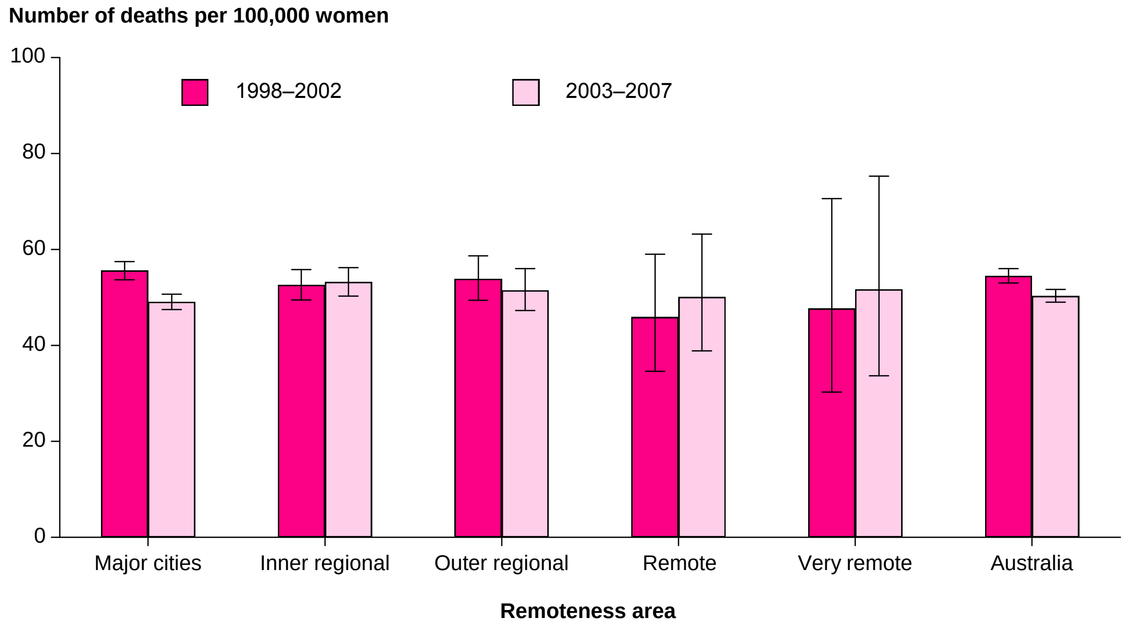
Table 8.4: Mortality from breast cancer, by remoteness area, women aged 50–69 and women of all ages, 2003–2007

	Major cities	Inner regional	Outer regional	Remote	Very remote	Australia
50–69 years						
Deaths	3,535	1,256	554	70	27	5,442
AS rate	49.1	53.2	51.5	50.1	51.7	50.3
95% CI	47.5–50.8	50.3–56.3	47.3–56.0	39.0–63.3	33.7–75.3	48.9–51.6
All ages						
Deaths	8,810	3,053	1,327	144	56	13,389
AS rate	22.6	24.8	24.7	22.5	23.8	23.2
95% CI	22.1–23.1	23.9–25.7	23.4–26.1	18.9–26.5	17.6–31.3	22.8–23.6

Note: Rates are the number of deaths from breast cancer per 100,000 women and age-standardised to the Australian population at 30 June 2001.

Source: AIHW National Mortality Database.

Mortality in *Major cities* decreased significantly between 1998–2002 and 2003–2007, along with the national rate (Figure 8.5).



Note: Bars on columns represent 95% confidence intervals.

Source: AIHW analysis of BreastScreen Australia data.

Figure 8.5: Mortality from breast cancer, by remoteness area, women aged 50–69, 1993–1997 and 2003–2007

Mortality from breast cancer by Aboriginal and Torres Strait Islander status

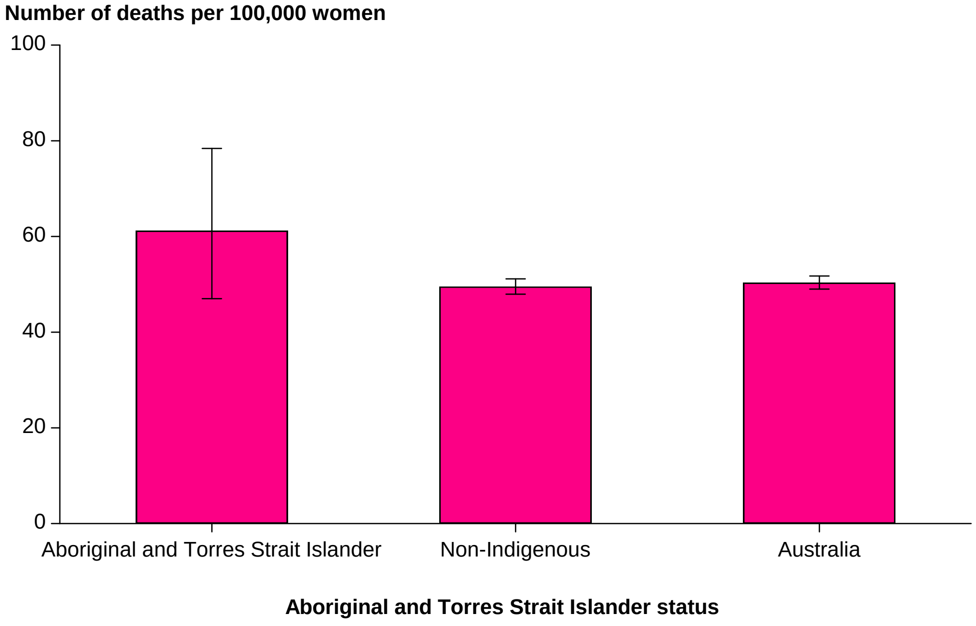
Information on Aboriginal and Torres Strait Islander status on the National Mortality Database is considered of sufficient quality or analysis for the years 2003 to 2007 for five jurisdictions —New South Wales, Queensland, Western Australia, South Australia and the Northern Territory. The majority (89%) of Aboriginal and Torres Strait Islander people reside in these five jurisdictions (ABS 2009a).

Mortality from breast cancer by Aboriginal and Torres Strait Islander status for New South Wales, Queensland, Western Australia, South Australia and the Northern Territory is presented for the most recent 5-year period, 2003–2007.

These data show that, despite significantly lower incidence of invasive breast cancer (shown in Indicator 7a), mortality where invasive breast cancer was the underlying cause was not found to be significantly different between Aboriginal and Torres Strait Islander and non-Indigenous women in 2003–2007 for New South Wales, Queensland, Western Australia, South Australia and the Northern Territory (Figure 8.6).

In 2003–2007, mortality from breast cancer in Aboriginal and Torres Strait Islander women aged 50–69 in the five jurisdictions combined was 61.2 deaths per 100,000 women, compared with the non-Indigenous rate of 49.5 in these jurisdictions (Table 6.9, Figure 6.8). Apparent differences were not found to be statistically significant.

Mortality for women of all ages was 23.4 deaths per 100,000 women for Aboriginal and Torres Strait Islander women compared with the non-Indigenous rate of 23.1 (Table 6.9).



Notes

1. Bars on columns represent 95% confidence intervals.
2. ‘Aboriginal and Torres Strait Islander’ and ‘non-Indigenous’ are for NSW, Qld, WA, SA and NT only. ‘Australia’ includes all states and territories.
3. Age-standardised rates are the number of deaths from breast cancer per100,000 women, age-standardised to the Australian population at 30 June 2001.

Source: AIHW National Mortality Database.

Figure 8.6: Mortality from breast cancer (New South Wales, Queensland, Western Australia, South Australia and the Northern Territory), by Aboriginal and Torres Strait Islander status, women aged 50–69, 2003–2007

Table 8.5: Mortality from breast cancer (New South Wales, Queensland, Western Australia, South Australia and Northern Territory) by Aboriginal and Torres Strait Islander status, women aged 50–69 and women of all ages, 2003–2007

	New South Wales, Queensland, Western Australia, South Australia and the Northern Territory[(a)]			Australia[(c)]
	Aboriginal and Torres Strait Islander	Non-Indigenous	Total[(b)]	
50–69 years				
Deaths	64	3,743	3,840	5,442
Crude rate	57.2	49.8	50.3	50.7
AS rate	61.2	49.5	49.9	50.3
95% CI	46.9–78.3	48.0–51.1	48.3–51.5	48.9–51.6
All ages				
Deaths	113	9,176	9,374	13,389
Crude rate	10.0	25.9	25.6	26.0
AS rate	23.4	23.1	23.2	23.2
95% CI	18.8–28.7	22.6–23.6	22.8–23.7	22.8–23.6

(a) ‘Aboriginal and Torres Strait Islander’ and ‘Non-Indigenous’ and ‘Total’ are for New South Wales, Queensland, Western Australia, South Australia and the Northern Territory only. Data from these jurisdictions were considered to have adequate levels of Indigenous identification in cancer mortality data at the time this report was prepared.

(b) ‘Total’ includes Aboriginal and Torres Strait Islander, non-Indigenous and women in the ‘not-stated’ category for Aboriginal and Torres Strait Islander status for New South Wales, Queensland, Western Australia, South Australia and the Northern Territory only.

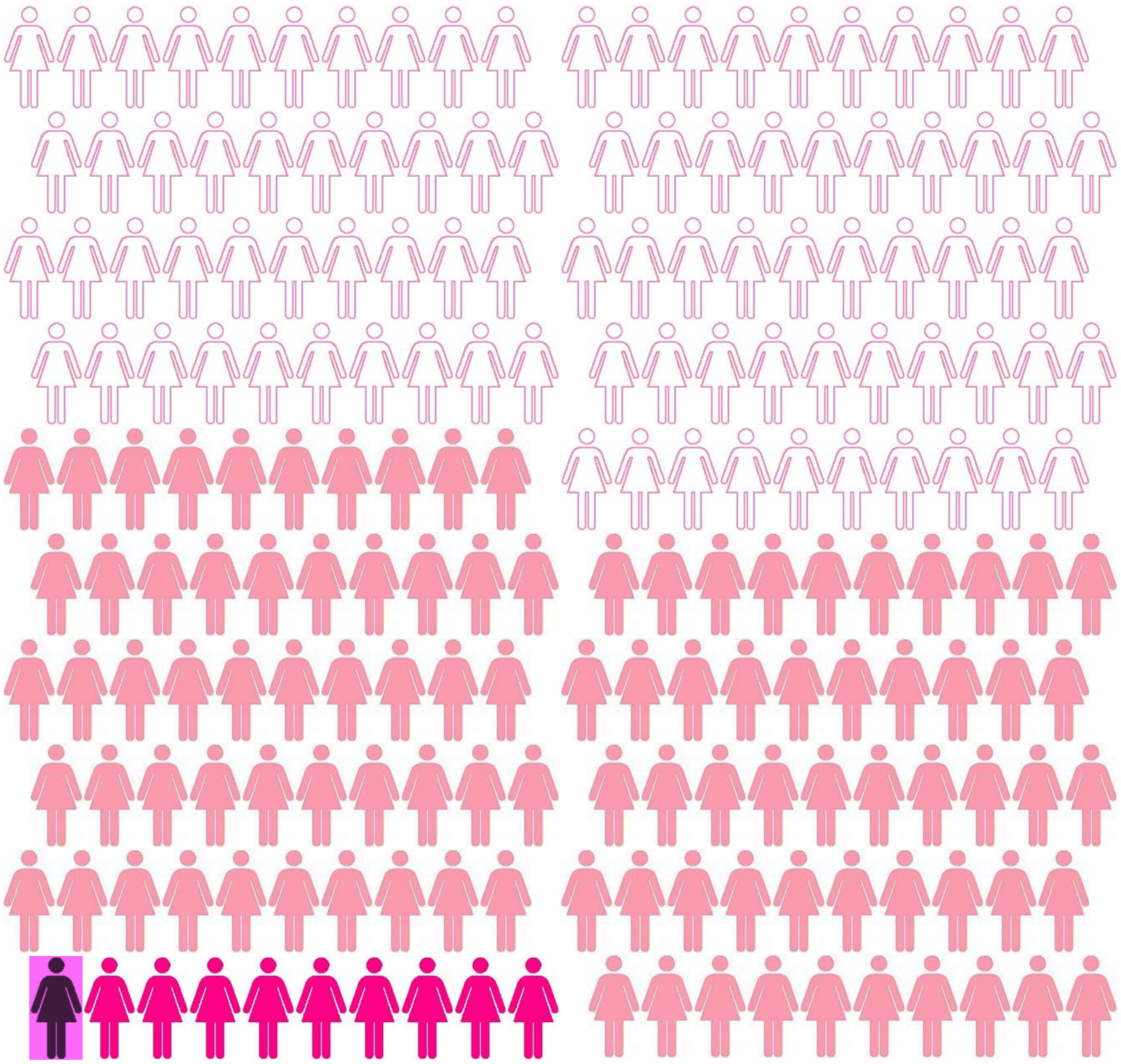
(c) All women in Australia.

Notes

1. Crude rates are the number of deaths from breast cancer per 100,000 women.
2. Age-standardised rates are the number of deaths from breast cancer per100,000 women, age-standardised to the Australian population at 30 June 2001.

Source: AIHW National Mortality Database.

Appendix A Additional data



Note:

1. The outline symbols represent are the average 2008 and 2009 Australian Bureau of Statistics estimated resident population for women aged 50–69.
2. The lighter highlighted symbols represent the proportion of women screened in 2008–2009.
3. The darker highlighted symbols represent the proportion of women recalled to assessment in 2008 and 2009.
4. The single darkest highlighted symbol represents the proportion of women who have an invasive breast cancer detected through BreastScreen Australia

Source: AIHW analysis of state and territory BreastScreen registers

Figure A1: Women in BreastScreen Australia, aged 50–69, 2008–2009

Rates and associated confidence intervals

Indicator 1 Participation 2008–2009

Table A1.1: BreastScreen Australia participation, by selected population groups, women aged 50–69 in BreastScreen Australia, 1998–1999, 2003–2004, 2006–2007 and 2008–2009

	Rates (confidence intervals)			
State and territory	**1998–1999**	**2003–2004**	**2006–2007**	**2008–2009**
NSW	53.2 (53.0–53.4)	50.4 (50.2–50.5)	56.0 (55.8–56.2)	53.9 (53.7–54.1)
Vic	56.9 (56.6–57.1)	58.9 (58.7–59.1)	56.1 (55.9–56.3)	53.2 (53.0–53.3)
Qld	56.3 (56.0–56.5)	57.9 (57.7–58.2)	56.6 (56.3–56.8)	58.3 (58.1–58.5)
WA	53.2 (52.9–53.6)	56.7 (56.4–57.0)	57.5 (57.2–57.9)	56.7 (56.3–57.0)
SA	62.2 (61.8–62.6)	62.9 (62.6–63.3)	55.9 (55.6–56.2)	58.7 (58.3–59.0)
Tas	59.4 (58.7–60.1)	57.3 (56.7–58.0)	54.2 (53.6–54.8)	57.4 (56.8–58.0)
ACT	61.3 (60.4–62.3)	53.2 (52.4–54.0)	57.5 (56.7–58.3)	53.8 (53.1–54.5)
NT[(a)]	47.8 (46.4–49.1)	42.6 (41.5–43.8)	40.6 (39.6–41.6)	41.0 (40.1–42.0)
Australia	**55.7 (55.6–55.8)**	**55.7 (55.6–55.8)**	**56.1 (56.0–56.2)**	**55.2 (55.1–55.3)**
Aboriginal and Torres Strait Islander status				
Aboriginal and Torres Strait Islander	33.7 (32.9–34.6)	35.4 (34.6–36.2)	36.2 (35.5–36.9)	36.5 (35.8–37.2)
Non-Indigenous	43.1 (43.0–43.2)	55.7 (55.6–55.8)	56.1 (56.0–56.2)	55.2 (55.1–55.3)
Australia	**55.7 (55.6–55.8)**	**55.7 (55.6–55.8)**	**56.1 (56.0–56.2)**	**55.2 (55.1–55.3)**
Main language spoken at home				
English	58.2 (58.1–58.4)	58.3 (58.2–58.4)	57.9 (57.8–58.1)	57.2 (57.1–57.3)
Non-English	42.2 (42.0–42.5)	42.5 (42.3–42.8)	46.3 (46.1–46.6)	44.7 (44.5–44.9)
Australia	**55.7 (55.6–55.8)**	**55.7 (55.6–55.8)**	**56.1 (56.0–56.2)**	**55.2 (55.1–55.3)**

Notes

1. Participants are the number of women screened through BreastScreen Australia in each 2-year reporting period. Periods cover 1 January 1998 to 31 December 1999, 1 January 2003 to 31 December 2004, 1 January 2006 to 31 December 2007 and 1 January 2008 to 31 December 2009.
2. Rates are the number of women screened as a percentage of the eligible female population calculated as the average of the ABS's estimated resident population and age-standardised to the Australian population at 30 June 2001.
3. Direct comparisons between the states and territories of Australia are not advised due to the substantial differences that exist between the jurisdictions, including population, area, geographic structure, policies and other factors.
4. With regard to Aboriginal and Torres Strait Islander status, some jurisdictions do not use the 'not stated' category. Therefore there are likely to be some Aboriginal and Torres Strait Islander women incorrectly assigned to non-Indigenous status. Limitations of Aboriginal and Torres Strait Islander data are detailed in Appendix B.
5. With regard to main language spoken at home, some jurisdictions do not use the 'not stated' category and there may be difference in how these data are collected. This means that the analysis based upon main language spoken at home should be interpreted with caution. Limitations are detailed in Appendix B.

Source: AIHW analysis of BreastScreen Australia data.

Indicator 2 Rescreening 2006 & 2007

Table A2.1: Rescreen rate for women aged 50–67, screened during 2001, 2005, 2006 and 2007

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
					(per cent)				
First screening round									
2001	55.4	65.1	72.8	62.0	64.4	72.6	47.8	39.9	62.8
95% CI	54.4–56.4	64.0–66.3	71.2–74.4	59.7–64.4	61.3–67.5	67.6–77.8	42.5–53.5	33.8–46.6	62.1–63.4
2005	58.5	57.4	63.4	62.5	47.1	52.0	63.6	52.8	59.3
95% CI	57.5–59.6	55.5–59.2	61.9–64.9	59.9–65.2	44.0–50.3	48.2–56.0	56.7–70.9	45.7–60.6	58.6–60.0
2006	46.1	41.3	62.0	54.8	55.5	57.7	52.3	45.6	49.9
95% CI	45.1–47.0	39.9–42.7	60.4–63.7	52.4–57.3	51.6–59.4	53.4–62.2	47.6–57.2	38.6–53.1	49.2–50.5
2007	54.9	45.3	63.5	55.8	63.3	67.7	54.9	55.5	55.9
95% CI	54.1–55.8	43.7–47.0	61.8–65.2	53.2–58.5	59.5–67.3	62.8–72.8	51.1–58.9	47.3–64.4	55.2–56.5
Second screening round									
2001	63.1	74.0	81.1	66.3	75.1	78.7	58.3	62.3	71.9
95% CI	62.1–64.1	72.5–75.4	79.8–82.4	64.3–68.4	72.9–77.4	74.4–83.2	53.1–63.8	55.1–70.0	71.3–72.5
2005	67.2	63.5	71.3	71.6	54.3	58.0	70.8	55.6	66.8
95% CI	66.1–68.4	61.8–65.1	69.7–72.9	69.2–74.0	51.4–57.2	53.8–62.3	64.6–77.5	46.1–66.0	66.1–67.5
2006	52.1	53.1	71.5	64.0	61.1	61.8	60.3	55.3	58.5
95% CI	51.1–53.1	51.6–54.6	69.8–73.1	61.8–66.3	57.9–64.5	57.5–66.2	54.1–66.9	47.6–63.7	57.9–59.2
2007	58.9	55.2	73.6	61.2	66.9	76.4	63.5	61.5	62.6
95% CI	57.9–59.9	53.7–56.8	72.0–75.2	58.9–63.5	63.6–70.2	71.6–81.3	59.5–67.7	54.2–69.6	61.9–63.3
Third and subsequent screening rounds									
2001	74.2	85.0	88.5	82.2	87.3	88.3	73.6	77.3	81.9
95% CI	73.7–74.7	84.4–85.6	87.8–89.3	81.2–83.1	86.3–88.2	86.5–90.1	71.4–75.8	72.9–81.9	81.6–82.2
2005	78.1	76.2	83.0	84.8	69.9	67.5	82.2	74.6	78.4
95% CI	77.6–78.5	75.7–76.8	82.4–83.6	83.9–85.7	69.1–70.7	66.1–69.0	80.2–84.2	71.0–78.4	78.1–78.6
2006	67.1	69.9	83.6	77.2	77.0	74.5	74.4	71.4	73.5
95% CI	66.7–67.5	69.4–70.5	83.0–84.2	76.4–78.0	76.1–77.9	73.0–76.1	72.3–76.5	67.8–75.2	73.2–73.7
2007	71.5	70.7	84.5	75.4	83.2	84.8	78.7	82.0	76.1
95% CI	71.0–71.9	70.2–71.3	83.9–85.0	74.5–76.2	82.3–84.2	83.1–86.5	77.1–80.4	78.2–85.9	75.9–76.4

Note: Rates are the number of women rescreening within 27 months as a percentage of women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Indicator 3 Recall to assessment 2009

Table A3.1: Recall to assessment rate for women aged 50–69, mammographic reasons, by state and territory, first and subsequent screening rounds, 1999, 2004, 2008 and 2009

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
					(per cent)				
First screening round									
1999	7.3	8.7	7.8	10.2	4.7	9.6	6.0	2.6	7.6
95% CI	6.9–7.6	8.1–9.2	7.4–8.2	9.2–11.3	4.1–5.3	8.0–11.3	4.4–7.9	1.3–4.3	7.4–7.8
2004	9.7	11.1	10.4	8.6	6.4	10.2	8.0	15.1	9.8
95% CI	9.3–10.2	10.3–11.9	9.8–11.1	7.8–9.6	5.2–7.7	8.5–12.1	5.9–10.5	10.6–20.4	9.6–10.1
2008	8.4	13	13.2	10.2	6.3	12.8	11.5	11.9	9.9
95% CI	8.1–8.7	12.2–13.9	12.5–13.9	9.2–11.3	5.1–7.5	10.9–14.9	8.5–14.8	9.1–15.3	9.7–10.1
2009	9.7	13.3	13.8	9.5	4.8	12.4	10.0	12.5	10.7
95% CI	9.3–10.0	12.4–14.1	13.0–14.5	8.6–10.4	3.9–5.9	10.5–14.6	7.5–13.0	9.5–15.8	10.4–11.0
Subsequent screening rounds									
1999	3.9	4.1	4.4	5.2	2.1	5.2	3.6	2.4	4.0
95% CI	3.8–4.0	4.0–4.2	4.2–4.6	4.9–5.4	2.0–2.2	4.8–5.7	3.2–4.1	1.7–3.3	3.9–4.0
2004	4.5	4.2	4.1	2.9	2.3	6.1	4.0	3.2	4.0
95% CI	4.4–4.6	4.1–4.4	4.0–4.2	2.7–3.0	2.2–2.4	5.7–6.6	3.6–4.5	2.5–4.1	4.0–4.1
2008	4.1	4.9	4.5	3.1	2.1	4.4	3.2	4.4	4.1
95% CI	4.0–4.2	4.8–5.0	4.4–4.7	3.0–3.2	2.0–2.2	4.1–4.7	2.9–3.7	3.7–5.3	4.1–4.2
2009	4.2	4.8	4.8	2.9	2.1	4.2	3.8	4.6	4.2
95% CI	4.1–4.3	4.7–4.9	4.7–4.9	2.8–3.0	1.9–2.2	3.9–4.6	3.4–4.2	3.9–5.4	4.1–4.2

Note: Rates are the number of women recalled for assessment as a percentage of women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Indicator 4 Invasive breast cancer detection 2009

Table A4.1: All-size and small (≤15mm) invasive breast cancer detection, by age, all screening rounds, 1999, 2004, 2008 and 2009

	Age group (years)						
	40–44	**45–49**	**50–54**	**55–59**	**60–64**	**65–69**	**70+**
All-size							
1999 rate	18.1	24.2	33.0	42.2	49.9	57.7	66.3
95% CI	14.7–22.0	21.1–27.6	30.3–35.9	38.8–45.8	45.9–54.2	53.0–62.7	61.3–71.5
2004 rate	19.6	29.1	37.0	44.5	50.6	58.6	72.2
95% CI	15.9–23.9	25.6–32.9	34.3–39.9	41.4–47.7	46.9–54.5	54.2–63.3	67.2–77.4
2008 rate	24.2	31.0	40.4	44.7	56.4	69.4	83.2
95% CI	19.7–29.4	27.1–35.3	37.6–43.4	41.7–47.8	52.9–60.1	64.9–74.2	76.5–90.3
2009 rate	20.1	35.5	35.7	41.4	55.8	69.9	90.5
95% CI	16.1–24.8	31.4–40.0	33.1–38.5	38.6–44.4	52.4–59.3	65.5–74.6	83.6–97.8
Small-size							
1999 rate	9.8	13.0	19.2	28.2	33.1	39.0	45.8
95% CI	7.4–12.8	10.8–15.6	17.2–21.4	25.4–31.2	29.8–36.6	35.2–43.1	41.7–50.2
2004 rate	11.1	16.1	21.9	28.9	32.4	38.3	48.1
95% CI	8.4–14.4	13.5–19.0	19.8–24.2	26.4–31.5	29.4–35.6	34.7–42.1	44.0–52.4
2008 rate	13.2	15.5	24.1	26	35.6	44.8	50.6
95% CI	10.0–17.1	12.8–18.6	21.9–26.4	23.7–28.4	32.8–38.5	41.2–48.7	45.4–56.2
2009 rate	11.3	18.8	20.6	24.5	36.3	46.3	57.8
95% CI	8.3–15.0	15.9–22.1	18.6–22.8	22.3–26.8	33.6–39.2	42.7–50.1	52.3–63.7

Note: Rates are the number of women with invasive breast cancer detected per 10,000 women screened.

Source: AIHW analysis of BreastScreen Australia data.

Table A4.2: All-size and small (≤15 mm) invasive breast cancer detection rates in women aged 50–69, by state and territory, 1999, 2004, 2008 and 2009

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
All-size, first screening round									
1999	54.2	75.3	77.8	70.4	99.5	53.7	81.6	6.3	68.5
95% CI	45.2–64.4	58.8–94.3	65.8–91.3	45.8–102.2	71.3–134.2	19.4–114.6	25.7–177.0	0.2–35.0	62.1–75.3
2004	78.2	93.7	90.9	63.2	95.3	75.1	64.1	91.4	82.2
95% CI	65.0–93.2	68.5–122.7	72.5–112.3	39.6–92.4	46.8–158.1	28.5–154.8	12.1–156.4	29.6–206.2	73.3–91.8
2008	66.1	81.2	91.2	99.0	117.2	95.6	114.6	62.9	75.5
95% CI	57.6–75.4	60.2–105.6	72.7–112.3	65.0–140.8	64.3–184.9	44.8–172.7	36.5–237.8	0.8–213.5	68.5–82.9
2009	74.3	75.5	95.3	91.5	82.0	58.3	99.4	146.1	79.5
95% CI	64.4–85.1	54.6–99.6	74.3–119.7	61.7–127.7	38.3–139.5	19.4–124.7	18.6–237.4	52.1–301.8	71.7–87.7
All size, subsequent screening rounds									
1999	36.8	40.2	42.5	50.1	40.2	40.0	47.7	33.1	40.5
95% CI	33.8–40.1	36.5–44.1	37.8–47.6	43.4–57.6	34.4–46.8	29.6–52.9	33.5–65.8	12.5–69.7	38.6–42.5
2004	45.5	39.6	43.0	45.1	42.5	48.0	54.6	48.0	43.3
95% CI	42.3–49.0	36.3–43.1	39.2–47.1	39.6–51.1	37.0–48.6	37.4–60.7	39.0–74.2	21.6–90.6	41.5–45.1
2008	45.7	49.3	49.8	47.8	45.6	41.9	54.8	48.4	47.8
95% CI	42.6–48.9	45.7–53.2	46.0–53.8	42.4–53.5	40.0–51.7	32.7–52.8	40.1–73.1	26.1–81.8	46.0–49.6
2009	43.4	42.5	52.5	43.2	43.1	41.8	62.0	44.4	45.4
95% CI	40.5–46.5	39.2–46.0	48.7–56.6	38.2–48.6	37.7–49.1	33.0–52.2	48.0–78.7	24.8–73.3	43.8–47.1
Small, all screening rounds									
1999	25.2	28.7	31.8	34.9	31.8	26.5	34.2	19.1	29.0
95% CI	22.9–27.8	25.8–31.8	28.2–35.7	29.6–40.9	27.0–37.3	18.7–36.6	22.9–49.1	5.3–46.3	27.5–30.5
2004	30.1	26.6	30.5	30.5	28.9	36.7	42.6	41.3	29.6
95% CI	27.6–32.8	24.1–29.3	27.5–33.8	26.3–35.3	24.6–33.8	27.8–47.4	29.5–59.4	19.5–75.1	28.3–31.0
2008	30.6	31.1	32.8	32.2	32.4	29.3	33.5	16.3	31.4
95% CI	28.3–33.0	28.3–34.0	29.9–35.9	28.1–36.8	28.0–37.3	22.0–38.2	22.9–47.3	5.6–36.1	30.1–32.8
2009	29.5	27.7	35.5	27.4	31.9	30.1	38.8	30.4	30.5
95% CI	27.3–31.8	25.2–30.4	32.5–38.7	23.7–31.6	27.5–36.9	23.0–38.8	28.3–52.0	16.0–52.3	29.2–31.8

Notes

1. Rates are the number of women with invasive breast cancer detected per 10,000 women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008.
2. State and territory differences, along with the size of the 95% confidence intervals (particularly in the smaller states and territories), need to be taken into consideration when interpreting cancer detection results.
3. In some states and territories, the age-standardised rates vary considerably from the crude rates. Crude rate are available in the BreastScreen Australia monitoring report 2008–2009 Supplementary report.

Source: AIHW analysis of BreastScreen Australia data.

Indicator 5 Ductal carcinoma in situ detection 2009

Table A5.1: Ductal carcinoma in situ detection rates in women aged 50–69, by state and territory, all screening rounds, 1999, 2004, 2008 and 2009

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
1999	9.5	9.6	10.5	10.9	9.1	14.4	13.8	0.0	10.0
95% CI	8.1–11.1	8.0–11.5	8.5–12.8	8.0–14.4	6.6–12.2	8.9–22.0	7.1–24.2	.–.	9.1–10.9
2004	11.0	10.4	12.8	12.8	11.2	13.8	12.1	15.0	11.5
95% CI	9.5–12.6	8.8–12.1	10.9–15.1	10.1–16.0	8.5–14.4	8.6–20.9	5.7–22.4	4.6–35.6	10.7–12.4
2008	10.6	13.9	11.7	15.9	10.8	15.0	7.3	24.0	12.3
95% CI	9.3–12.1	12.1–15.9	10.0–13.6	13.1–19.2	8.3–13.8	9.9–21.9	2.9–15.0	9.9–48.1	11.5–13.1
2009	12.0	12.9	13.3	14.3	13.2	3.6	13.4	13.0	12.6
95% CI	10.6–13.5	11.2–14.8	11.5–15.3	11.6–17.3	10.4–16.5	1.4–7.4	7.5–22.2	4.1–30.6	11.8–13.4

Notes:

1. Rates are the number of women with DCIS detected per 10,000 women screened and age-standardised to the population of women attending a BreastScreen Australia service in 2008.
2. State and territory differences, along with the size of the 95% confidence intervals (particularly in the smaller states and territories), need to be taken into consideration when interpreting cancer detection results.
3. In some states and territories, the age-standardised rates vary considerably from the crude rates. Crude rate are available in the BreastScreen Australia monitoring report 2008–2009 Supplementary report.

Source: AIHW analysis of BreastScreen Australia data.

Appendix B BreastScreen Australia information

Table B1: Contacts and links for the state and territory and commonwealth components of BreastScreen Australia

BreastScreen New South Wales	
Tel: (02) 8374 5777 Fax: (02) 8374 5699 E-mail: information@cancerinstitute.org.au	http://www.bnsw.org.au/
BreastScreen Victoria	
Tel: (03) 9660 6888 Fax: (03) 9662 3881 E-mail: info@BreastScreen.org.au	http://www.BreastScreen.org.au
BreastScreen Queensland	
Tel: (07) 3328 9467 Fax: (07) 3328 9487 Email: cssb@health.gov.au	http://www.BreastScreen.qld.gov.au
BreastScreen Western Australia	
Tel: (08) 9323 6700 Fax: (08) 9323 6799 E-mail: BreastScreenwa@health.wa.gov.au	http://www.BreastScreen.health.wa.gov.au
BreastScreen South Australia	
Tel: (08) 8274 7100 Fax: (08) 8373 4395 E-mail: BSSAenquiries@health.sa.gov.au	http://www.BreastScreen.sahealth.sa.gov.au
BreastScreen Tasmania	
Tel: (03) 6216 4300 Fax: (03) 6216 4326 E-mail: canscreen@dhhs.tas.gov.au	http://www.dhhs.tas.gov.au/cancerscreening/information_about_breast_screening
BreastScreen ACT	
Tel: (02) 6205 4444 Fax: (02) 6205 1394 E-mail: BreastScreen@act.gov.au	http://health.act.gov.au/c/health?a=sp&pid=1059452616
BreastScreen NT	
Tel: (08) 8922 6449 Fax: (08) 8922 6440 E-mail: wcpp.ths@nt.gov.au	http://www.health.nt.gov.au/Womens_Health/Breast_Screen_NT/index.aspx
Commonwealth Department of Health and Ageing	
cancerscreening@health.gov.au	http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/BreastScreen-about
Australian Institute of Health and Welfare	
screening@aihw.gov.au	http://www.aihw.gov.au/breast-cancer-screening/

BreastScreen Australia definitions

Target age group

Women aged 50–69. BreastScreen Australia selects women on the basis of age alone. BreastScreen Australia actively targets women aged 50–69 through recruitment strategies and reminder letters.

Aboriginal and Torres Strait Islander status

Participation is able to be reported by Aboriginal and Torres Strait Islander status because this is recorded on state and territory BreastScreen registers. Women who attend for a screening mammogram at a BreastScreen Australia service are asked to complete a form that includes personal and demographic details, as well as personal and family history of breast cancer. The form also includes a question on Aboriginal and Torres Strait Islander status where they are able to identify as 'Aboriginal', 'Torres Strait Islander', 'both Aboriginal and Torres Strait Islander', or 'neither Aboriginal or Torres Strait Islander'. There is an additional 'not stated' category for women who choose not to answer this question.

This aligns with the *BreastScreen Australia data dictionary* (AIHW & DoHA 2005), that specifies that 'Aboriginal and Torres Strait Islander status' (currently 'Indigenous status' in the dictionary) should be coded as:

- Aboriginal
- Torres Strait Islander
- both Aboriginal and Torres Strait Islander
- not Indigenous or
- not stated.

For the purposes of this report, these categories were amalgamated and the data stratified into three categories:

- Aboriginal and Torres Strait Islander
- not Indigenous or
- not stated.

While self-reported data are generally a robust source of data on Aboriginal and Torres Strait Islander status (AIHW 2010), a significant cause of concern with the accuracy of these data is that some jurisdictions do not allow for the 'not stated' category. Further, some Aboriginal and Torres Strait Islander women may choose not to identify as such when presenting to a BreastScreen Australia service. Thus, some Aboriginal and Torres Strait Islander women may be incorrectly assigned non-Indigenous status. This means that the analysis based upon Aboriginal and Torres Strait Islander status should be interpreted with caution.

Aboriginal and Torres Strait Islander women comprise a small proportion of women both in the population and within BreastScreen Australia. Aboriginal and Torres Strait Islanders make up about 2.5% of the Australian population, with 1.3% of the 2008 female population aged 50–69 estimated to be Aboriginal or Torres Strait Islander, based on estimates in Aboriginal and Torres Strait Islander population projections (ABS cat. no. 3238.0) (ABS 2009b).

Main language spoken at home

Main language spoken at home is also a self-reported category that is supplied at the time of screening. Women who are reported as 'non-English-speaking' have reported that they speak a language other than English at home, which can be interpreted as an indication of 'active ethnicity'. Since a different cultural and linguistic background may present a barrier to screening, this self-reported category is used to identify women who may have difficulties accessing services due to their cultural or language background.

The *BreastScreen Australia data dictionary* (AIHW & DoHA 2005) specifies that 'main language spoken at home' be coded according to the four-digit ABS Australian Standard Classification of Languages, 1997 (ABS cat. no. 1267.0). This report has collapsed the classification into the simple dichotomy of 'English' and 'other language'.

Although this stratification is reported as 'main language spoken at home', practice varies between the jurisdictions as to how this information is collected. Thus, in some jurisdictions there may thus be some lack of comparability with the *BreastScreen Australia data dictionary* definition of 'main language'.

Data limitations are similar to Aboriginal and Torres Strait Islander status in that some jurisdictions do not allow for the 'not stated' category, which means some women who speak a language other than English at home will be incorrectly assigned to the 'English only' category.

Tumour size

Tumour size is the size in millimetres of the malignant lesion, and applies to invasive cancers only. For more details, see the definition given in the *BreastScreen Australia data dictionary* (AIHW & DoHA 2005).

Screening round

The *BreastScreen Australia data dictionary* (AIHW & DoHA 2005) distinguishes between a woman's screening round in the national program and her round in the state or territory program. The screening round in the national program is used for this stratification in this report. However, it is not always possible to determine the round in the national program, so, for some women, this stratification has been collected as the round number in the state or territory program.

Appendix C Data sources and classifications

Data sources

Data used in this report are derived from multiple sources and are summarised below. All data are based on calendar years.

Indicator	Data source	Epoch and latest data available
1 Participation	State and territory BreastScreen registers	2 years (to align with recommended screening interval); latest data are for women screened in 2008 or 2009.
2 Rescreening	State and territory BreastScreen registers	1 year; latest data are for women screened in 2007 (27 months needs to have passed since last screen to calculate this indicator)
3 Recall to assessment	State and territory BreastScreen registers	1 year; latest data are for women screened in 2009
4 Invasive breast cancer detection	State and territory BreastScreen registers	1 year; latest data are for women screened in 2009
5 DCIS detection	State and territory BreastScreen registers	1 year; latest data are for women screened in 2009
6 Sensitivity	State and territory BreastScreen registers	1 year, but 3 years are combined due to small numbers; latest data are for women screened in 2006 (2 years needs to have passed since last screen to calculate this indicator)
7a Invasive breast cancer incidence (ICD-10 C50)	Australian Cancer Database, AIHW	1 year; latest data are for new cases diagnosed in 2007
7b DCIS incidence	State and territory cancer registries	1 year; latest data are for new cases diagnosed in 2007
8 Mortality (ICD-9 174, ICD-10 C50)	National Mortality Database, AIHW	1 year; latest data are for new cases diagnosed in 2007

BreastScreen Australia data

BreastScreen Australia has both national and state and territory components. BreastScreen Australia policy is coordinated at the national level. However, implementation of the program is the responsibility of the individual state or territory. Data for participation, cancer detection, sensitivity, DCIS detection, recall to assessment and rescreening are provided by each state and territory BreastScreen program, and then compiled into national figures to allow national monitoring of BreastScreen Australia.

Incidence data

Incidence data in this report come from the Australian Cancer Database (formerly the National Cancer Statistics Clearing House)—a national collection of cancer statistics held and operated by the AIHW. The Australian Cancer Database receives data from individual state and territory cancer registries on cancers diagnosed in residents of Australia and is the data source for reports on national incidence.

Data have been analysed using the year of diagnosis of cancer. This is because incidence data by year of diagnosis of cancer is a more accurate reflection of incidence during a particular year than year of registration data.

Mortality data

Mortality data in this report come from the AIHW's National Mortality Database, which is a national collection of de-identified information for all deaths in Australia maintained by the AIHW. Information on the characteristics and causes of death of the deceased is provided by the Registrars of Births, Deaths and Marriages and coded nationally by the ABS. Information on the cause of death is supplied by the medical practitioner certifying the death, or by a coroner. The data are updated each calendar year.

Analyses are based on the year of death, except for 2007 (the latest year for which mortality data are available), which is based on year of registration of death. Note that about 5% of deaths are not registered until the year following the death (ABS 2007).

Population data

The ABS estimated resident female population was used to calculate participation, incidence and mortality rates in this report.

Participation rates were calculated using the average of the estimated resident female population for 2-year reporting periods. In this report, denominators for participation rates have been calculated using the average of the ABS estimated resident population for 2008 and 2009 and other periods.

Because the ABS does not calculate the estimated resident population by socioeconomic status or language spoken at home, alternative methods were used to calculate the denominators for these rates. In the case of language spoken at home, the denominator was calculated by applying the age-specific distribution from the language question in the 2006 national population Census to the relevant age-specific estimated resident population counts. The denominator for rates based on socioeconomic status was calculated by applying an ABS concordance between postal area and socioeconomic status to the relevant estimated resident population by postal area.

The average of the ABS projected populations (ABS cat. no. 3238.0) (ABS 2009b) for 2008 and 2009 was used as the denominator for Aboriginal and Torres Strait Islander women's participation.

The age-standardised rates in this publication were calculated using the total estimated resident Australian population at June 2001.

There may be some variation in published participation rates because of different sources of estimated resident population data between national reports and state and territory reports.

Classifications

Age

The data in this report are either stratified by the age of the woman at the time of screening (for the screening data), at the time of diagnosis (for the cancer incidence data) or at the time of death (for the cancer mortality data).

State or territory

The state or territory reported is the one where screening took place (for the screening data), where the diagnosis was made (for the cancer incidence data) or the place of usual residence (for the cancer mortality data).

This means that it is possible for a woman to be double-counted in the screening data. If she was screened in one jurisdiction and then screened again less than 2 years later in another, both screens may be included in participation. This is expected to have a negligible effect on the reported participation.

Remoteness area

Remoteness areas are classified according to the ABS's Australian Standard Geographic Classification (ASGC) Remoteness Structure (ABS 2006), which groups geographic areas into six categories. These categories, called Remoteness Areas (RAs), are based on Census Collection Districts (CDs) and defined using the Accessibility/Remoteness Index for Australia (ARIA). ARIA is a measure of the remoteness of a location from the services provided by large towns or cities. Accessibility is judged purely on distance to one of the metropolitan centres. A higher ARIA score denotes a more remote location. The six RAs of the ASGC Remoteness Structure are listed in the table below (Table C4); the sixth 'migratory' area is not used in this report.

Table C3: Remoteness areas for the ASGC

Remoteness area	Collection districts within region
Major cities of Australia	CDs with an average ARIA index value of 0 to 0.2
Inner regional Australia	CDs with an average ARIA index value greater than 0.2 and less than or equal to 2.4
Outer regional Australia	CDs with an average ARIA index value greater than 2.4 and less than or equal to 5.92
Remote Australia	CDs with an average ARIA index value greater than 5.92 and less than or equal to 10.53
Very remote Australia	CDs with an average ARIA index value greater than 10.53
Migratory	Areas composed of off-shore, shipping and migratory CDs

Women were allocated to a remoteness area using their residential postcode supplied at the time of screening. Caution is required when examining differences across remoteness areas. First, postcodes used to allocate women may not represent their location of residence. Second, because remoteness area classifications are based on the 2006 Census, their accuracy diminishes due to subsequent changes in demographics. Third, many postcodes (and hence women) are unable to be allocated to a remoteness area.

Socioeconomic status

Socioeconomic status classifications are based on the ABS Index of Relative Socioeconomic Disadvantage (ABS 2008). Geographic areas are assigned a score based on attributes such as low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations. The score does not refer to the socioeconomic situation of a particular individual but instead refers to the geographic area in which a person lives. A low score means an area has many low-income families, people with little training and high unemployment, and may be considered disadvantaged relative to other areas. Areas with high index scores may be considered less disadvantaged relative to other areas.

Socioeconomic status groups based on the level of the index are used for analysis where 1 (lowest) represents the most disadvantaged and 5 (highest) the least disadvantaged.

Women were allocated to a socioeconomic status using their residential postcode supplied at the time of screening. Caution is required when examining differences across socioeconomic status for several reasons. First, postcodes used to allocate women may not represent their location of residence. Second, because socioeconomic status classifications are based on the 2006 Census, their accuracy may diminish due to subsequent changes in demographics. Third, many postcodes (and hence women) are unable to be allocated to a socioeconomic status group.

BreastScreen Australia classifications

See Appendix B, section *BreastScreen Australia definitions* for classifications specific to BreastScreen Australia.

Appendix D Statistical methods

Comparisons and tests of statistical significance

This report includes statistical tests of the significance of comparisons of rates between population groups. Any statistical comparison applied to one variable must take account of any other potentially relevant variables. For example, any comparison of participation by state must also take account of differences in the distribution of age between the states. These other variables are known as 'confounding' variables.

Crude rates

A crude rate is defined as the number of events over a specified period of time (for example, a year) divided by the total population. For example, a crude cancer incidence rate is defined as the number of new cases of cancer in a specified period of time divided by the population at risk. Crude mortality rates and cancer incidence rates are expressed in this report as number of deaths or new cases per 100,000 population. Crude participation rate is expressed as a percentage.

Age-specific rates

Age-specific rates are calculated by dividing the number of cases occurring in each specified age group by the corresponding population in the same age group expressed as a percentage or a number per 1,000 or 100,000 population. This rate may be calculated for particular age and sex groupings. For example:

Age-specific cervical cancer incidence rate in females aged 50–54

= (*New cases* aged 50-54 over *Female population* aged 50-54) times 100,000

= (75 over 698,700) times 100,000

= 10.7 per 100,000

Age-standardised rates (AS rates)

Rates are adjusted for age to facilitate comparisons between populations that have different age structures, for example, between youthful and ageing communities. There are two different methods commonly used to adjust for age. This publication uses direct standardisation, in which the age-specific rates are multiplied by a constant population (the 2001 Australian Standard Population unless otherwise specified). This effectively removes the influence of the age structure on the summary rate.

It important to be aware that for some data presented in this report, indirect age standardisation would be more appropriate due to small numbers (most commonly for the Australian Capital Territory and the Northern Territory), but direct age standardisation has been used for consistency. This can result in relatively large differences between crude and age-standardised rates. In these cases, crude rates should also be considered when interpreting data.

The method used for this calculation comprises that first, the age-specific rate is calculated (as shown above) for each age group. Second, the expected number of cases in each 5-year age group is calculated by multiplying the age-specific rates by the corresponding standard population and dividing by the appropriate factor (that is, 100,000 for mortality and incidence rates, and 100 for participation). Third, to give the age-standardised rate, the expected number of cases in each group are summed, divide by the total of the standard population and multiplied by the appropriate factor (for example 100,000 for mortality and incidence rate, and 100 for participation).

Confidence intervals

Population numbers for incidence and mortality and screening have a natural level of variability for a single year above and below what might be expected in the mean over many years. The percentage variability is small for large population numbers but high for small numbers such as mortality in a young age group. One measure of the likely difference is that standard error, which indicates the extent to which a population number might have varied by chance in only 1 year of data. In the 95% confidence interval, there are about 19 chances in 20 that the difference will be less than two standard errors.

There are several methods for calculating confidence intervals. The 95% confidence intervals (CIs) in this report were calculated using a method developed by Dobson et al. (1991). This method calculates approximate confidence intervals for a weighted sum of Poisson parameters.

Interpretation of confidence intervals

Where indicators include a comparison (such as between states and territories), a 95% confidence interval is presented along with the rates. This is because the observed value of a rate may vary due to chance, even where there is no variation in underlying value of the rate. The 95% confidence interval represents a range (interval) over which variation in the observed rate is consistent with this chance variation. In other words, there is a 95% confidence that the true value of the rate is somewhere within this range.

These confidence intervals can be used as a guide to whether differences in a particular rate are consistent with chance variation. Where the confidence intervals do not overlap, the difference between rates is greater than that which could be explained by chance and is regarded as statistically significant at the 95% level.

It is important to note that overlapping confidence intervals does not imply that the difference between two rates is definitely due to chance. Instead, an overlapping confidence interval represents a difference in rates that is too small to allow differentiation between a real difference and one that is due to chance variation. It can, therefore, only be stated that no statistically significant differences were found, and not that no differences exist.

The approximate comparisons presented might understate the statistical significance of some differences, but they are sufficiently accurate for the purposes of this report.

As with all statistical comparisons, care should be exercised in interpreting the results of the comparison. If two rates are statistically significantly different from each other, this means that the difference is unlikely to have arisen by chance. Judgment should, however, be exercised in deciding whether or not the difference is of any clinical significance.

Small counts

Numbers of 1 and 2 as well as the rates on which these are based have been suppressed (some small numbers remain in some indicators, where these were considered important to show). Additional suppression has been applied to some data on the request of the data custodians.

Glossary

Age-specific rate: a rate for a specific age group. The numerator and denominator relate to the same age group.

Age-standardised rate: weighted average of age-specific rates according to a standard distribution of the population by age to eliminate the effect of different age distributions and thus facilitate valid comparisons of groups with differing age compositions.

Assessment: further investigation of a mammographic abnormality or symptom reported at screening.

Benign: not cancerous.

Cancer (malignant neoplasm): a term used to describe one of several diseases that result when the process of cell division, by which tissues normally grow and renew themselves, becomes uncontrolled and leads to the development of malignant cells. These cancer cells multiply in an uncoordinated way, independently of normal growth control mechanisms, to form a tumour. The tumour can expand locally by invasion or systemically by metastasis through the lymphatic or vascular systems. If left untreated, most malignant tumours eventually result in death.

Cancer death: a death where the underlying cause is indicated as cancer. People with cancer who died of other causes are not counted in the death statistics in this publication.

Confidence interval: a range determined by variability in data, within which there is a specified (usually 95%) chance that the true value of a calculated parameter lies.

Data: refers to the building blocks of health information, including observations from administrative databases and health survey data sets.

Ductal carcinoma in situ: a non-invasive tumour of the mammary gland (breast) arising from cells lining the ducts.

False negative: means that the test has incorrectly observed that the disease is not present.

False positive: means that the test has incorrectly observed that the disease is present.

First screening round: see *Screening round.*

Incidence: see *New cancer case.*

Incident cancer: a new cancer that is detected in a subsequent screening round.

Index screening year: the year for which the interval cancer rate and the program sensitivity rate are determined.

Index screens: all screening examinations performed within the index screening year.

Indicators: observations about data that have been analysed to provide a means of comparing measures of health within and between population groups.

International Classification of Diseases: the World Health Organization's internationally accepted classification of diseases. The 10th revision (ICD-10) is currently in use.

Interval cancer—invasive (as defined for national reporting purposes by (Kavanagh et al. 1999), with minor changes endorsed by the National Advisory Committee):

- an invasive breast cancer diagnosed after completion of a negative screening episode and before the next screening examination (within 24 months from the date of the previous screen)
- a case of invasive breast cancer that is diagnosed at early review or in the interval between assessment and early review, where the recommendation for early review is 6 months or more from the screening date
- breast cancer diagnosed in a woman by BreastScreen Australia within 24 months of a negative screen (early rescreen) if the woman presents with a breast lump and/or clear or blood-stained nipple discharge in the breast in which the breast cancer was diagnosed
- an invasive breast cancer diagnosed between 6 and 24 months after a recommendation for assessment is made and a woman fails to attend assessment.

Invasive cancer: a tumour whose cells have invaded healthy or normal tissue.

Mammogram: a radiographic depiction of the breast.

Morbidity: illness.

Mortality: see *Cancer death.*

New cancer case: a person who has a new cancer diagnosed for the first time. One person can have more than one cancer and therefore may be counted twice in incidence statistics if it is decided that the two cancers are not of the same origin. This decision is based on a series of principles set out in more detail in a publication by (Jensen et al. 1991.).

Population estimates: official population numbers compiled by the ABS at both state and territory and statistical local area levels, by age and sex, as at 30 June each year. These estimates allow comparisons to be made between geographic areas of differing population sizes and age structures.

Prevalent cancer: an existing cancer that is detected at a woman's first screen.

Rescreening: the next screening examination after the screening episode in the index screening year.

Risk factor: an attribute or exposure that is associated with an increased probability of a specified outcome, such as the occurrence of a disease. Risk factors are not necessarily the causes of disease.

Screening: the performance of tests on apparently well people in order to detect a medical condition at an earlier stage than would otherwise be the case. Because a screening test is not intended to be diagnostic, a person with a positive or suspicious result must be referred for diagnosis and treatment if necessary.

Screening episode: a screening episode includes all attendances for screening and assessment within 6 months relating to a particular round of screening. It starts at the date of attendance for screening. It is completed when:

- a recommendation is made to return the woman to routine rescreening
- a recommendation is made for early review at 6 months or more from the screening date
- a diagnosis of cancer is made
- the woman fails to attend for technical recall or assessment within 6 months
- the woman dies.

Screening round: the first screening round is a woman's first visit to a mammography screening service; a subsequent screening round means that she has been screened before. If she attends for the fourth screening round, she has been screened three times before.

Screening round (first): a woman's first visit to a BreastScreen Australia mammography screening service.

Screening round (subsequent): a woman's visit to a BreastScreen Australia mammography screening service when she has attended such a service before.

Sensitivity: the proportion of people with a disease that has a positive test result for the disease.

Significant difference: Rates are deemed statistically significantly different when their confidence intervals do not overlap, because their difference is greater than what could be explained by chance. See 'confidence intervals' in Appendix D for more information.

Symptom: any evidence of disease apparent to the patient. For the purposes of this report, symptoms refer to a self-reported breast lump and/or blood-stained or watery nipple discharge.

Target population: women aged 50–69.

Ultrasound: diagnostic method based on the reflection of ultrasonic sound waves generated through scanning of, in this case, the breast. The reflections are viewed on a computer screen or photograph and checked for variations in images.

Women-years 'at risk' of interval or screen-detected breast cancer are:

- all women screened aged 50–69 who are resident in the service catchment area in which they are screened at the time of screening who have not reported a personal history of invasive cancer or DCIS
- women who are recommended for annual rescreening are only at risk of interval cancer until 12 months after the screening examination
- women who are recommended for routine rescreening are only at risk of an interval cancer until 24 months after the screening examination.

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Related publications

This report, *BreastScreen Australia monitoring report 2008–2009*, is part of an annual series. Earlier editions and any published subsequently can be downloaded for free from the AIHW website <http://www.aihw.gov.au/publications>. The website also includes information on ordering printed copies.

For those requiring further detail, complete data tables are available in *BreastScreen Australia monitoring report supplementary data tables*, which can also be downloaded for free from the AIHW website <http://www.aihw.gov.au/publications >.