Australian Government
Australian Institute of
Health and Welfare

BreastScreen Australia monitoring report

2018

AIHW

Australian Government
Australian Institute of
Health and Welfare

Cancer Series
Number 112

BreastScreen Australia monitoring report 2018

Australian Institute of Health and Welfare
Canberra
Cat. no. CAN 116

The Australian Institute of Health and Welfare is a major national agency whose purpose is to create authoritative and accessible information and statistics that inform decisions and improve the health and welfare of all Australians.

This publication is part of the Australian Institute of Health and Welfare's cancer series. A complete list of the Institute's publications is available from the Institute's website <www.aihw.gov.au>.

ISSN 2205-4855 (PDF)
ISSN 1039-3307 (Print)
ISBN 978-1-76054-420-1 (PDF)
ISBN 978-1-76054-421-8 (Print)

Suggested citation
Australian Institute of Health and Welfare 2018. BreastScreen Australia monitoring report 2018. Cancer series no. 112. Cat. no. CAN 116. Canberra: AIHW.

Any enquiries relating to copyright or comments on this publication should be directed to:
Australian Institute of Health and Welfare
GPO Box 570
Canberra ACT 2601
Tel: (02) 6244 1000
Email: info@aihw.gov.au

Published by the Australian Institute of Health and Welfare

This publication is printed in accordance with ISO 14001 (Environmental Management Systems) and ISO 9001 (Quality Management Systems). The paper is sourced from sustainably managed certified forests.

MIX
From responsible sources
FSC® C017269

Please note that there is the potential for minor revisions of data in this report.
Please check the online version at <www.aihw.gov.au> for any amendments.

Contents

Acknowledgments ..... **vi**

Abbreviations ..... **vii**

Symbols ..... **viii**

Summary ..... **ix**

Data at a glance ..... **x**

1 Introduction **1**

1.1 Breast cancer 1

1.2 Age is the greatest risk factor for breast cancer 2

1.3 Screening can detect breast cancer early 3

1.4 Screening mammography decreases morbidity and mortality from breast cancer 4

2 Women aged 50–74 now targeted by BreastScreen Australia **5**

2.1 Reporting women aged 50–74 5

3 Monitoring BreastScreen Australia using program data **6**

3.1 Screening behaviour 6

Screening 6

Rescreening 7

Screening and rescreening behaviour across ages 8

Screening behaviour across areas 11

3.2 Sensitivity of the screening test 13

How time since screen affects sensitivity 14

How age affects sensitivity 16

Specificity 16

3.3 Detection of invasive breast cancer and ductal carcinoma in situ 17

Detection of small breast cancers 19

Detection over time 20

Detection across ages 23

4 Key breast cancer outcomes **25**

4.1 Incidence of breast cancer 25

Breast cancer over time 25

Breast cancer across ages 26

Breast cancer types 27

Breast cancer across areas 28

4.2 Incidence of ductal carcinoma in situ 30
DCIS over time 30
DCIS across ages....................30
4.3 Survival after a diagnosis of breast cancer 31
Survival over time 31
4.4 Prevalence of breast cancer 33
4.5 Mortality from breast cancer 34
Breast cancer deaths over time 34
Breast cancer deaths across ages....................35
Breast cancer deaths across areas....................36
4.6 Burden of breast cancer....................38
5 Participation in BreastScreen Australia and breast cancer outcomes in Indigenous women 40
5.1 Participation in BreastScreen Australia in Indigenous women....................40
5.2 Breast cancer outcomes in Indigenous women....................42
Survival....................43
Mortality....................43
6 Monitoring other aspects of BreastScreen Australia....................45
6.1 Expenditure on BreastScreen Australia 45
Appendix A: Supporting data tables....................46
A1 Participation....................46
A2 Rescreening 51
A3 Recall to assessment....................53
A4 Invasive breast cancer detection....................55
A5 Ductal carcinoma in situ detection 57
A6a Interval cancers....................58
A6b Program sensitivity....................60
A7a Invasive breast cancer incidence....................61
A7b Ductal carcinoma in situ incidence 64
Survival after a diagnosis of breast cancer 65
A8 Mortality from breast cancer 67
Appendix B: BreastScreen Australia information....................70
Performance indicators....................73
National Accreditation Standards (NAS) Measures....................73
Appendix C: Data sources....................75
State and territory BreastScreen registers 75

AIHW Australian Cancer Database....75

AIHW National Mortality Database....76

Aboriginal and Torres Strait Islander deaths....76

ABS population data....76

ABS population data for participation calculations....77

ABS population data for incidence and mortality calculations....77

Australian Burden of Disease Study 2011....77

Appendix D: Classifications....78

Age....78

State or territory....78

Remoteness area....78

Socioeconomic group....78

Classification of invasive breast cancer and ductal carcinoma in situ....79

Histology....79

Appendix E: Statistical methods....84

Comparisons and tests of statistical significance....84

Crude rates....84

Age-specific rates....84

Age-standardised rates....84

Confidence intervals....85

Interpretation of confidence intervals....85

Glossary....86

References....89

List of tables....92

List of figures....95

List of boxes....97

Related publications....98

Supplementary online data tables....99

Acknowledgments

BreastScreen Australia monitoring report 2018 was produced by Biljana Tanevska, Alison Budd and Faith Ng.

This report was produced in collaboration with BreastScreen Australia. Thanks are extended to the state and territory program and data managers listed below for providing data, expertise and assistance in producing this document.

Thanks are also extended to all state and territory cancer registries, which are the source of data on breast cancer incidence and ductal carcinoma in situ incidence (through the Australian Cancer Database), and to all state and territory registrars of births, deaths and marriages, which are the source of data on breast cancer mortality (through the National Mortality Database).

Financial support and professional assistance provided by the Screening Section of the Australian Government Department of Health are also gratefully acknowledged.

BreastScreen Australia

New South Wales

Sarah McGill
Naomi Combe
Matthew Warner-Smith
Madhan Kumar
Kavitha Jyoshith

Victoria

Vicki Pridmore
Rachael Anderson
Pradeep Pamalapadi
Georgina Marr
Suzen Maljevac

Queensland

Paul Vardon
Michelle Tornabene
Nick Ormiston-Smith

Western Australia

Liz Wylie
Helen Lund

South Australia

Jane Burden
Andrew Holmes
Ada Childs

Tasmania

Gail Ward
Dylan Sutton
Carol Ramsay

Australian Capital Territory

Yvonne Epping
Mark Debeljakovic
Ming Ling Lau

Northern Territory

Kim Coulter
Guillermo Enciso

Australian Government Department of Health

Alice Creelman
Caroline Arthur
Gabrielle Bryant
Jason Scoullar

Abbreviations

ABDS	Australian Burden of Disease Study
ABS	Australian Bureau of Statistics
ACD	Australian Cancer Database
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
AS	age-standardised rate
CI	confidence interval
DALY	disability-adjusted life year
DCIS	ductal carcinoma in situ
DRF	Death Registration Form
ICD	International Classification of Disease
IRSD	Index of Relative Socio-economic Disadvantage
MCCD	Medical Certificate of Cause of Death
NAS	National Accreditation Standards
NCSP	National Cervical Screening Program
NMD	National Mortality Database
NOS	not otherwise specified
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
RA	remoteness area
SA	South Australia
SEIFA	Socio-Economic Indexes for Areas
SCU	State Coordination Unit
Tas	Tasmania
Vic	Victoria
WA	Western Australia
YLD	years lived with disability
YLL	years of life lost

Symbols

. .	not applicable
n.p.	not publishable because of small numbers, confidentiality or other concerns about the quality of the data
<	Less than
≤	Less than or equal to

Summary

BreastScreen Australia is the national breast cancer screening program. It aims to reduce illness and death from breast cancer through an organised approach to the early detection of breast cancer, using screening mammography to detect unsuspected breast cancer in women. Early detection provides an opportunity for early treatment, which can reduce illness and death. Women aged 40 and over are eligible for free mammograms every 2 years.

This report is the latest in the *BreastScreen Australia monitoring report* series, which is published annually to provide regular monitoring of BreastScreen Australia. The latest data available for women aged 50–74—the target age group since 1 July 2013—are presented.

Breast cancer is the most common cancer diagnosed in Australian women

Breast cancer is the most common cancer affecting Australian women. In 2014, there were 10,230 new cases of invasive breast cancer diagnosed in women aged 50–74, which is equivalent to 326 new cases per 100,000 women.

Incidence increased from around 200 new cases per 100,000 women aged 50–74 in the years before BreastScreen Australia began in 1991, to 300 cases per 100,000 in 2000. For the years 2000 to 2014, incidence remained at around 300 new cases per 100,000 women.

Breast cancer is the second most common cause of cancer-related death in Australian women, behind lung cancer. In 2015, 1,432 women aged 50–74 died from breast cancer, which is equivalent to 45 deaths per 100,000 women aged 50–74.

Breast cancer mortality has decreased since BreastScreen Australia began—from 74 deaths per 100,000 women aged 50–74 in 1991 to less than 50 deaths per 100,000 since 2010.

More than half of targeted women participate in BreastScreen Australia

More than 1.7 million women aged 50–74 had a screening mammogram through BreastScreen Australia in 2015–2016. This was 55% of women in the target age group. Participation has stayed between 54% and 55% since 2010–2011.

A small proportion of women are recalled for further investigation

In 2016, 12% of women who screened for the first time, and 4% of women attending a subsequent screen, had a screening mammogram result indicating they should be recalled for further investigation. These rates are similar to those in 2015.

More than half the cancers detected by BreastScreen Australia are small

Small breast cancers (≤15 mm in diameter) tend to be associated with more treatment options, lower morbidity and improved survival. In 2016, 46% of breast cancers detected in women attending their first screen, and 61% of breast cancers detected in women attending a subsequent screen, were small. In comparison, it has been shown that just 28% of breast cancers detected outside BreastScreen Australia are small (NBOCC 2009).

Indigenous women have lower screening rates and poorer outcomes

Participation in BreastScreen Australia is lower for Aboriginal and Torres Strait Islander women than for non-Indigenous women—in 2015–2016 this was 39% compared with 54%.

While incidence of breast cancer was lower for Indigenous women than for non-Indigenous women, at 251 compared with 285 new cases per 100,000 women aged 50–74, mortality from breast cancer was higher. This was 55 deaths per 100,000 women for Aboriginal and Torres Strait Islander women compared with the non-Indigenous rate of 46 deaths per 100,000 women aged 50–74.

Data at a glance

Performance Indicator	Number	Crude rate
Participation in 2015–2016	1,772,540	54.8%
Rescreening 2014		
After first screening round	45,926	62.1%
After second screening round	59,913	72.4%
After subsequent screening rounds	564,023	85.1%
Recall to assessment 2016		
First screening round	10,133	11.5%
Subsequent screening rounds	31,635	3.7%
Invasive breast cancer detection 2016		
First screening round	739	83.9
Subsequent screening rounds	4,721	55.4
All screening rounds	5,460	58.1
All screening rounds, small breast cancer detection	3,205	34.1
Ductal carcinoma in situ detection 2016		
First screening round	209	23.7
Subsequent screening rounds	1,131	13.3
All screening rounds	1,340	14.3
Interval cancers 2011, 2012 and 2013		
In the first year after a negative screen	1,369	6.8
In the second year after a negative screen	2,245	11.9
Program sensitivity 2011, 2012 and 2013		
In the 2 years after a negative screen	. .	76.6%
Invasive breast cancer incidence 2014	10,230	326.5
Ductal carcinoma in situ incidence 2013	1,713	56.0
Mortality 2015	1,432	44.7

Notes

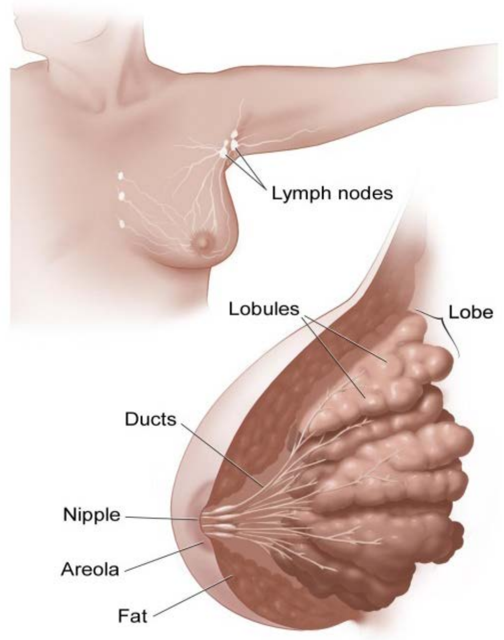
1. Crude rate for ‘Invasive breast cancer detection’, ‘Ductal carcinoma in situ detection’ and ‘Interval cancers’ are per 10,000 women screened.
2. Crude rate for ‘Invasive breast cancer incidence’, ‘Ductal carcinoma in situ incidence’ and ‘Mortality’ are per 100,000 women in the population.
3. All data shown are for women aged 50–74—except for interval cancers and program sensitivity data (women aged 50–69).

1 Introduction

1.1 Breast cancer

Cancer is a group of several hundred diseases in which abnormal cells are not destroyed naturally by the body but instead multiply and spread out of control. Cancers are distinguished from each other by the specific type of cell involved and the place in the body in which the disease began.

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). More rarely, breast cancer can originate in the connective tissue of the breast. The arrangement of breast tissue is illustrated in Figure 1.1.



Source: National Cancer Institute 2007 <http://visualsonline.cancer.gov>.

Figure 1.1: Anatomy: The breast and adjacent lymph nodes

Worldwide, breast cancer is the most common cancer affecting women, representing 1 in 4 of all cancers in women. The incidence of breast cancer differs worldwide, this disease being far more common in more developed countries than in developing countries (although as less-developed countries become more developed, a shift towards the lifestyles of developed countries brings an increase in cancers that have reproductive, dietary and hormonal risk factors—of which breast cancer is one) (UICC 2014).

Breast cancer is the most commonly diagnosed cancer in Australian women, representing 28% of all female cancers, with an incidence rate of around 124 new cases per 100,000 women, and is second only to lung cancer in cancer deaths (AIHW 2017c). (Note that this cancer comparison excludes basal and squamous cell carcinoma of the skin—collectively known as non-melanoma skin cancer—as these cancers are not currently reported to Australian cancer registries.)

1.2 Age is the greatest risk factor for breast cancer

It is not known what causes breast cancer; however, several risk factors have been identified that may increase the chance of a woman developing breast cancer. Having a risk factor does not mean that a woman will get breast cancer—many women who have risk factors never develop the disease.

The greatest risk factor for breast cancer is **age**, with most breast cancers occurring in women over the age of 50; in Australia this is more than three-quarters of breast cancers.

Certain reproductive or hormonal factors may also increase a woman's risk of developing breast cancer, including not having carried or given birth to any children (or to fewer children); older age at birth of first child; younger age at menarche; and older age at 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 similar to that associated with late menopause (De et al. 2010; McPherson et al. 2000).

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—8 out of 9 women who develop breast cancer do not have a mother, sister or daughter with breast cancer (Breast Cancer Network Australia 2013).

Family history can be split into 3 categories (Cancer Australia 2015):

- 'At or slightly above average risk' covers more than 95% of the female population, and includes women with no family history as well as women with a weak family history (such as one first degree relative diagnosed with breast cancer at age 50 or older). Nine out of 10 women in this group will not develop breast cancer.
- 'Moderately increased risk' covers less than 4% of the female population, and includes women with a strong family history (for instance, one first degree relative diagnosed with breast cancer under the age of 50).
- 'Potentially high risk' covers less than 1% of the female population, and includes women with a very strong family history (for instance, two first or second degree relatives on one side of the family diagnosed with breast or ovarian cancer plus one of a range of additional factors on the same side of the family, such as an additional breast cancer diagnosed before the age of 40, or breast cancer in a male relative).

See *Advice about familial aspects of breast cancer and epithelial ovarian cancer: a guide for health professionals* (Cancer Australia 2015) for more information about assessing individual risk.

Women with a **BRCA1** or **BRCA2 mutation** (see Glossary) have a higher risk of developing breast cancer, compared with the general population in all age groups. Women who carry a fault in BRCA1 or BRCA2 have a high lifetime risk of breast cancer: in a recent study, the cumulative breast cancer risk to age 80 was 72% for women who carry a fault in BRCA1 and 69% for women who carry a fault in BRCA2 (Kuchenbaecker et al. 2017).

Other risk factors associated with breast cancer include a higher body mass index, exposure to X-rays and gamma radiation, and consumption of alcoholic beverages (Cancer Research UK 2014).

The only factor protective against breast cancer is breastfeeding (WCRF/AICR 2007).

Although most breast cancers occur in women over the age of 50, younger women, and men of any age can, and do, get breast cancer (see Box 1.1).

Box 1.1: People of all ages can develop breast cancer

As women aged 40 and over are eligible for breast cancer screening through BreastScreen Australia, these women are the focus of this report. However, even though screening mammography is not recommended for women under the age of 40, young women can, and do, develop breast cancer. More rarely, men of any age can also develop breast cancer. Therefore, **it is important for people of all ages to be aware of how their breasts normally look and feel and promptly report any new or unusual changes** to their general practitioner. More information about breast cancer diagnosed in women aged under 40 can be found in *Breast cancer in young women: key facts about breast cancer in women in their 20s and 30s* (AIHW 2015a); more information about breast cancer in men can be found at <http://breastcancerinmen.canceraustralia.gov.au>.

1.3 Screening can detect breast cancer early

In Australia, population-based breast cancer screening is available through BreastScreen Australia, which targets women aged 50–74 for 2-yearly screening mammograms. Women aged 40–49 and 75 and over are also eligible to attend, but are not actively targeted.

As with all population-based breast cancer screening programs, BreastScreen Australia aims to reduce morbidity and mortality from breast cancer by using screening mammograms to detect unsuspected breast cancers in women who have no symptoms and therefore would not otherwise know they had the disease. Detection of breast cancers at an early stage allows access to diagnostic and treatment services early, so that women can benefit the most from available treatments.

Mammography is the only means of population-based screening shown to reduce breast cancer mortality, and is recommended as a population-based screening tool by Cancer Australia (Cancer Australia 2009). In screening mammography, two views are taken of each breast, and images reviewed by radiologists to look for suspicious characteristics that require further investigation. Screening mammography, like screening tests used in other screening programs, is not intended to be diagnostic; rather, it aims to identify people who are more likely to have cancer, and therefore require further investigation from diagnostic tests.

Screening mammograms work well in older women because breasts become less dense as women get older, particularly after menopause, which is why mammograms become more effective as women get closer to age 50. Incidence of breast cancer is also much higher, with more than 75% of breast cancers occurring in women aged 50 and over.

Mammographic screening is not recommended for women younger than 40. This is because breast tissue in premenopausal women tends to be dense, which can make it difficult to correctly identify the presence of breast cancer with mammography. The reduced accuracy of mammography in younger women produces a high risk of false positive and false negative results, which would result in high numbers of both unnecessary investigations and missed breast cancers (Irwig et al. 1997).

Box 1.2: ‘Overdiagnosis’ of breast cancer by BreastScreen Australia

The following points are from Cancer Australia’s position statement on ‘overdiagnosis’:

- A majority of breast cancers found through screening would be progressive and would become symptomatic within a woman’s lifetime if left untreated.
- It is likely that some screen-detected breast cancers (ductal carcinoma in situ or invasive breast cancer) might never have progressed to become symptomatic in a woman’s lifetime. Detection of these cancers is sometimes referred to as ‘overdiagnosis’.
- It is not possible to precisely predict at diagnosis, to which cancers overdiagnosis would apply.
- Research is needed, including molecular and genomic research, to find means of identifying cancers that would be of minimal risk of progression and therefore could be managed more conservatively.

For further information, please refer to the position statement endorsed by the Australian Health Ministers’ Advisory Council Standing Committee on Screening; Cancer Council Australia; and the Royal Australian and New Zealand College of Radiologists, and supported by the Cancer Australia Advisory Council, which can be found at <https://canceraustralia.gov.au/publications-and-resources/position-statements/overdiagnosis-mammographic-screening> (Cancer Australia 2014).

1.4 Screening mammography decreases morbidity and mortality from breast cancer

Lower morbidity from breast cancer is achieved by detecting cancers when they are small, because small breast cancers tend to be associated with increased treatment options (NBOCC 2009). Consistent with this, it has been shown that 59% of breast cancers detected by BreastScreen Australia are small, compared with just 28% of breast cancers detected outside BreastScreen Australia. Further, treatment of breast cancers detected by BreastScreen Australia is more likely to involve breast-conserving surgery (74% compared with 56% outside the program) (NBOCC 2009), which is associated with decreased morbidity.

Mortality benefits from breast cancer screening are also due to the detection of breast cancers when they are small, as it has been shown that finding breast cancers when they are small leads to improved survival (AIHW & NBCC 2007). In 2009, in a comprehensive evaluation of BreastScreen Australia, it was estimated that breast cancer mortality had been reduced by 21%–28% as a result of breast cancer screening (BreastScreen Australia EAC 2009). Further, analysis of data from the Swedish Two-Country Trial and England’s Breast cancer screening program estimated that 8.8 and 5.7 breast cancer deaths per 1,000 women screened were prevented by screening, respectively (Duffy et al. 2010).

In 2015, the International Agency for Research on Cancer (IARC) conducted a full review of available high-quality observational studies, to ensure that the evidence compiled in 2002—which showed a reduction in mortality as a result of screening mammography (IARC 2002)—was still relevant today. The study determined that women aged 50–69 who attended breast cancer screening using screening mammography had about a 40% reduction in the risk of death from breast cancer, with a substantial reduction in the risk of death also observed in women aged 70–74 (Lauby-Secretan et al. 2015). These mortality benefits align with the women targeted by BreastScreen Australia (that is, those aged 50–74).

2 Women aged 50–74 now targeted by BreastScreen Australia

As part of the 2013–14 Federal Budget, the Australian Government committed $55.7 million over 4 years to expand BreastScreen Australia's target age range from 50–69 to 50–74, resulting in a change to the age group actively targeted for 2-yearly screening mammograms.

This means that, from 1 July 2013, women aged 70–74 began being actively targeted by BreastScreen Australia, along with women aged 50–69.

Both the funding and the targeting activities associated with increasing the target age range by 5 years were phased in over several years, with full implementation by 2016–17. This meant that participation of women aged 70–74 was likely to increase until 2016–17, and thereafter be relatively stable (as illustrated in Figure 2.1).

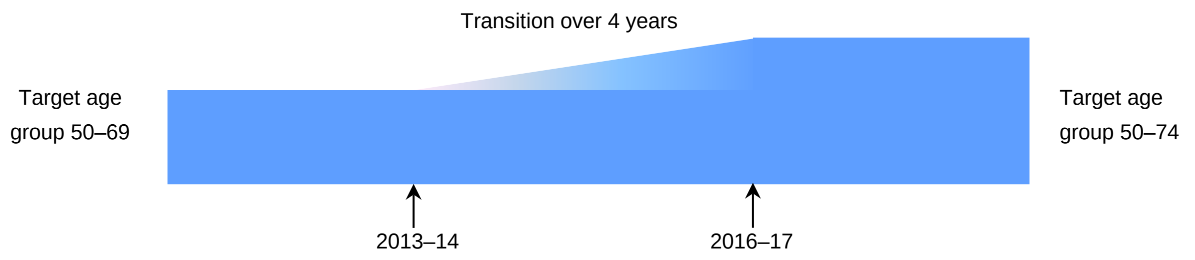


Figure 2.1: Transition of the target age range of BreastScreen Australia, from women aged 50–69 to women aged 50–74, between the financial years 2013–14 and 2016–17

More recently, the 2017–18 Federal Budget announced funding of $64.3 million over the next four years, from 2017–18 to 2020–21, to enable BreastScreen Australia to continue to actively invite women aged 70–74 to screen for the early detection of breast cancer.

2.1 Reporting women aged 50–74

Each performance indicator will be reported using the new target age group when its reporting period reaches 2014. This is detailed in Box 2.1.

Box 2.1: Reporting BreastScreen Australia's new target age group of 50–74

The new 50–74 target age group will be included in indicator reporting as follows:

Participation: for women screened in the 2 years 2014–2015, onwards.

Recall to assessment, invasive breast cancer detection and ductal carcinoma in situ detection: for women screened in the year 2014, onwards.

Rescreening, **interval cancers** and **program sensitivity:** for women screened in the index year 2014 and onwards (noting that at least 27 months need to have passed after the index year to know if a woman rescreened or had an interval cancer detected).

This means that, for the current report, the target age group of 50–74 is reported for *Participation, Rescreening, Recall to assessment, Invasive breast cancer detection* and *Ductal carcinoma in situ* detection, and the target age group of 50–69 is used for *Interval cancers* and *Program sensitivity*. *Incidence* and *Mortality* use the target age group of 50–74.

3 Monitoring BreastScreen Australia using program data

3.1 Screening behaviour

Breast cancer screening through BreastScreen Australia is provided by a dedicated service that is free to women aged 40 and over. While a small amount of screening mammography occurs outside BreastScreen Australia (screening mammography is available through Medicare for women at higher risk of breast cancer, and mammograms are also undertaken in private clinics), data presented in this report include screening mammography through BreastScreen Australia only.

Screening behaviour in this report refers to participation in BreastScreen Australia (screening) and whether or not women return at 2-yearly intervals (rescreening).

Screening

Participation is a major indicator of the performance of BreastScreen Australia, because high attendance for screening by women in the target age group maximises the reductions in morbidity and mortality from breast cancer. Participation is measured as the percentage of women in the population in the target age group screened by BreastScreen Australia over 2 calendar years. Participation is measured over 2 years to align with the 2-year recommended screening interval, because most women will screen only once within a 2-year period (Box 3.1).

Box 3.1: Participation is measured over 2 calendar years

Participation is measured over 2 years to align with the 2-year recommended screening interval, as most women will screen only once within a 2-year period. A consequence of measuring participation over 2 years on an annual basis is that there are ‘rolling’ participation rates, in which there is an overlap of 1 calendar year between any 2 consecutive rates. Because of this, the participation rate for a 2-year reporting period is often compared with the previous non-overlapping rate.

As participation for women aged 50–74 for the first time was reported for 2014–2015, the current report will compare the participation data for the reporting period 2015–2016 and 2014–2015.

In 2015–2016, the latest 2-year period, 1,772,540 women aged 50–74 participated in BreastScreen Australia (54.8% of the target population). This is an increase from 2014–2015, when 1,701,854 women aged 50–74 participated (53.7% of the target population). The greatest increase between 2014–2015 and 2015–2016 (around 13%) was in women aged 70–74, which indicates that the overall increase in 50–74 is due, in part, to BreastScreen services actively targeting women aged 70–74 since 1 July 2013.

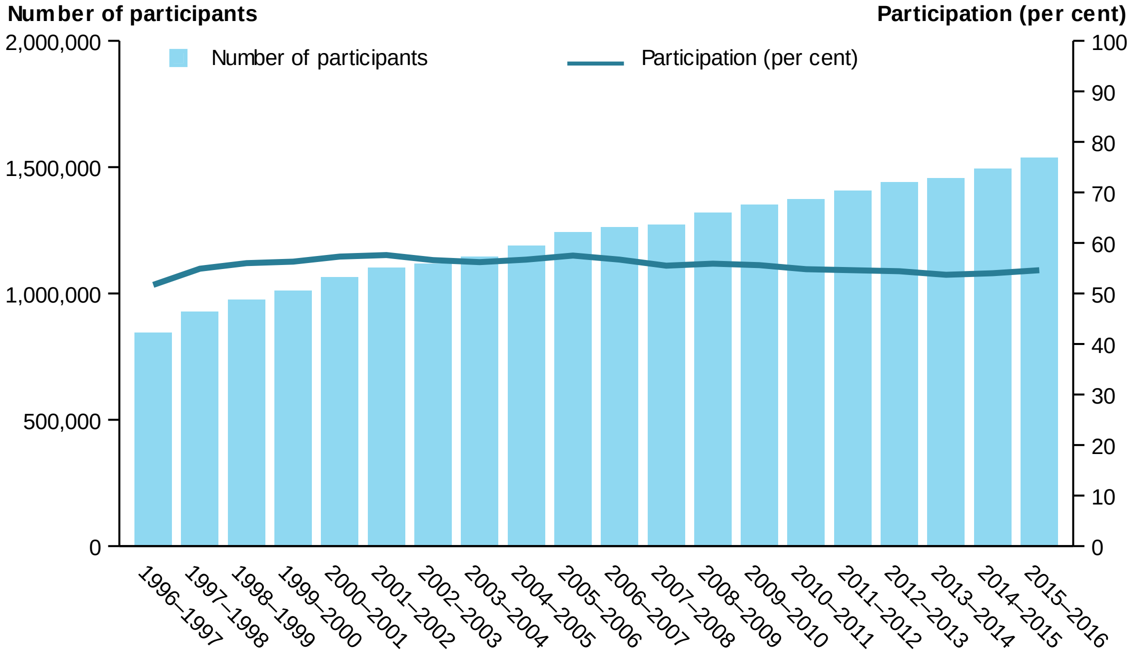
This is a favourable trend and shows that more women aged 50–74 attend BreastScreen services. It also suggests that the participation rate may continue to increase over the following years as more women aged 70–74 are targeted and screened. Participation by age is further detailed in the section *Screening and rescreening behaviour across ages*.

Participation rates for women aged 50–74 in 2015–2016 and 2014–2015 have been age-standardised to 54.3%, and 53.2% which are the rates used when comparing participation over time or across population subgroups (Box 3.2).

Box 3.2: Crude versus age-standardised rates

This report presents crude and age-standardised rates. Crude is the 'true' proportion or rate, and is appropriate when a single reporting period is used. However, comparisons over time or across states/territories or population subgroups require that crude rates are age-standardised to remove the underlying differences in age structure over time or between groups. Age-standardised rates allow analysis of trends and differentials, and are therefore preferentially reported in these situations.

Using the age-standardised rates for women aged 50–69 allows us to see that participation in 2014–2015 and 2015–2016 is similar to participation in previous 2-year periods, as indicated by the dark blue line in Figure 3.1. This figure also shows that the number of women screened in each 2-year period (indicated by the light blue columns) increased steadily from year to year.



Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A1.1.

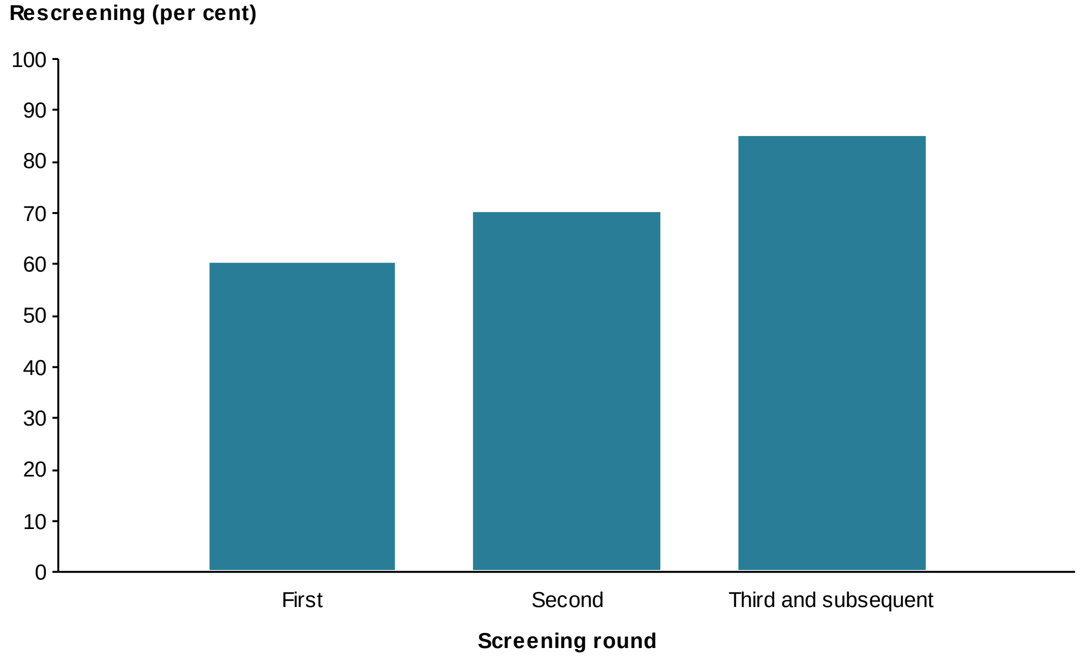
Figure 3.1: Participation of women aged 50–69 in BreastScreen Australia, 1996–1997 to 2015–2016

Rescreening

As well as the proportion of women who screen in each 2-year period, the proportion of women who return for a rescreen is also monitored. It is important that women rescreen according to BreastScreen Australia's recommended screening interval of 2 years, because 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.

Although the recommended screening interval is 2 years (24 months), 27 months is used to allow a reasonable time frame for women to respond to invitations. The latest rescreening data are for women screened in 2014. The target age group used for rescreening (prior to 2014) was 50–67 rather than 50–69, because women aged 68–69 at the time of their screen would be outside the target age group of 50–69 when they would be due for their rescreen. The target age group for women screened from 2014 onwards has changed to 50–72.

These data show that for women aged 50–72 screened for the first time in 2014, 60.0% rescreened within 27 months. This increased to 70.1% of women who screened for the second time in 2014, and to 85.0% of women who screened for the third or subsequent time in 2014 (Figure 3.2). This indicates that the proportion of women aged 50–72 who return for a rescreen within 27 months increases with the number of screens previously attended.



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 service in 2008.

Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A2.1.

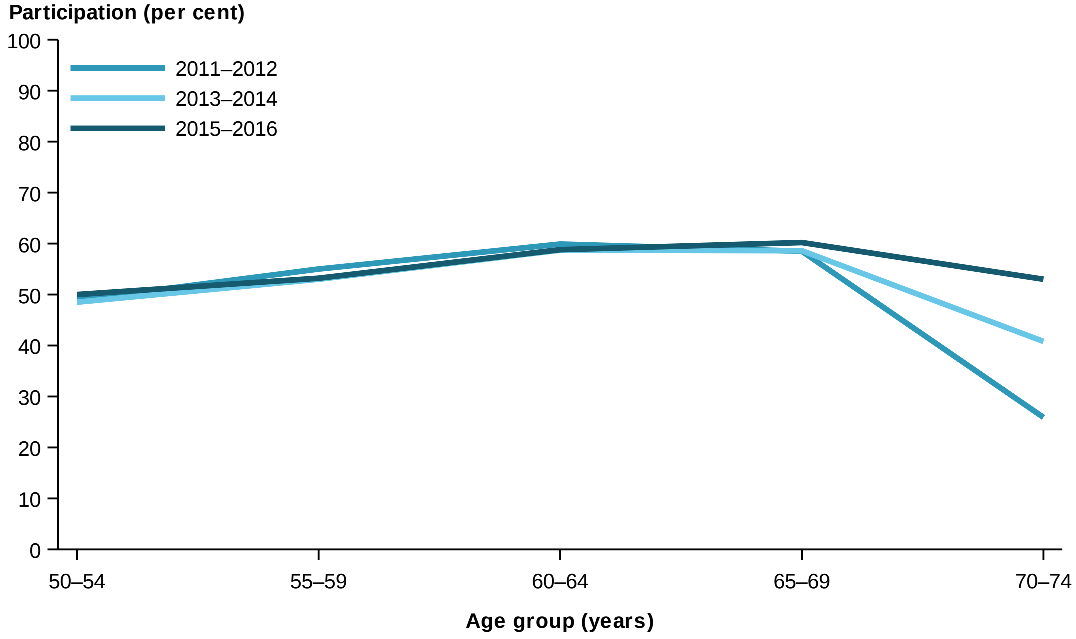
Figure 3.2: Rescreening by screening round, women aged 50–72 screened during 2014

It has been shown that women with false positive screening mammograms (that is, those recalled to assessment for further investigation and found not to have breast cancer) are less likely to participate in subsequent screening rounds (Sim et al. 2012). Since women are more likely to be recalled to assessment at their first screening visit (see Section 3.3), this may deter some women from rescreening within the desired 27 months, which may contribute to the lower rescreening rates for women after their first screening visit.

Screening and rescreening behaviour across ages

With the addition of women aged 70–74 to the target age group, it is of interest to see the effect from 1 July 2013. There has been a significant increase in the number of women screening in this age group, from 97,957 in 2011–2012 (the last reporting period that did not include any data from 1 July 2013) to 235,103 in 2015–2016. This has equated to an increase in participation of this age group from 25.9% in 2011–2012 to 53.0% in 2015–2016, with all years in between showing an increase relative to the proportion of the 2-year reporting period for which this age group was actively targeted. Of note, at 53.0% of the population, the participation rate of women aged 70–74 is now higher than the participation rate of women aged 50–54 (Figure 3.3).

Further increases in the age group 70–74 are possible—the increase in the target age group to include women aged 70–74 was over 4 years until 2016–17, so participation may increase further before it plateaus. Further, women aged 70–74 are already in the habit of screening, and are less likely to have work or family commitments that may be obstacles to screening.

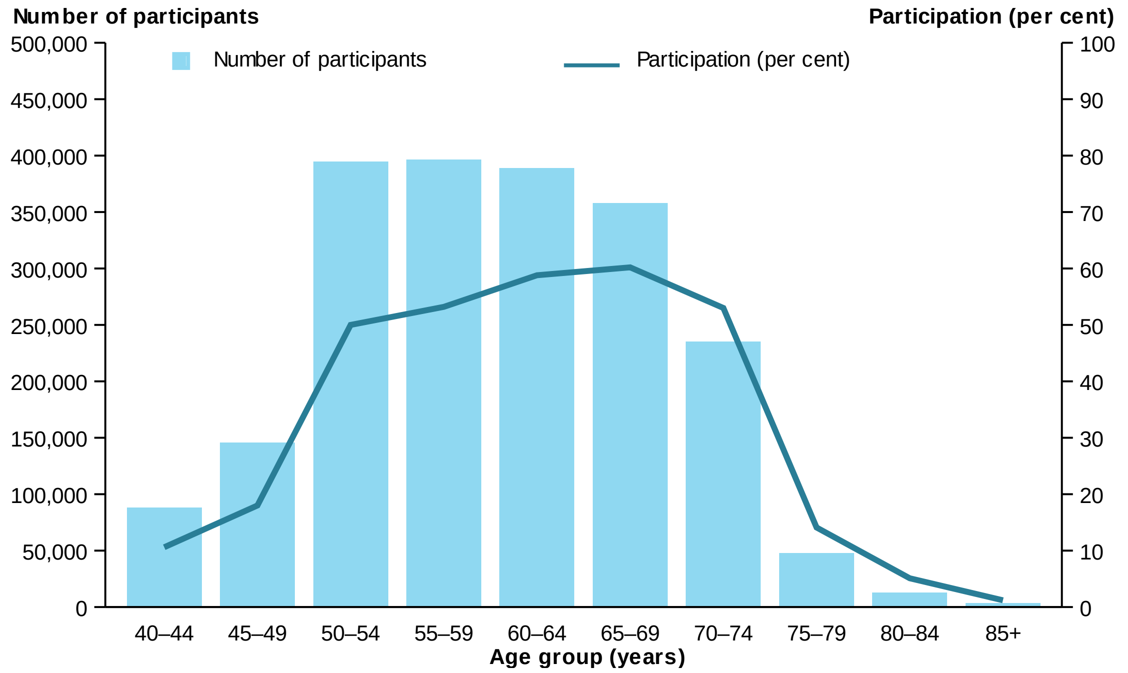


Source: AIHW analysis of BreastScreen Australia data.

Figure 3.3: Participation trends for women aged 50–74, 2011–2012, 2013–2014 and 2015–2016

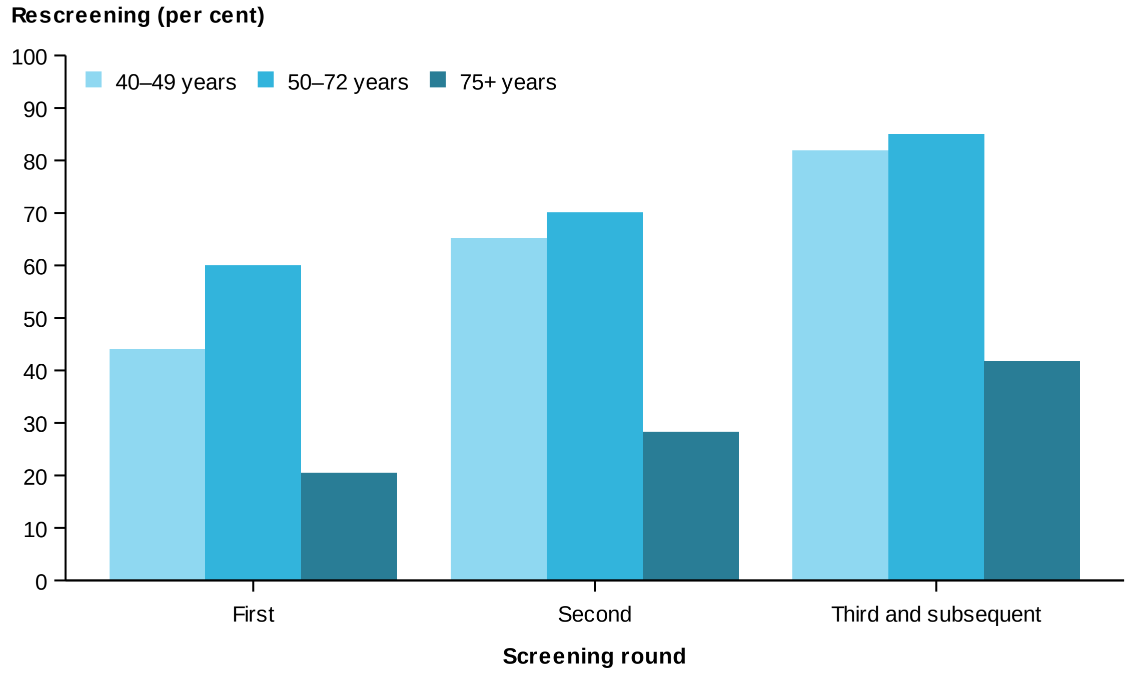
Most women who screen and rescreen are in the target age group. In 2015–2016, the proportion of women participating was at 50% or above for all 5-year age groups within the target age range, with participation highest for women aged 65–69 at 60.2% (Figure 3.4).

Screening and rescreening is next highest for women aged 40–49, with the lowest screening and rescreening rates for women aged 75 and over (figures 3.4 and 3.5).



Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A1.2.

Figure 3.4: Participation in BreastScreen Australia by age, 2015–2016



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

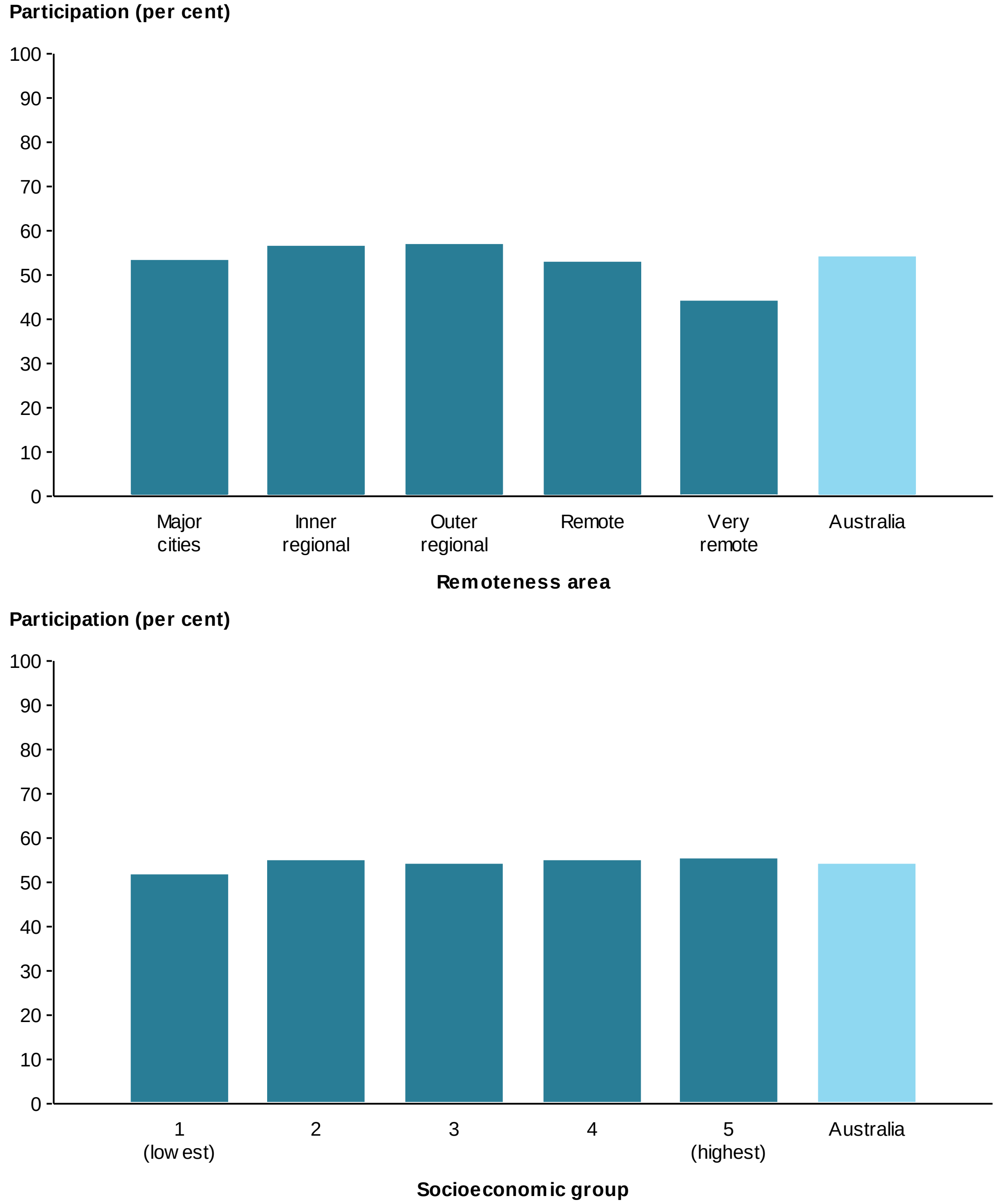
Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A2.2.

Figure 3.5: Rescreening by screening round, women aged 40–49, 50–72 and 75+ screened in 2014

Screening behaviour across areas

Participation for women aged 50–74 was highest in *Outer regional* areas at 56.9%, compared with 53.3% in *Major cities* and 44.1% in *Very remote* areas (Figure 3.6).

There was little variation in participation across socioeconomic groups, with all groups having participation rates between 51.8% and 55.2% (Figure 3.6).



Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in tables A1.4 and A1.5.

Figure 3.6: Participation of women aged 50–74 in BreastScreen Australia, by remoteness area, and by socioeconomic group, 2015–2016

Access to BreastScreen services—especially for women from Indigenous, culturally and linguistically diverse, rural/remote, and lower socioeconomic backgrounds—is a national policy feature of BreastScreen Australia, which has developed National Accreditation Standards (NAS) Measures to ensure that this policy feature is met by services accredited through BreastScreen Australia (see Box 3.3 for more information on NAS Measures and accreditation).

These NAS Measures (along with other NAS Measures related to access and participation in BreastScreen Australia) underpin BreastScreen Australia's aim to maximise the proportion of women in the target population who are screened every 2 years.

Table 3.1 shows the NAS Measures related to participation and rescreening. While NAS Measures for women aged 50–74 do not yet have a target, BreastScreen Australia aims to maximise the participation of women in the target age groups for screening and rescreening.

Box 3.3: BreastScreen Australia and National Accreditation Standards

Provision of a high-quality service to women is of great importance to BreastScreen Australia. For this reason, services accredited under BreastScreen Australia are expected to operate according to the National Accreditation Standards (NAS) of BreastScreen Australia, along with national policy features and protocols. The accreditation system, of which the NAS are an integral part, intends to drive continuous quality improvement in the delivery of breast screening services, to ensure women receive safe, effective and high-quality care.

The BreastScreen Australia NAS Measures have been developed to ensure that all women receive breast screening services that are of a consistently high quality, regardless of where they attend for screening or assessment.

A number of NAS Measures are consistent with the performance indicators in this report—where appropriate, the data in this report are benchmarked against these Measures. These benchmarks are useful in helping to interpret the data presented, although in considering how these national data compare with the NAS Measures, it should be noted that the NAS Measures were not designed to be used as standards for the BreastScreen Australia performance indicators.

Table 3.1: NAS Measures for participation and rescreening calculated using BreastScreen Australia data supplied for the *BreastScreen Australia monitoring report 2018*

NAS Measure		Value (crude rate)
NAS Measure 1.1.1(a)	The Service and/or SCU monitors and reports the participation rate of women aged 50–74 years who participate in screening in the most recent 24-month period.	54.8%
NAS Measure 1.1.2(a)	The Service and/or SCU monitors and reports the proportion of women aged 50–72 years who attend for their first screening episode within the Program and who are rescreened within 27 months.	62.1% first
NAS Measure 1.1.3(a)	The Service and/or SCU monitors and reports the proportion of women aged 50–72 years who attend for their second and subsequent screen within the Program who are rescreened within 27 months of their previous screening episode.	72.4% second 85.1% subsequent
NAS Measure 1.2.1(a)	The Service and/or SCU monitors and reports participation of women aged 50–74 years from special groups and where rates are below that of the overall population, implements specific strategies to encourage their participation in screening. Consideration of equitable participation rates of at least the following groups is made: women from Indigenous, culturally and linguistically diverse, rural/remote and lower socioeconomic backgrounds.	
	Indigenous	39.0%
	Non-English-speaking	49.8%
	Remote/Very remote	53.2%/43.8%
	SES group (lowest)	52.5%
NAS Measure 1.2.2	The Service and/or SCU monitors the proportion of all women in the Service who are screened and recalled for assessment, aged 40–49 years and 75 years and over.	
	(a) women who are screened	
	40–49	14.3%
	75+	7.2%
	(b) women who are recalled for assessment	
	40–49	5.4% to 10.4%
	75+	4.4% to 12.1%

Source: AIHW analysis of BreastScreen Australia data.

3.2 Sensitivity of the screening test

Mammography (X-ray of the breast) is the test used in breast cancer screening. Screening mammography, like the screening tests used in other programs such as bowel and cervical screening, is not intended to be diagnostic; rather, it aims to identify people who are more likely to have breast cancer, and therefore require further investigation from diagnostic tests.

Sensitivity of a screening test is the ability of that test to identify accurately the disease in people who have that disease. This is referred to as a ‘true positive’ screening result. A ‘false negative’ screening result occurs when women have a screening mammography that incorrectly indicates that they do not have breast cancer.

The estimation of false negative results requires that we know if a woman had breast cancer present at the time of her screen. Because this cannot be truly known at the time of the test, we use interval cancers—breast cancers that arise between routine screening mammograms—as a way of assessing breast cancers that might have been present at the time of screen but missed by the screening process (although many interval cancers cannot be detected because they were either not yet present or not visible, as described in more detail in Box 3.4 and in the paragraphs that follow).

Box 3.4: Interval cancers

An interval cancer is defined as an invasive breast cancer that is diagnosed after a screening episode that detected no cancer and before the next scheduled screening episode (Kavanagh et al. 1999). This means that a woman attends BreastScreen for a screening mammogram, is advised that her mammogram is not suspicious for breast cancer, and is given a recommendation to rescreen in 2 years (or in 1 year if she screens annually), and then within those 2 years (or 1 year in the case of the latter), she experiences signs or symptoms suggestive of breast cancer (such as a lump or clear or bloody nipple discharge), and either returns to BreastScreen or—more commonly—visits her doctor for further investigation, at which time it is discovered that she has invasive breast cancer in that breast.

There are two categories of interval cancers, but the category can be determined only when previous screening mammograms are reviewed after the discovery of an interval cancer (for interval cancers diagnosed outside BreastScreen Australia, this discovery is made through linkage with the cancer registry in the relevant state or territory). All interval cancers in all state and territory BreastScreen programs undergo clinical review.

The first category comprises 'true' interval cancers. These are invasive breast cancers diagnosed between routine screening mammograms that, upon review, could not have been detected in the previous routine screening mammogram. This may be due to either the interval cancer being an aggressive breast cancer that emerged and grew very rapidly in the period between routine screening mammograms, or due to the breast cancer not being visible due to the characteristics of the cancer or the breast tissue (for example, dense breast tissue can make breast cancers very difficult to see). True interval cancers do not represent any failure in detection.

The second category comprises breast cancers that, upon review, were visible in the previous routine screening mammogram. These are false negative screening results and are considered a failure of the screening process.

However, even though only missed cancers, and not 'true' interval cancers, are considered as false negative screening results, all interval cancers are included in this measure of sensitivity.

'Program sensitivity' is measured as 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 (2 years), and is therefore a measure of the sensitivity of screening mammography.

How time since screen affects sensitivity

The latest data for interval cancers and program sensitivity are for women screened in 2011, 2012 and 2013 (referred to as index years 2011–2013). These are the latest data available because at least 2 years need to have passed since a woman's last routine screening mammogram in order to know whether she was diagnosed with an interval cancer in that time—often longer due to time required for cancer registries to be notified of the cancer, and for linkage between the BreastScreen registers and cancer registers to occur.

There are fewer interval cancers, and thus higher program sensitivity, in the first year following a woman's negative screen than in the second. For the index years 2011–2013, in the first year after a negative screening episode, there were 8 and 7 interval cancers per 10,000 women-years after a woman's first visit and subsequent visits, respectively.

In comparison, in the second year after a negative screening episode, there were 10 and 12 interval cancers per 10,000 women-years after a woman’s first visit and subsequent visits, respectively (Table 3.2).

In these data, there were no appreciable differences in the interval cancer rate between first and subsequent screening rounds for the first and second year after a negative screening episode (apparent differences are considered not statistically significant due to overlapping confidence intervals). This indicates that the possibility for women to be diagnosed with interval cancer is similar between the first and subsequent screening rounds for the first and second year after a negative screening episode.

Program sensitivity differs by time since screen, being higher in the first year than in the first two years after a negative screen. Program sensitivity was 92.7% in the first year, and 86.2% in the first two years after a woman’s first screening round. Similarly, it was 86.8% in the first year, and 74.2% in the first two years after subsequent screening rounds (Table 3.2).

Unlike the interval cancer measures, program sensitivity measures differ by screening round, being higher after a woman’s first visit compared with her subsequent visits. This may be because women at their first screening visit are more likely to be recalled to assessment for further investigation, and thus more likely to have a breast cancer detected.

Table 3.2: Interval cancer rate and program sensitivity, by time since screen, women aged 50–69 screened in 2011–2013

Time since screen	First year after screen	Second year after screen	First and second years
Interval cancers			
First screening round			
Number	149	217	366
Crude rate	6.8	10.3	8.6
AS rate	7.5	9.7	8.6
95% CI	6.0–9.3	8.1–11.6	7.5–9.8
Subsequent screening rounds			
Number	1,220	2,028	3,248
Crude rate	6.8	12.1	9.4
AS rate	6.8	12.0	9.3
95% CI	6.4–7.2	11.5–12.5	9.0–9.6
Program sensitivity			
First screening round			
Crude rate	92.2	. .	84.6
AS rate	92.7	. .	86.2
Subsequent screening rounds			
Crude rate	87.6	. .	75.1
AS rate	86.8	. .	74.2

. . not applicable: program sensitivity is not calculated for the second year after a negative screening episode

Notes

1. Queensland data for 2013 were not available to be included in this report.
2. ‘Crude rate’ is the number of interval cancers detected per 10,000 women-years; ‘age-standardised (AS) rate’ is the number of interval cancers detected per 10,000 women-years, age-standardised to the population of women attending a BreastScreen Australia service in 2008; 95% CI are 95% confidence intervals.

Source: AIHW analysis of BreastScreen Australia data.

How age affects sensitivity

In 2011–2013, for the first year after a negative screening round, the interval cancer rate was lowest for women aged 50–59 and 60–69, and was highest for women outside these age groups. The trend was not as clear in the second year after a negative screening round, with the interval cancer rate lowest for women aged 40–49 and 50–59, and thereafter increasing with age (Table 3.3). Program sensitivity was lowest for women aged 40–49, increasing with each 10-year age group to be highest for women aged 70 and over (Table 3.3).

These results, when combined, point to lower sensitivity of screening mammography for women aged 40–49, meaning that BreastScreen Australia is less able to detect invasive breast cancers in women aged 40–49 who attend for screening. This is likely to be due to features of young breasts, such as high density, which can make breast cancers difficult to visualise with screening mammography (Irwig et al. 1997).

Table 3.3: Interval cancer rate and program sensitivity, by age, women screened in 2011–2013

	Age group (years)			
Time since screen	**40–49**	**50–59**	**60–69**	**70+**
Interval cancers				
First year				
Number	261	704	665	204
Crude rate	8.2	6.6	7.1	9.8
Second year				
Number	361	1,111	1,134	293
Crude rate	12.1	11.0	12.9	15.1
Program sensitivity				
First year				
Crude rate	80.0	86.7	89.7	91.1
First and second years				
Crude rate	67.4	74.5	78.3	82.7

Notes

1. Queensland data for 2013 were not available to be included in this report.
2. 'Crude rate' is the number of interval cancers detected per 10,000 women-years.

Source: AIHW analysis of BreastScreen Australia data.

Specificity

While sensitivity is the ability of a screening test to accurately identify the disease in people who have that disease, specificity refers to the ability of a screening test to accurately identify people who do not have the disease—referred to as a 'true negative' screening result. The vast majority of women who are given a negative screening result after their screening mammography through BreastScreen Australia do not have breast cancer, and thus receive a true negative screening result.

Women who are not given a negative screening result are recalled to assessment for further investigation. A 'true positive' screening result is when they are found to have breast cancer at assessment; a 'false positive' screening result is when women are recalled to assessment for further investigation when they do not have breast cancer. Most women who are recalled to assessment through BreastScreen Australia do not have breast cancer.

The proportion of women who are recalled to assessment is examined in Section 3.3. BreastScreen Australia aims to achieve a balance in breast cancer screening that minimises the number of cancers that are missed (false negatives) while also minimising the number of women who are recalled when they do not have breast cancer (false positives). This underpins many of the objectives and NAS Measures of BreastScreen Australia. The NAS Measures related to interval cancers are shown in Table 3.4.

Table 3.4: NAS Measures for interval cancers calculated using BreastScreen Australia data supplied for the *BreastScreen Australia monitoring report 2018*

NAS Measure		**Value (crude rate)**
NAS Measure 2.3.1(b)	<7.5 per 10,000 women aged 50–69 years who attend for screening are diagnosed with an interval invasive breast cancer in the first calendar year following a negative screening episode.	6.8/6.8
NAS Measure 2.3.2(b)	≤15 per 10,000 women aged 50–69 years who attend for screening are diagnosed with an interval invasive breast cancer in the second calendar year following a negative screening episode.	10.3/12.1

Source: AIHW analysis of BreastScreen Australia data.

3.3 Detection of invasive breast cancer and ductal carcinoma in situ

The majority of women who participate in BreastScreen Australia experience only the screening test, as nothing suspicious is seen on the screening mammogram. However, a subset of women—those identified by the screening test as being more likely to have breast cancer—are recalled for more rigorous and sometimes invasive diagnostic testing. Testing at assessment can include palpation, diagnostic mammography, ultrasound and, if required, a percutaneous biopsy (fine needle aspiration for cytological assessment or core biopsy of breast tissue for histological assessment).

In 2016, of the 88,061 women aged 50–74 screened for the first time, 10,133 (11.5%) were recalled for further assessment; of the 851,781 women attending subsequent screens, 31,635 (3.7%) were recalled. Of the women recalled to assessment, most did not have an invasive breast cancer or ductal carcinoma in situ (DCIS) detected (see Box 3.5 for more information on DCIS and how it differs from invasive breast cancer). Of the 10,133 women recalled to assessment after a first screen, 948 (9.4%) had an invasive breast cancer or DCIS detected, and of the 31,635 women recalled to assessment after a subsequent screen, 5,852 (18.5%) had an invasive breast cancer or DCIS detected (Table 3.5).

This is 1.1% of women attending a first screen and 0.7% of women attending a subsequent screen having an invasive breast cancer or DCIS detected through BreastScreen Australia.

Box 3.5: Ductal carcinoma in situ (DCIS)

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, but unlike breast cancer, DCIS does not invade the surrounding breast tissue, but instead is contained entirely within the milk duct.

Women with DCIS are at an increased risk of later developing invasive breast cancer (AIHW 2010; IARC 2002). However, it is not currently possible to predict which DCIS cases might progress to invasive breast cancer, so they are treated similarly to invasive breast cancer. Further, 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, just as it does for invasive breast cancer.

Table 3.5: Number of women aged 50–74 who had invasive breast cancer or DCIS detected, first and subsequent screening rounds, 2016

	Number	% of women screened	% of women recalled to assessment
Screened			
First screening round	88,061	. .	. .
Subsequent screening rounds	851,781	. .	. .
Recalled to assessment			
First screening round	10,133	11.5	. .
Subsequent screening rounds	31,635	3.7	. .
Invasive breast cancer or DCIS detected			
First screening round	948	1.1	9.4
Subsequent screening rounds	5,852	0.7	18.5

Source: AIHW analysis of BreastScreen Australia data.

Data in Table 3.5 highlight that screening mammography is less accurate for women attending for the first time, in so far as more women are recalled to assessment when there is no breast cancer or DCIS present (that is, have more false positives). This is likely to be due, in part, to not having any previous images with which to compare a woman’s first screening mammography images. Without any previous images for comparison, it is more difficult to distinguish between what is normal and what might be suspicious (BreastScreen WA 2008), with additional testing less likely when prior mammograms are available for comparison.

A higher proportion of women attending their first screen have an invasive breast cancer or DCIS detected, because a woman’s first visit detects prevalent cancers that may have been present for some time rather than incident cancers that have grown between screens, which tend to be the breast cancers detected at subsequent screening visits (Kavanagh et al. 1999).

Detection is usually expressed as the number of invasive breast cancers and the number of cases of DCIS detected per 10,000 women screened. Table 3.6 shows that in 2016, for women aged 50–74, for every 10,000 women screened for the first time, 84 had an invasive breast cancer detected, while for every 10,000 women attending subsequent screens, 55 had an invasive breast cancer detected. Detection of DCIS was rarer, at 24 per 10,000 women attending their first screen, and 13 per 10,000 women attending subsequent screens in 2016 (Table 3.6).

Table 3.6: Invasive breast cancer and DCIS detection in women aged 50–74, first and subsequent screening rounds, 2016

	Number	Crude rate	AS rate
Invasive breast cancer			
First screening round	739	83.9	103.3
Subsequent screening rounds	4,721	55.4	50.4
DCIS			
First screening round	209	23.7	27.5
Subsequent screening rounds	1,131	13.3	12.7

Note: 'Crude rate' is the number of women with invasive breast cancer or DCIS detected per 10,000 women screened; 'age-standardised (AS) rate' is the number of women with invasive breast cancer or DCIS detected per 10,000 women screened, age-standardised to the population of women attending a BreastScreen Australia service in 2008. AS rates are shown to aid in comparisons over time.

Source: AIHW analysis of BreastScreen Australia data.

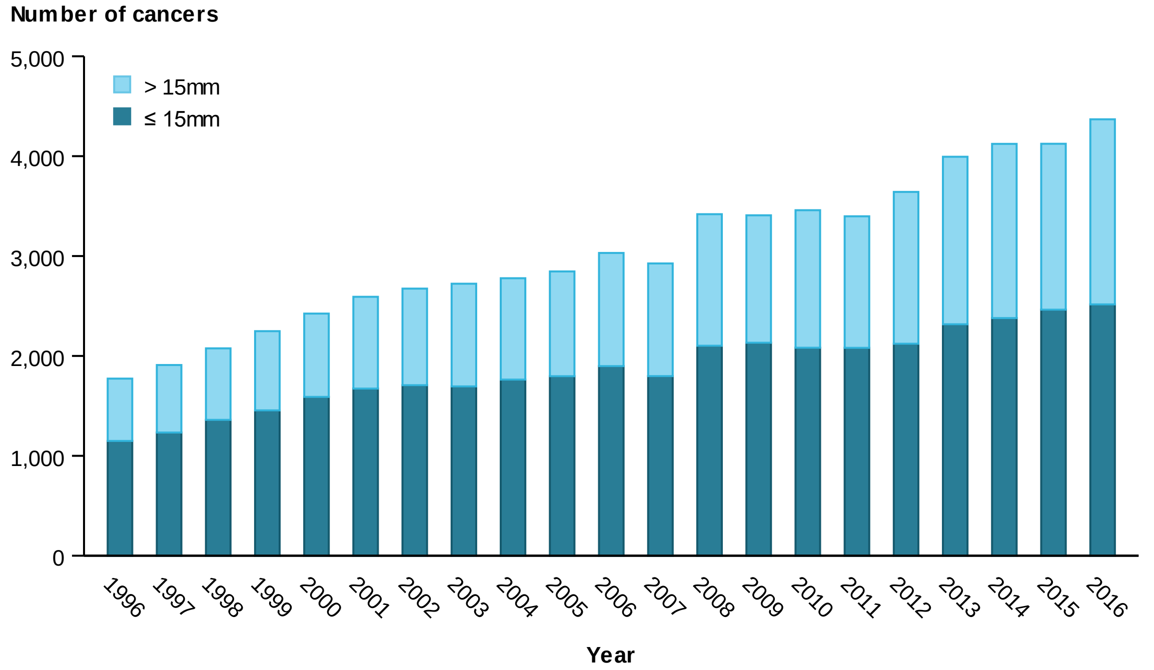
Detection of small breast cancers

BreastScreen Australia strives to maximise the detection of invasive breast cancers, particularly small cancers, to achieve the desired reductions in morbidity and mortality.

In 2016, for every 10,000 women screened through BreastScreen Australia aged 50–74, 34 had a small (≤15 mm) invasive breast cancer detected. As a proportion of all invasive breast cancers detected, this was 45.6% for first screens, and 60.7% for subsequent screens. For all screening rounds combined, it was 58.7%.

A woman is more likely to be diagnosed with a small cancer in subsequent screening visits than at 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. In contrast, invasive breast cancers detected at a first screen are less likely to be small because they are prevalent cancers that have had more time to grow.

Although the proportion of small breast cancers detected has fallen over time for women aged 50–69, from around 65% of all invasive breast cancers between 1996 and 2001 to 58% in 2016 (Figure 3.7), it is still of note that more than half of all invasive breast cancers detected through BreastScreen Australia are small, at ≤15 mm. The high proportion of small breast cancers is a positive outcome, because small breast cancers tend to be associated with increased treatment options (NBOCC 2009) and improved survival (AIHW & NBCC 2007). Invasive breast cancers detected outside BreastScreen Australia are less likely to be small, with only 28% measuring ≤15 mm (NBOCC 2009).



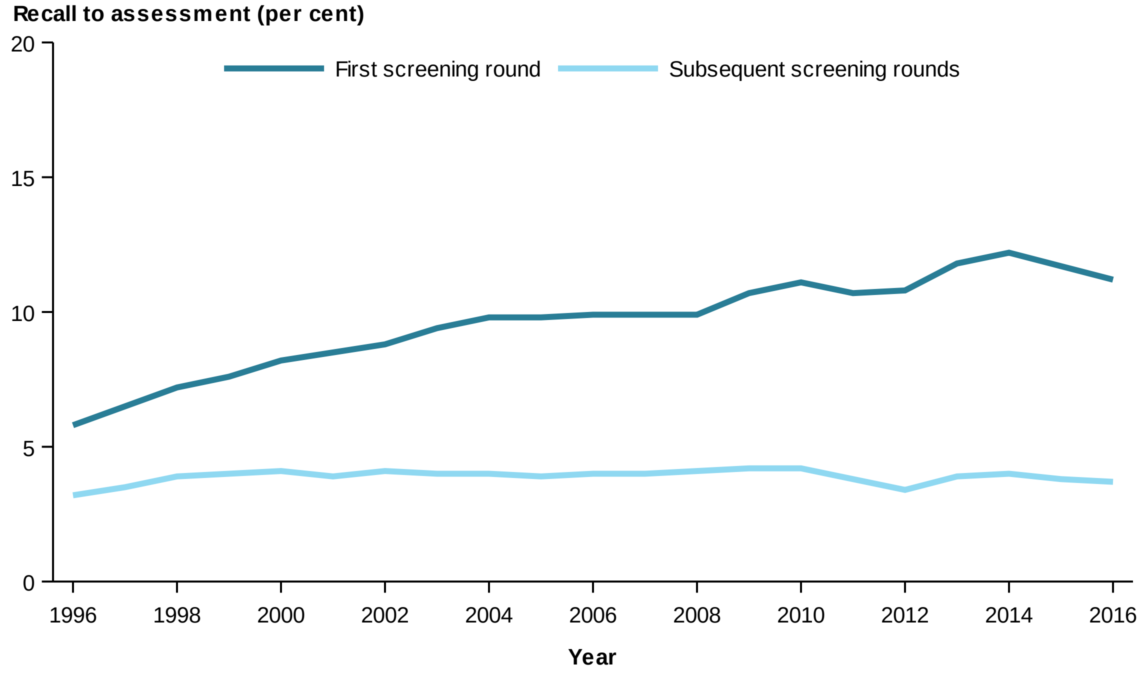
Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A.4.4.

Figure 3.7: Number Number of invasive breast cancers, showing the proportion of small (≤15 mm) to other sizes (>15 mm), detected in women aged 50–69, all screening rounds, 1996–2016

The proportion of cancers that are small is lower in younger age groups—44.8% for women aged 40–49 compared with 58.7% for women aged 50–74 and 52.3% for women aged 75 and over.

Detection over time

Over time, while the recall to assessment rate for women aged 50–69 for subsequent screening rounds has remained steady at 4%, the proportion of women attending BreastScreen Australia for the first time who were recalled to assessment has increased. After remaining steady at 10% from 2004 to 2008, it increased to 11% from 2009 to 2012, before reaching a high of 12.2% in 2014 and falling to 11.2 % in 2016 (Figure 3.8).



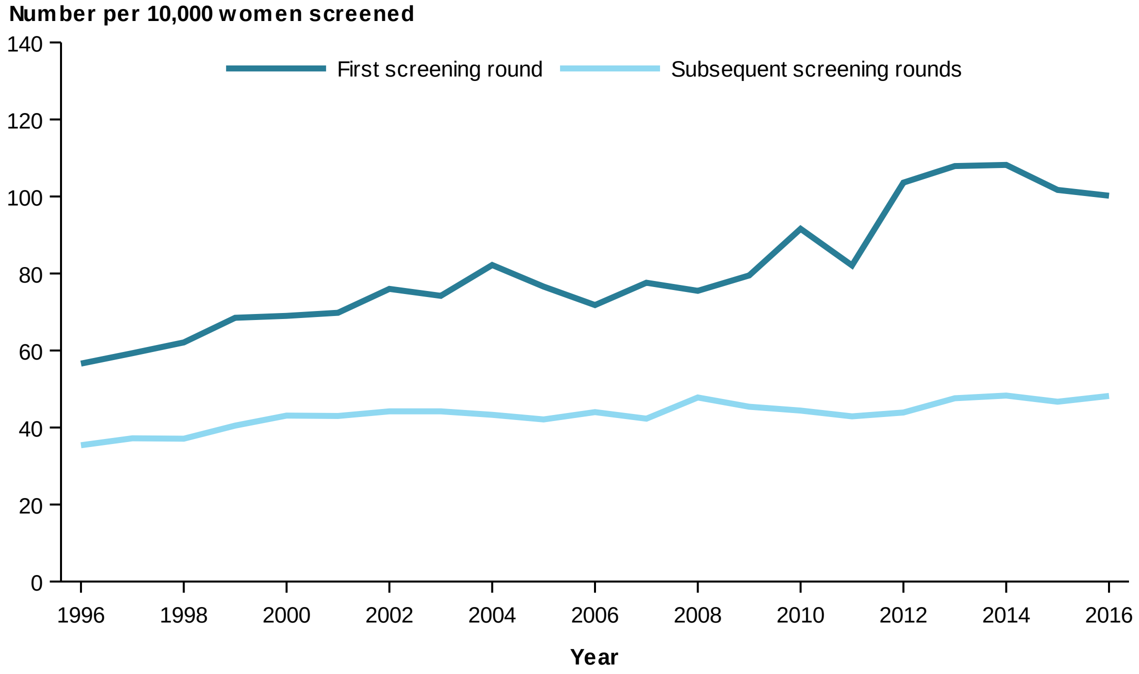
Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A.3.1.

Figure 3.8: Recall to assessment, women aged 50–69, first and subsequent screening rounds, 1996–2016

Invasive breast cancer detection trends are shown in Figure 3.9. For the past decade, the rate of invasive breast cancer detection in women aged 50–69 for subsequent screening rounds has remained steady, ranging between 42 and 48 per 10,000 women screened. In contrast, after ranging between 72 and 80 in the past decade, invasive breast cancer detection for the first screening round increased to 92 in 2010, before falling back to 82 in 2011, and then increased to 108 in 2014 before falling to 100 women diagnosed with invasive breast cancer per 10,000 women screened in 2016 (Figure 3.9).

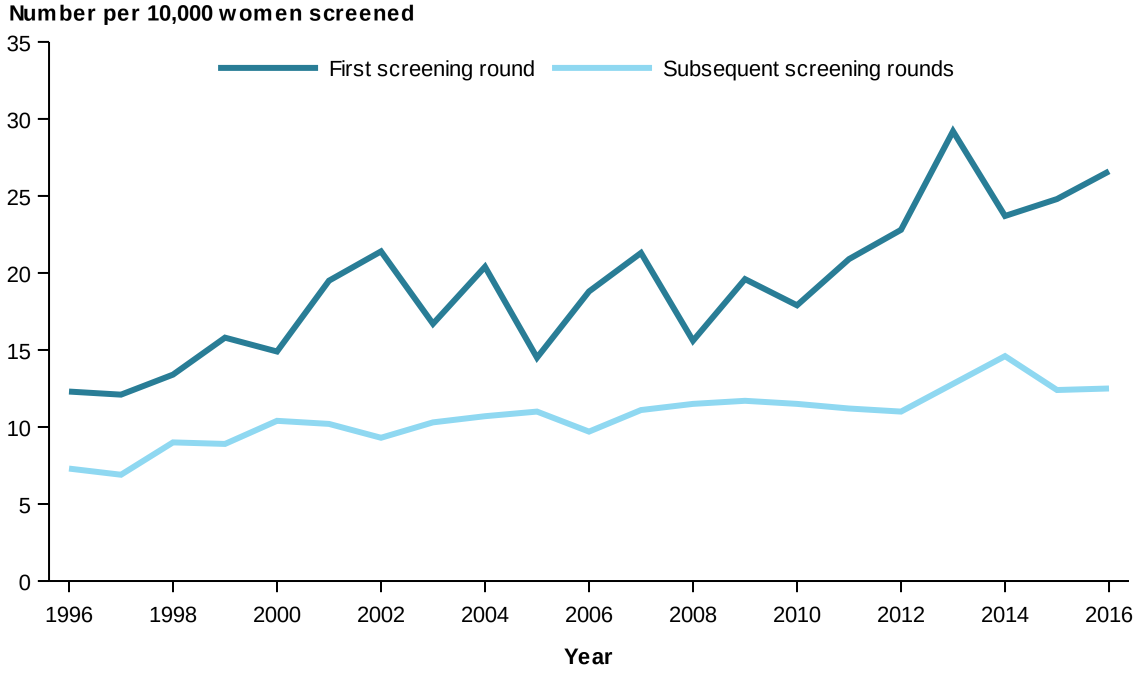
Detection of DCIS in women aged 50–69 was also higher for the first screening round than subsequent screening rounds, reaching a high of 29 in 2013, falling to 25 in 2015 and then increasing to 27 women diagnosed with DCIS per 10,000 women screened in 2016 (Figure 3.10).

Considering recall to assessment and invasive breast cancer detection rates together, it appears that the increase in the proportion of women who were recalled for further investigation in the last few years has led to an increase in the detection of breast cancer and DCIS for women screening for the first time. In this respect, the increase in the recall to assessment rate between 11% and 12% for the first screening round may be considered acceptable.



Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A.4.1.

Figure 3.9: Invasive breast cancer detection (all sizes), women aged 50–69, first and subsequent screening rounds, 1996–2016



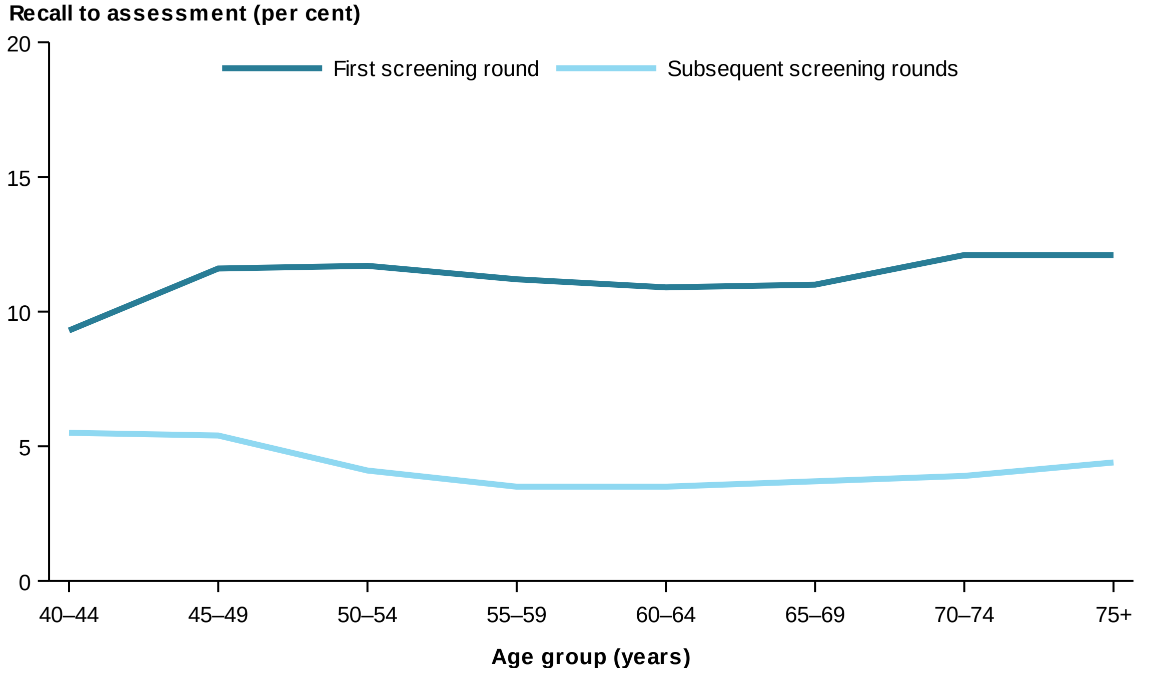
Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A.5.1.

Figure 3.10: DCIS detection, women aged 50–69, first and subsequent screening rounds, 1996–2016

Detection across ages

In 2016, the proportion of women attending their first screen who were recalled to assessment for further investigation was between 11% and 12% for all age groups 45 and over, with women aged 40–44 having a lower recall rate of 9% (Figure 3.11).

This differed for women attending subsequent screens, for whom the proportion recalled to assessment was highest for women aged 40–44 and 45–49, at 5.5% and 5.4%, respectively, followed by women aged 50–54 and 70–74 at 4.1% and 3.9%, respectively. Women aged 55–69 were least likely to be recalled after a subsequent screen, having recall rates ranging between 3.5% and 3.7% of women screened in 2016 (Figure 3.11).



Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A.3.2.

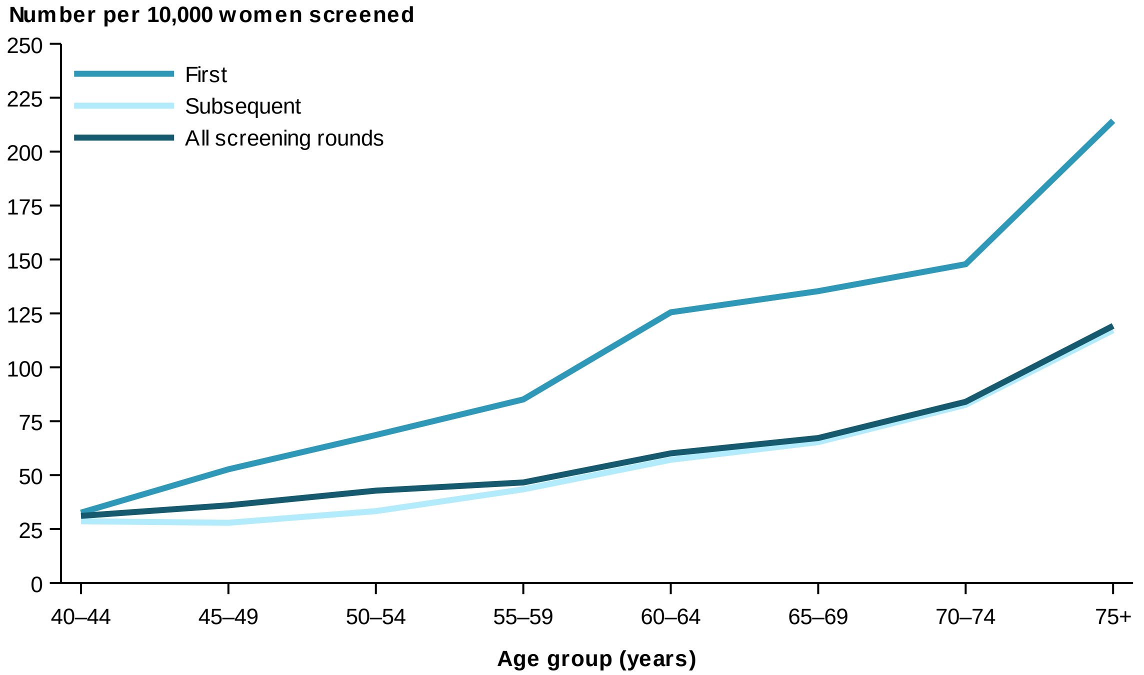
Figure 3.11: Recall to assessment by age, first and subsequent screening rounds, 2016

Breast cancer detection increased with age in 2016, from 31 and 36 cases per 10,000 women screened for those aged 40–44 and 45–49, respectively, to 43 and 47 for those aged 50–54 and 55–59, respectively, and to 60 and 67 for women aged 60–64 and 65–69, respectively. Breast cancer detection was higher (at 84) for women aged 70–74 and highest for women aged 75 and over, with 119 women diagnosed with invasive breast cancer for every 10,000 women screened. This trend of invasive breast cancer detection increasing with age was true both for women attending their first screen and for women attending subsequent screens (Figure 3.12).

DCIS detection also increased with age. In 2016, DCIS detection rate was 12 and 13 cases per 10,000 women screened for those aged 40–49 and 50–59, 15 and 17 for those aged 60–69 and 70–74, and 18 women diagnosed with DCIS per 10,000 women screened for ages 75 and over.

This is likely to be a direct effect of the underlying incidence of invasive breast cancer and DCIS increasing with age, as shown in Section 4.

BreastScreen Australia aims to maximise the number of invasive breast cancers and DCIS detected, while also minimising the number of women who are recalled when they do not have breast cancer (false positives). The NAS Measures related to invasive breast cancer detection, DCIS detection and recall to assessment are shown in Table 3.7.



Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A4.3.

Figure 3.12: Invasive breast cancer detection by age, first, subsequent and all screening rounds, 2016

Table 3.7: NAS Measures for the detection of invasive breast cancers and DCIS and recall to assessment using data supplied for the *BreastScreen Australia monitoring report 2018*

NAS Measure		**Value (crude rate)**
NAS Measure 2.1.1(a)	The Service and/or SCU monitors and reports the proportion of women aged 50–74 years who attend for their first screening episode who are diagnosed with invasive breast cancer.	83.9
NAS Measure 2.1.2(a)	The Service and/or SCU monitors and reports the proportion of women aged 50–74 years who attend for their second or subsequent screening episode who are diagnosed with invasive breast cancer.	55.4
NAS Measure 2.1.3(a)	The Service and/or SCU monitors and reports the proportion of women aged 50–74 years who attend for their first screening episode who are diagnosed with small (≤15mm) invasive breast cancer.	38.3
NAS Measure 2.1.3(b)	The Service and/or SCU monitors and reports the proportion of women aged 50–74 years who attend for their second or subsequent screening episode who are diagnosed with small (≤15mm) invasive breast cancer.	33.7
NAS Measure 2.2.1(a)	The Service and/or SCU monitors and reports the proportion of women aged 50–74 years who attend for their first screening episode who are diagnosed with DCIS.	23.7
NAS Measure 2.2.2(a)	The Service and/or SCU monitors and reports the proportion of women aged 50–74 years who attend for their second or subsequent screening episode who are diagnosed with DCIS.	13.3
NAS Measure 2.6.3(a)	The Service and/or SCU monitors and reports the proportion of women aged 50–74 years who attend for their first screening episode and are recalled for assessment.	11.5%
NAS Measure 2.6.4(a)	The Service and/or SCU monitors and reports the proportion of women aged 50–74 years who attend for their second or subsequent screening episode and are recalled for assessment.	3.7%

Source: AIHW analysis of BreastScreen Australia data.

4 Key breast cancer outcomes

4.1 Incidence of breast cancer

Australia has high-quality and virtually complete cancer incidence data. Collected by state and territory cancer registries, clinical and demographic data for all cancer cases are provided to the AIHW and compiled into the Australian Cancer Database (ACD). Data in this section are sourced from the 2014 version of the Australian Cancer Database (note that 2014 data for New South Wales are estimated; see Appendix C for further information).

The latest national data available are for new cases in 2014; in this latest year, 16,614 new cases of breast cancer were diagnosed in women in Australia. This is equivalent to 140 new cases for every 100,000 women in the population, which (when age-standardised to allow analysis over time and between population groups) equates to an incidence rate of 125 new cases per 100,000 women for 2014.

Of the 16,614 new cases, around 62% (10,230) occurred in women aged 50–74 (the target population of BreastScreen Australia). This is equivalent to 326 new cases per 100,000 women in the population, or 322 new cases per 100,000 women when age-standardised.

In 2014, the risk of a woman being diagnosed with breast cancer before age 75 was 1 in 10, and the risk of diagnosis before age 85 was 1 in 8 (AIHW 2017a).

Box 4.1: Estimated incidence to 2018

Incidence data are also estimated to the current year of reporting, based on 2004–2013 incidence data (note that actual incidence data for 2015–2018 may differ from estimated data for these years due to current and ongoing program or practice changes).

In 2018, it is estimated that there will be 18,087 new cases of breast cancer in Australian women, equivalent to 125.1 new cases per 100,000 women (age-standardised).

Of these 18,087 new cases, it is estimated that 11,035 will occur in women aged 50–74, equivalent to 317.9 new cases per 100,000 women (age-standardised).

Box 4.2: Invasive breast cancer detected through BreastScreen Australia

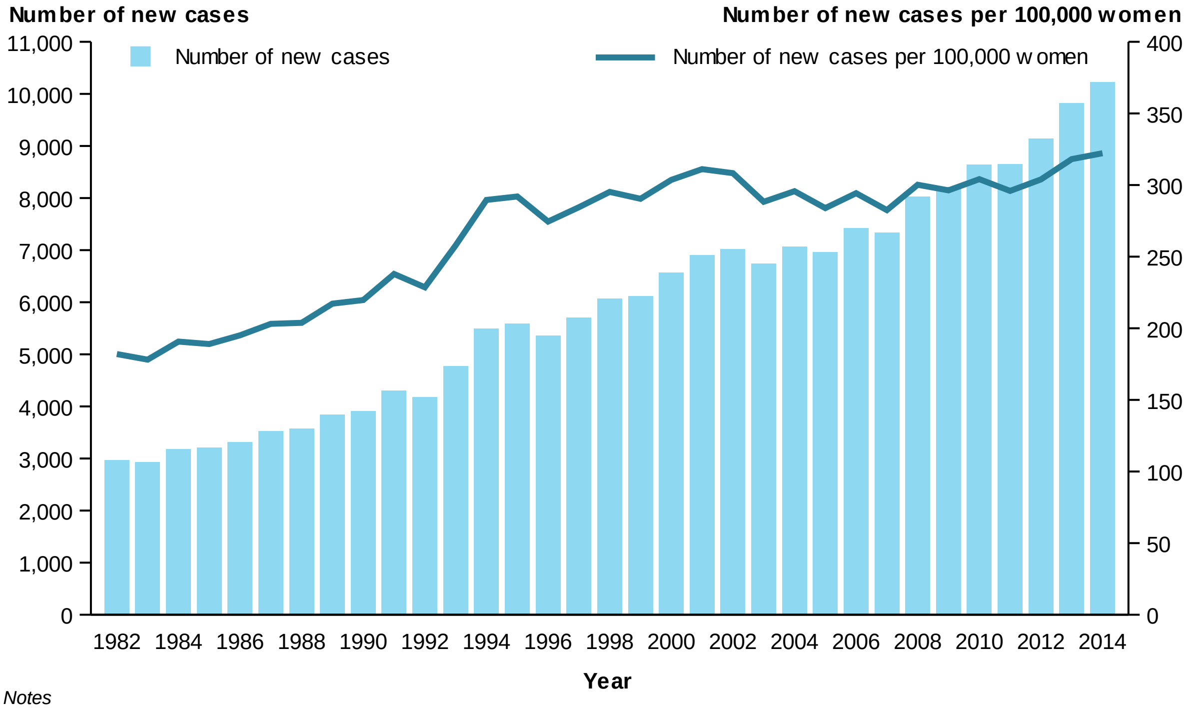
Of all invasive breast cancer cases diagnosed in 2014 in women aged 50–69, 48.5% were detected through BreastScreen Australia (37.0% for women aged 40 and over).

Breast cancer over time

Prior to the introduction of BreastScreen Australia in 1991, the age-standardised incidence rate of breast cancer for women aged 50–74 increased from 182 new cases per 100,000 in 1982 to 220 new cases per 100,000 in 1990. Following the introduction of BreastScreen Australia, the age-standardised incidence rate increased rapidly from 238 new cases per 100,000 women in 1991 to 311 new cases per 100,000 in 2001. From 2001 to 2012 the age-standardised incidence rate for women aged 50–74 has remained relatively steady at around 300 before increasing in 2013 and 2014 to 320 new cases per 100,000 (Figure 4.1).

The increase in incidence rates has been accompanied by an increase in the risk of diagnosis by age 75, from 1 in 16 women in 1982, to 1 in 10 in 2014, and by age 85, from

1 in 12 women in 1982, to 1 in 8 women in 2014 (AIHW 2017a). Breast cancer has remained the most commonly diagnosed cancer among Australian women since 1982.



Notes

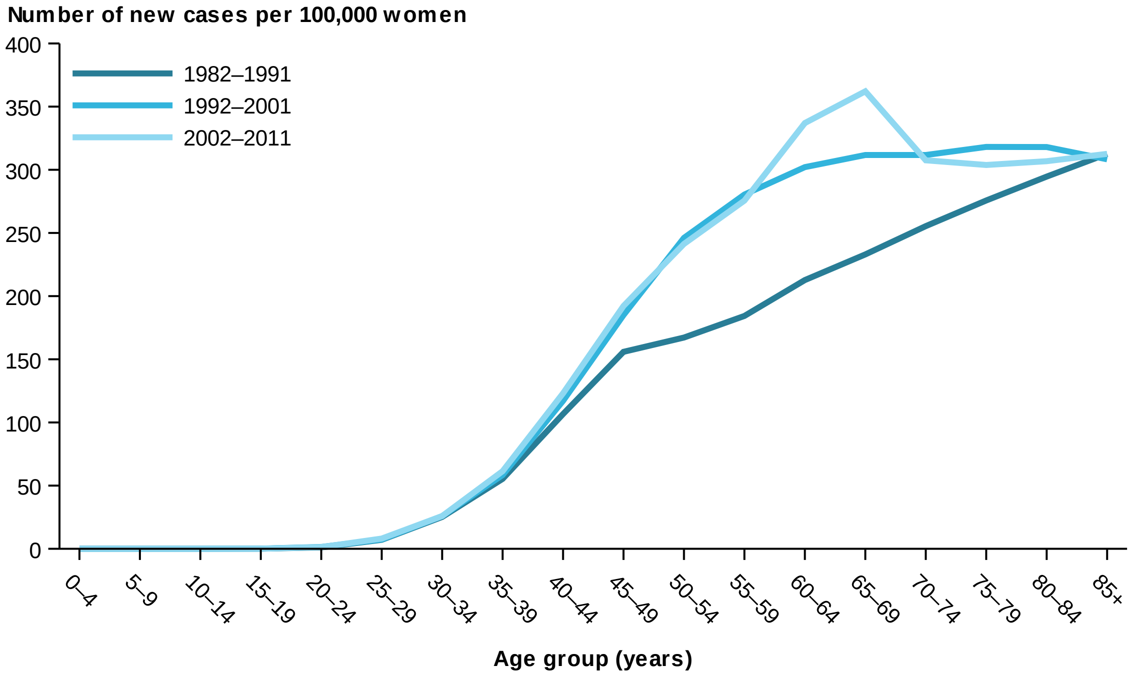
1. Rates age-standardised to the Australian population as at 30 June 2001.
2. 2014 data for NSW were estimated as the actual data were not available.

Source: AIHW Australian Cancer Database 2014. Data for this figure are available in Table A7.1.

Figure 4.1: Incidence of breast cancer in women aged 50–74, 1982 to 2014

Breast cancer across ages

The effect of BreastScreen Australia on the age distribution of breast cancer incidence is illustrated in Figure 4.2. Between 1982 and 1991 (prior to the introduction of BreastScreen Australia), age-specific incidence rates increased steadily from age 40 onwards. In contrast, in 1992–2001 and 2002–2011 (after the introduction of BreastScreen Australia), the age-specific incidence rate has increased in women aged 50–74, showing that the screening program has shifted the peak incidence of breast cancers to women aged 50–74 (the target age group of BreastScreen Australia).



Note: Rates are expressed per 100,000 women.

Source: AIHW Australian Cancer Database 2014. Data for this figure are available in Table A7.3.

Figure 4.2: Incidence of breast cancer by age, 1982–1991, 1992–2001 and 2002–2011

Breast cancer types

Invasive breast cancers by type are shown in Table 4.1 (2013 data are used instead of 2014, as 2014 data are estimated for New South Wales).

The most common breast cancer type for women aged 50–74 was invasive ductal carcinoma, at 78.2% of all breast cancers; invasive lobular cancer was the second most common, at 13.2%. Other breast cancer types were rarer—ranging between less than 1 and 6 new cases per 100,000 women aged 50–74. These accounted for between less than 0.1% and 1.9% of all invasive breast cancers; ‘unspecified’ breast cancers accounted for 0.9% of cases (Table 4.1).

Table 4.1: Incidence of breast cancer in women aged 50–74, by type, 2013

Type of breast cancer	New cases	Crude rate	Percentage of breast cancers
Invasive ductal carcinoma	7,687	251.4	78.2
Invasive lobular carcinoma	1,302	42.6	13.2
Medullar carcinoma and atypical medullary carcinoma	23	0.8	0.2
Tubular carcinoma and invasive cribriform carcinoma	178	5.8	1.8
Mucinous carcinoma	187	6.1	1.9
Invasive papillary carcinoma	151	4.9	1.5
Inflammatory carcinoma	25	0.8	0.3
Mesenchymal	8	0.3	0.1
Other—specified	174	5.7	1.8
Unspecified	93	3	0.9
Total	9,828	330.3	100

Note: 'Crude rate' is the number of new cases per 100,000 women. Histology codes that comprise each breast cancer group appear in Table D1.

Source: AIHW Australian Cancer Database 2014.

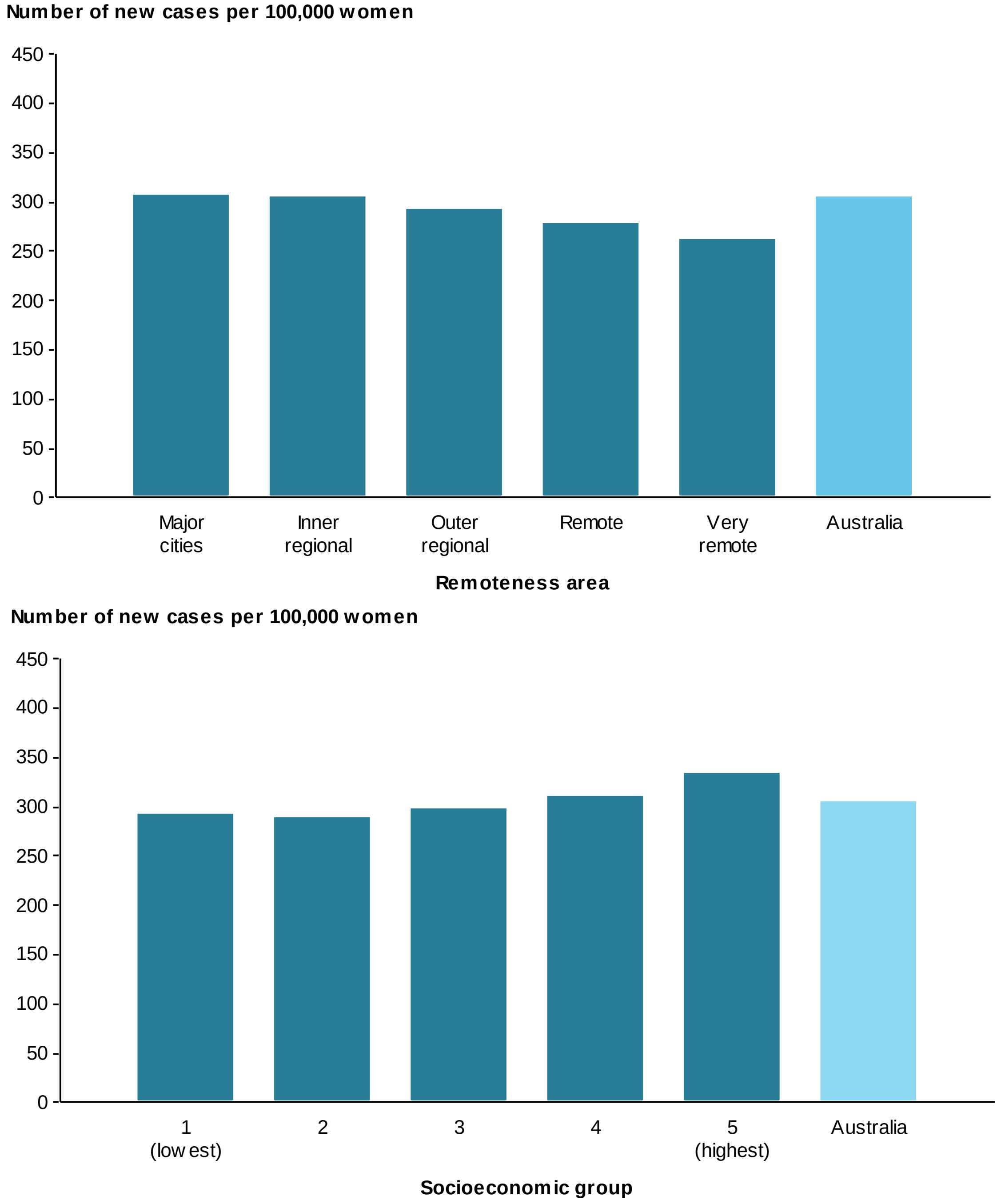
Breast cancer across areas

Incidence for population groups is presented for 2009–2013, as these are the most recent years for which actual data are available for all states and territories (see Appendix C for further information).

Incidence of breast cancer in 2009–2013 was similar for *Major cities* and *Inner regional* areas, with an age-standardised rate of 306.1 and 304.0 new cases per 100,000 women aged 50–74, respectively. Incidence was lowest in *Very remote* areas, at 261.2 new cases per 100,000 women aged 50–74 (Figure 4.3).

In 2009–2013, incidence generally increased with increasing advantage, being lowest for women living in the second lowest socioeconomic area at 288.8 new cases per 100,000 women aged 50–74, and highest for women living in the highest socioeconomic areas at 333.0 new cases per 100,000 women aged 50–74 (Figure 4.3).

Breast cancer incidence in 2009–2013, and breast cancer mortality in 2011–2015, reported by small geographic areas, can be found on the AIHW website at <http://www.aihw.gov.au/reports/cancer/cancer-incidence-mortality-small-geographic-areas/data>.



Note: Rates age-standardised to the Australian population as at 30 June 2001.

Source: AIHW Australian Cancer Database 2014. Data for this figure are available in tables A7.6 and A7.7.

Figure 4.3: Incidence of breast cancer in women aged 50–74, by remoteness area, and by socioeconomic group, 2009–2013

4.2 Incidence of ductal carcinoma in situ

DCIS is a non-invasive tumour arising from the lining of the ducts that carry milk from the milk-producing lobules to the nipple. Cell changes seen in DCIS are similar to those in invasive breast cancer. However, unlike invasive breast cancer, DCIS does not invade surrounding breast tissue, and is instead contained entirely within the milk duct (Box 3.5).

State and territory cancer registries have been collecting data on DCIS since 1996 (New South Wales has been collecting these data from early 2000, and its collection has been considered complete from 2002). These data have been included in data provided to the AIHW for the formation of the ACD, which means that DCIS data have been sourced and analysed nationally through the ACD (see Appendix D for classification of DCIS). The latest national data for DCIS incidence are for 2013 because, unlike invasive breast cancers, DCIS cases were not estimated for New South Wales for 2014.

In 2013, there were 2,343 new cases of DCIS in Australian women, equivalent to 20 new cases for every 100,000 women in the population. Of the 2,343 new cases, 73% (1,713) were in women aged 50–74, the target population of BreastScreen Australia. These 1,713 new cases are equivalent to 56 new cases for every 100,000 women in the population.

These rates have also been age-standardised, for use in analyses of trends and differentials, to 18 new cases per 100,000 women of all ages, and 55 new cases per 100,000 women aged 50–74.

DCIS is known as a ‘disease of screening’ (see Box 4.3). DCIS was rarely detected before breast screening was introduced, and its incidence has increased since the introduction of screening mammography, including that performed through BreastScreen Australia.

Box 4.3: DCIS cases detected through BreastScreen Australia

Of all DCIS cases diagnosed in 2013 in women aged 50–69, 72.2% were detected through BreastScreen Australia (63.0% for women aged 40 and over).

DCIS over time

Both the incidence rate and the number of new cases of DCIS in women aged 50–74 have increased over time: the former from 31 new cases per 100,000 women in 1996 to 55 in 2013, and the latter from 603 new cases in 1996 to 1,713 new cases in 2013.

DCIS across ages

Similar to invasive breast cancer, the incidence of DCIS increases with age. Also, similar to invasive breast cancer, there is a clear connection between BreastScreen Australia and DCIS incidence, with DCIS incidence also peaking in women aged 50–74. In 2013, the age-specific incidence rate of DCIS increased from 23 new cases per 100,000 women aged 40–49, to 50 in women aged 50–59, and finally to 65 for women aged 60–69; incidence thereafter drops off to 32 new cases per 100,000 women for women aged 70 and over.

In 2013, DCIS in women aged 50–74 represented 73% of all cases diagnosed in that year.

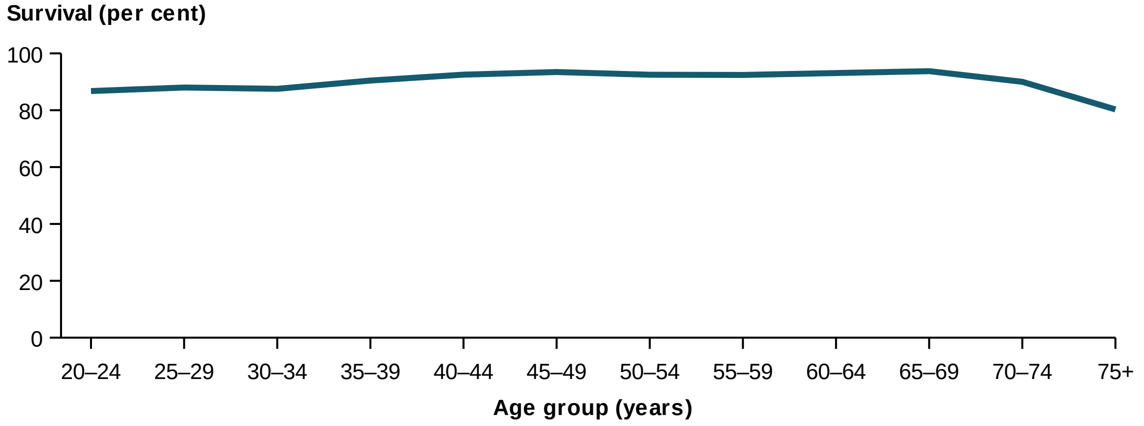
4.3 Survival after a diagnosis of breast cancer

Survival in this report refers to 'relative survival'—which means that survival figures reflect the probability of being alive for a given amount of time after a cancer diagnosis, compared with the general population, and reflects the impact of a cancer diagnosis.

The source of survival data is the 2014 ACD, which includes data from the National Death Index on deaths (from any cause) that occurred up to 31 December 2014. These data were used to determine which people with cancer had died and when this occurred.

In 2010–2014, women diagnosed with breast cancer in Australia had a 90.6% chance of surviving for 5 years, compared with their counterparts in the general population. For the target age group (50–74), 5-year relative survival was 92.5%.

In 2010–2014, the 5-year survival rate from breast cancer was highest for women aged 40–69, followed by women aged 20–39. Women aged 75+ had a lower chance of surviving for 5 years, with a 5-year relative survival rate of 80.3% (Figure 4.4).



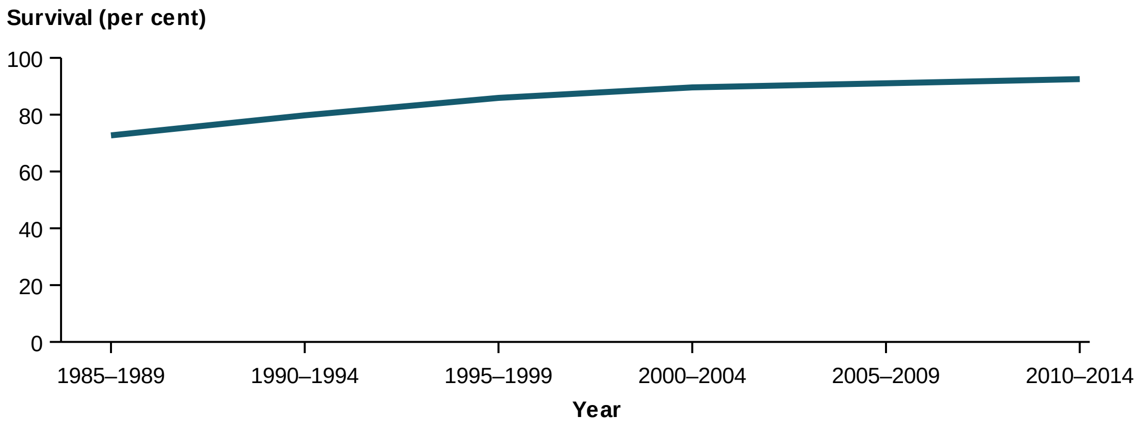
Note: The period 2010–2014 does not contain incidence data for 2014 for NSW.

Source: AIHW Australian Cancer Database 2014. Data for this figure are available in Table A7.11.

Figure 4.4: Five-year relative survival from breast cancer, by age, 2010–2014

Survival over time

Survival from breast cancer for women aged 50–74 has improved over time. Between 1985–1989 and 2010–2014, the 5-year relative survival rate increased from 72.7% to 92.5% (Figure 4.5).



Note: The period 2010–2014 does not contain incidence data for 2014 for NSW.

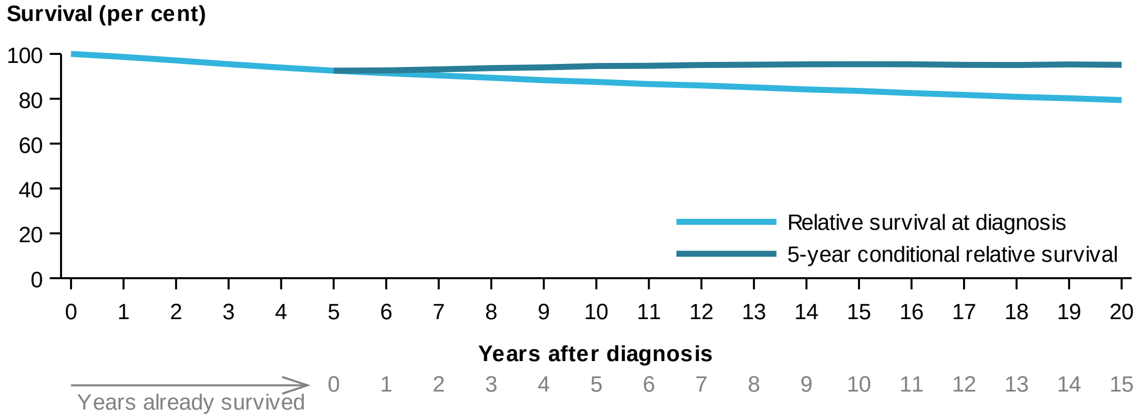
Source: AIHW Australian Cancer Database 2014. Data for this figure are available in Table A7.12.

Figure 4.5: Trends in 5-year relative survival from breast cancer in women aged 50–74 1985–1989 to 2010–2014

Conditional survival is the probability of surviving a given number of years provided that an individual has already survived a specified amount of time after diagnosis.

Conditional survival for breast cancer for women aged 50–74 is illustrated in Figure 4.6. In this graph, the lighter blue line shows relative survival for each year after diagnosis (as shown by the numbers in black on the x-axis), whereas the darker blue line shows relative survival for each year once an individual has already survived 5 years (as shown by the numbers in grey on the x-axis).

For breast cancer, the prospect of surviving for at least 5 more years after having already survived for 5, 10 or 15 years was much higher than relative survival, at around 94% to 95% (Figure 4.6).



Note: The period 2010–2014 does not contain incidence data for 2014 for NSW.

Source: AIHW Australian Cancer Database 2014. Data for this figure are available in Table A7.13.

Figure 4.6: Relative survival at diagnosis and 5-year conditional survival from breast cancer in women aged 50–74, 2010–2014

4.4 Prevalence of breast cancer

Prevalence is the number of people alive after a diagnosis of cancer. It is related to incidence and survival: if incidence and survival are both high, prevalence will be high, whereas if incidence and survival are both low, prevalence will be low.

The source of prevalence data is the 2014 ACD, which includes data from the National Death Index on deaths (from any cause) that occurred up to 31 December 2014. These data were used to determine which people with cancer had died and when this occurred. Individuals who have been diagnosed with cancer and are still alive contribute to prevalence data.

At the end of 2013, there were 43,471 women aged 50–74 alive who had been diagnosed with breast cancer in the previous 5 years and 76,663 who had been diagnosed in the previous 10 years (Table 4.2).

Table 4.2: Prevalence of breast cancer in women, by age group, Australia, end of 2013

Age group	5-year prevalence	10-year prevalence
<40	2,387	3,006
40–44	3,689	5,074
45–49	6,205	9,132
50–54	8,999	14,392
55–59	8,252	15,193
60–64	9,272	16,175
65–69	9,930	17,510
70–74	7,018	13,393
75–79	5,141	9,649
80–84	3,582	6,666
85+	3,835	7,000
All ages	**68,310**	**117,190**
Ages 50–74	**43,471**	**76,663**

Note: Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

Source: AIHW Australian Cancer Database 2014.

4.5 Mortality from breast cancer

Australia has high-quality and virtually complete mortality data. The mortality data used here were provided by the registries of births, deaths and marriages and the National Coronial Information System, and coded by the Australian Bureau of Statistics (ABS). These data are maintained at the AIHW in the National Mortality Database (NMD).

The latest national data available at the time of writing are for deaths in 2015. In this latest year, there were 2,939 deaths from breast cancer in Australian women. This is equivalent to 24.5 deaths for every 100,000 women in the population, which (when age-standardised to allow analysis over time and between population groups), equates to a mortality rate of 20.1 deaths per 100,000 women for 2015.

Of the 2,939 deaths, around 49% (1,432) occurred in women aged 50–74 (the target of BreastScreen Australia). This is equivalent to 44.7 deaths per 100,000 women in the population, or 43.9 deaths per 100,000 women when age-standardised.

In 2015, the risk of death from breast cancer in a woman before age 75 was 1 in 74, and the risk of death before age 85 was 1 in 41 (AIHW 2017a).

Box 4.4: Estimated mortality to 2018

Mortality data are also estimated to the current year of reporting. These estimates are based on Joinpoint analysis of 2004–2013 mortality data. (Note that actual mortality data for 2016–2018 may differ from estimated data for these years, due to current and ongoing program or practice changes).

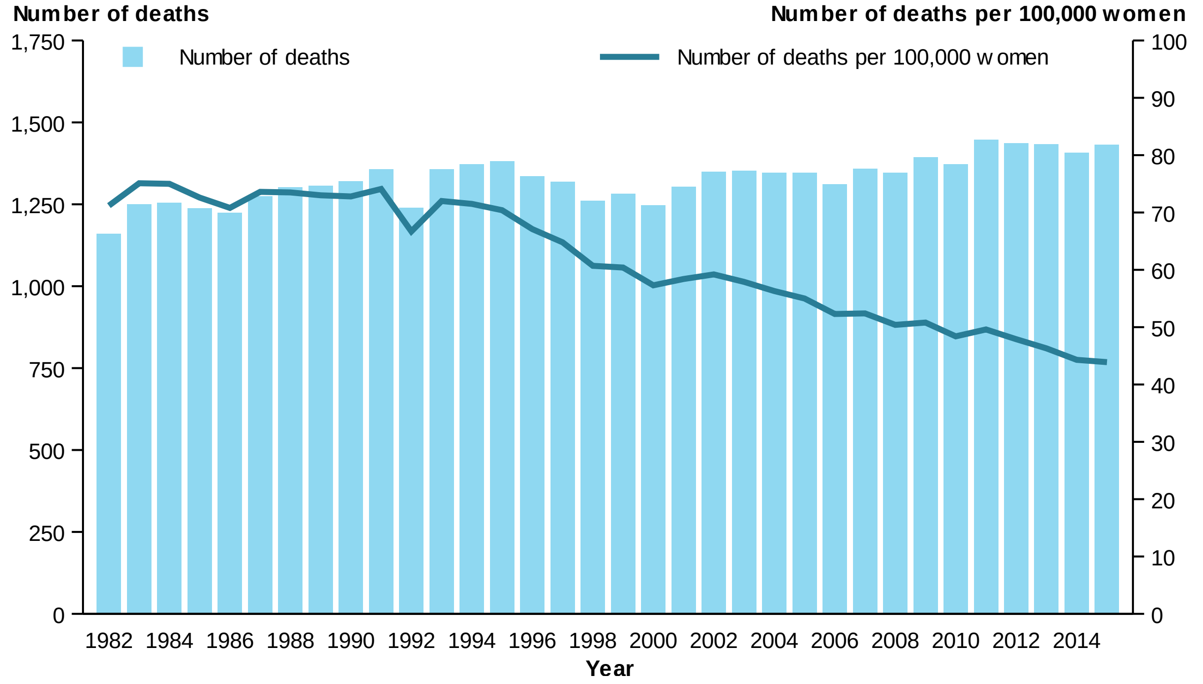
In 2018, it is estimated that there will be 3,128 deaths from breast cancer in women, equivalent to 19.7 deaths per 100,000 women (age-standardised).

Of these 3,128 deaths, it is estimated that 1,591 will occur in women aged 50–74, equivalent to 44.6 deaths per 100,000 (age-standardised).

Breast cancer deaths over time

Breast cancer mortality rates have decreased over time, with this decrease evident after the introduction of BreastScreen Australia in 1991. The age-standardised mortality rate from breast cancer in women aged 50–74 decreased from 74 deaths per 100,000 in 1991 to 44 deaths per 100,000 in 2015 (Figure 4.7).

The fall in breast cancer mortality in women aged 50–74 has been attributed in part to the early detection of breast cancer through BreastScreen Australia, along with advances in the management and treatment of breast cancer (BreastScreen Australia EAC 2009).



Notes

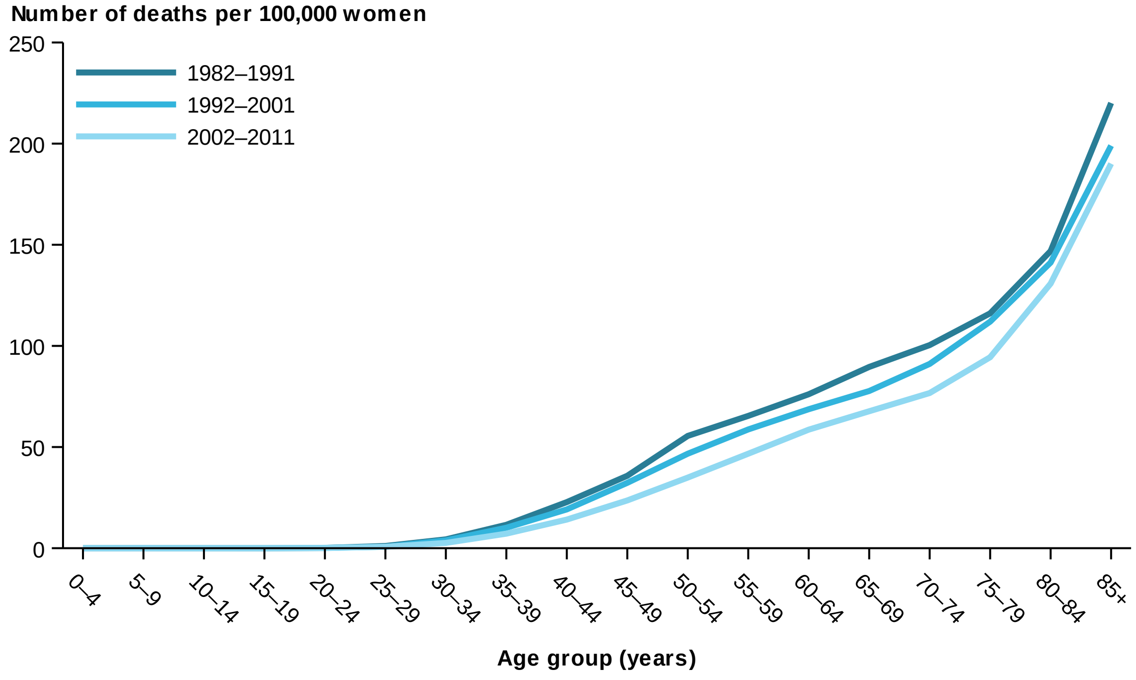
1. Deaths from 1983 to 2014 were derived by year of death; deaths in 2015 were derived by year of registration of death. Deaths registered in 2013 and earlier are based on the final version of cause of death data; deaths registered in 2014 and 2015 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
2. Rates age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database. Data for this figure are available in Table A8.1.

Figure 4.7: Mortality from breast cancer in women aged 50–74, 1982–2015

Breast cancer deaths across ages

As previously noted, mortality in all age groups has decreased over time. Most of the reduction in breast cancer mortality occurred after the introduction of BreastScreen Australia in 1991, and the greatest reduction occurred in women aged 40–79 (Figure 4.8). This decrease is most notable in the period 2002–2011.



Notes

1. Deaths from 1982 to 2011 were derived by year of death, and are based on the final version of cause of death data.
2. Rates are the number of deaths from breast cancer per 100,000 women.

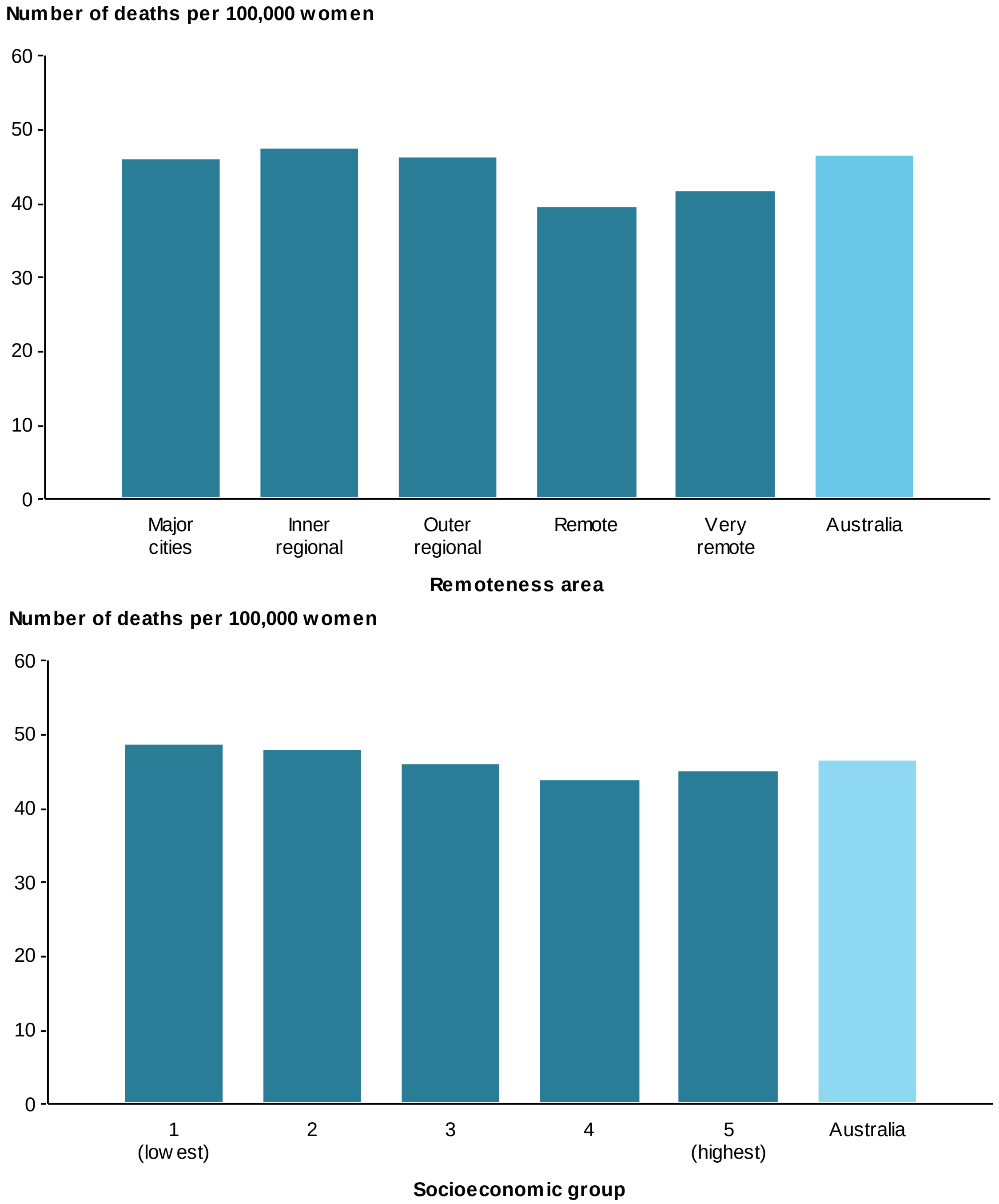
Source: AIHW National Mortality Database. Data for this figure are available in Table A8.3.

Figure 4.8: Mortality from breast cancer by age, 1982–1991, 1992–2001 and 2002–2011

Breast cancer deaths across areas

Mortality from breast cancer in 2011–2015 was around 46 deaths per 100,000 women aged 50–74 in *Major cities* (46), *Inner regional* (47) and *Outer regional* (46) areas, but lower in *Remote* and *Very remote* areas at 39 and 42 deaths per 100,000 women, respectively (Figure 4.9).

In 2011–2015, mortality increased with increasing socioeconomic disadvantage, being highest for women living in the lowest socioeconomic areas, at 49 deaths per 100,000 women, and lowest for women living in the highest socioeconomic areas, between 44 and 45 deaths per 100,000 women aged 50–74 (Figure 4.9).



Notes

1. Deaths from 2011 to 2014 were derived by year of death; deaths in 2015 were derived by year of registration of death. Deaths registered in 2013 and earlier are based on the final version of cause of death data; deaths registered in 2014 and 2015 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
2. Rates age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database. Data for this figure are available in tables A8.5 and A8.6.

Figure 4.9: Mortality from breast cancer in women aged 50–74, by remoteness area and by socioeconomic group, 2011–2015

4.6 Burden of breast cancer

Burden of disease analysis measures the combined impact of fatal and non-fatal burden. More than merely counting deaths or disease prevalence, it takes into account age at death and severity of disease. Burden of disease analysis quantifies the gap between a population's actual health and an ideal level of health in a given year—that is, every individual living in full health to a theoretical maximum life span—for all diseases at the same time.

This section presents data on the burden of cancer, based on the Australian Burden of Disease Study (ABDS) 2011. The ABDS 2011 provides Australia-specific burden of disease estimates best matched to the Australian context for the total 2011 population. In the ABDS 2011, the cancer and other neoplasms disease group also includes the impact of benign, in situ and uncertain neoplasms. See *Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011* (AIHW 2016) for more information.

Data are presented for the fatal burden, non-fatal burden and the overall burden. Fatal burden, which is expressed as years of life lost (YLL), measures the years lost between the age at which people die and the number of years they could have potentially gone on to live, based on the current best life expectancy across the world. Total YLL are influenced by both the number of deaths, and the ages at which the deaths occur.

Non-fatal burden, which is expressed as years lived with disability (YLD), measures the years of healthy life lost due to living with a disease in a given year. Total YLD are influenced by the number of people with each disease, the duration of its effects and how severe those effects are.

The overall burden, which is expressed as disability-adjusted life years (DALY), is the sum of YLL and YLD. One DALY is one year of 'healthy life' lost due to premature death or living with the effects of an illness or injury. The more DALY associated with a disease, the greater the burden.

Cancer is a major cause of illness in Australia: in 2011, cancer was the disease group accounting for the highest disease burden—19% of the total disease burden (AIHW 2016). Most (94%) of the burden from cancer was due to dying prematurely, with only a small proportion (6.1) due to living with a cancer diagnosis.

This section focuses on the burden of breast cancer in women.

Breast cancer was the leading cause of cancer burden for females in 2011, with 70,268 DALY, accounting for 19% of the total cancer burden for females. It was the 3rd leading cause of cancer burden for persons, at 8.5% (AIHW 2017b). Breast cancer was responsible for one-quarter of the cancer burden in women aged 25–44 (8,632 DALY; 26%) and 45–64 (36,207 DALY; 25%). Cervical and ovarian cancers also caused considerable burden in these age groups.

Breast cancer was also the leading cause of fatal and non-fatal cancer burden in females in 2011 (Table 4.3).

Table 4.3: Leading causes of cancer burden (DALY), leading causes of fatal cancer burden (YLL), and leading causes of non-fatal cancer burden (YLD), females, 2011

Rank	Cancer type	% of DALY	Cancer type	% of YLL	Cancer type	% of YLD
1	Breast cancer	19.4	Breast cancer	18.5	Breast cancer	31.5
2	Lung cancer	16.6	Lung cancer	17.3	Bowel cancer	12.8
3	Bowel cancer	10.8	Bowel cancer	10.7	Lung cancer	6.4
4	Pancreatic cancer	5.5	Pancreatic cancer	5.7	Melanoma of the skin	5.4
5	Ovarian cancer	5.3	Ovarian cancer	5.5	Uterine cancer	3.0
6	Unknown primary	4.3	Unknown primary	4.4	Non-Hodgkin lymphoma	2.9
7	Brain cancers	3.9	Brain cancers	4.0	Brain tumours	2.9
8	Leukaemia	3.3	Leukaemia	3.4	Unknown primary	2.8
9	Melanoma of the skin	3.1	Melanoma of the skin	2.9	Ovarian cancer	2.7
10	Non-Hodgkin lymphoma	2.9	Non-Hodgkin lymphoma	2.9	Leukaemia	2.5
	Leading 10 cancers	**75.1**	**Leading 10 cancers**	**75.4**	**Leading 10 cancers**	**73.0**
	All other cancers	*24.9*	*All other cancers*	*24.6*	*All other cancers*	*27.0*
	Total	**100.0**	**Total**	**100.0**	**Total**	**100.0**

Source: AIHW 2017b.

5 Participation in BreastScreen Australia and breast cancer outcomes in Indigenous women

Aboriginal and Torres Strait Islander women of Australia, hereafter respectfully referred to as Indigenous women, experience a high burden from breast cancer.

While Indigenous women experience a lower age-standardised incidence rate of breast cancer than non-Indigenous women (rate ratio of 0.9; AIHW 2017c), breast cancer is still the most common cancer diagnosed in Indigenous women.

Aspects of breast cancer and breast screening in Indigenous women are reported by the AIHW and others in various reports and publications, but considering these data individually is not as valuable as considering all available data collectively. This chapter therefore brings together the BreastScreen Australia participation, incidence and mortality data that previously appeared in several places in this report, and supplements these with additional analyses on incidence, survival and mortality, as well as incorporating data and findings from other published sources.

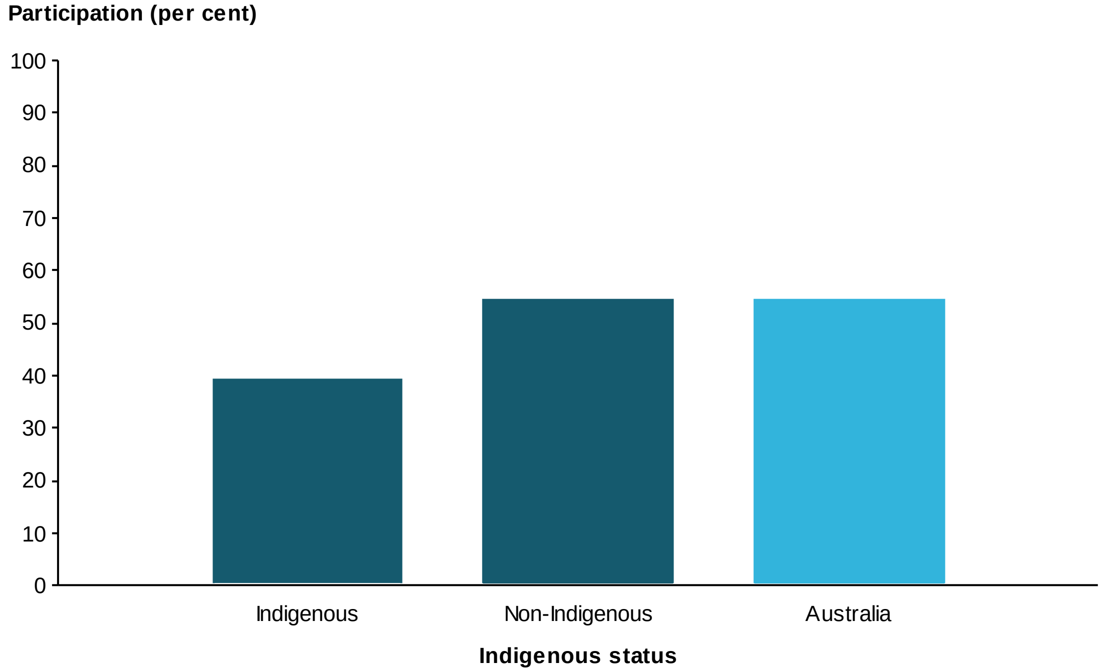
5.1 Participation in BreastScreen Australia in Indigenous women

Indigenous status of women who participate in BreastScreen Australia is self-reported by women at the time of their screen.

In 2015–2016, participation of Indigenous women aged 50–74 in BreastScreen Australia was 39.1%, compared with the non-Indigenous rate of 54.3% (age-standardised).

Participation trends for Indigenous and non-Indigenous women are shown in Figure 5.1. Historical Indigenous participation rates have been recalculated using new Indigenous population estimates so that meaningful comparisons between reporting periods can be made (see Box 5.1).

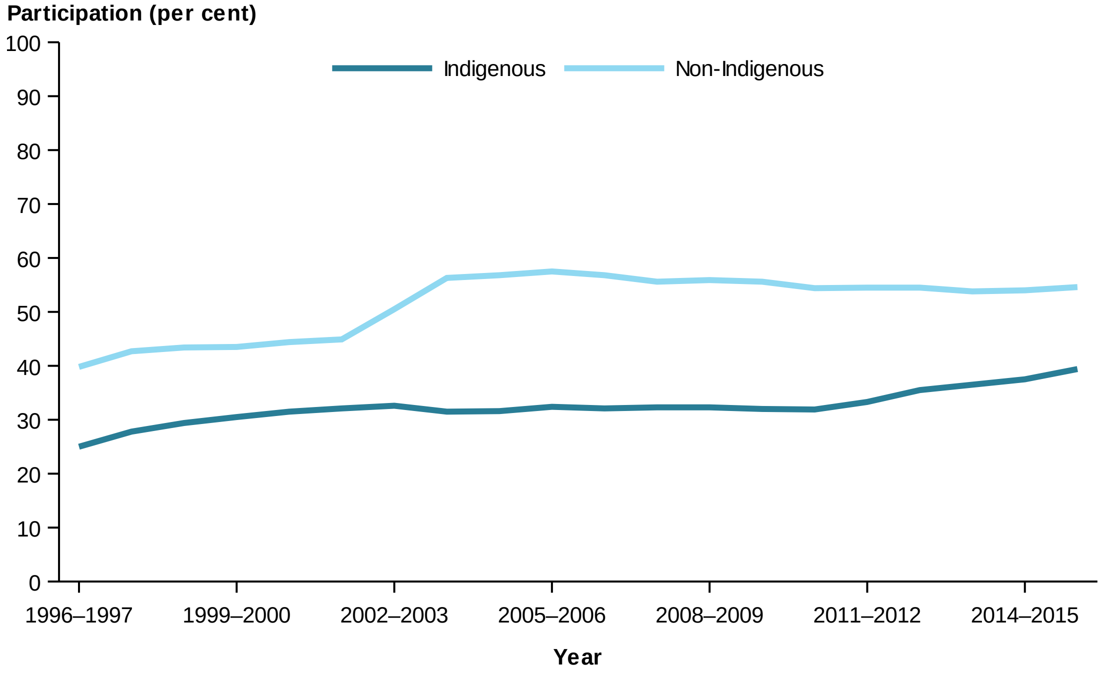
Trend data show that the participation rates in Indigenous women aged 50–69 have increased, from around 32%–33% for all reporting periods between 2001–2002 and 2011–2012 to 38% in 2014–2015 and 39% in 2015–2016—although Indigenous women have always had a lower participation rate than non-Indigenous women (Figure 5.2). Lower participation of Indigenous women may reflect a decreased opportunity to screen, compared with non-Indigenous women, and/or different screening behaviour of Indigenous women (that is, being less likely to screen even with the same opportunity to do so). There may also be a level of under-reporting of Indigenous status in BreastScreen data (as Indigenous status is self-reported by women at the time of their screen), which would also have the effect of lowering the apparent participation rate. This is because under-identification of Indigenous women in BreastScreen data would reduce the size of the numerator without affecting the denominator.



Note: Rates age-standardised to the Australian population as at 30 June 2001. 'Australia' rate includes women with a 'not stated' Indigenous status.

Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A.1.7.

Figure 5.1: Participation of women aged 50–74 in BreastScreen Australia, by Indigenous status, 2015–2016



Source: AIHW analysis of BreastScreen Australia data. Data for this figure are available in Table A1.8.

Figure 5.2: Participation of women aged 50–69 in BreastScreen Australia, by Indigenous status, 1996–1997 to 2015–2016

Box 5.1: Indigenous populations

This report uses Indigenous population estimates based on the 2011 Census, which were the most recent estimates available at the time of preparation of this report.

New Indigenous population estimates were released by the ABS in 2014 based on the 2011 Census. These estimates included backcasts of the Indigenous population, as well as population projections to 2026. The backcast estimates of the Indigenous population were considerably larger than those previously published based on the 2006 Census. This is in part due to improvements in Census coverage and enumeration of Indigenous Australians in the 2011 Census, and an increased likelihood that individuals identified themselves and their children as Indigenous. Historical Indigenous participation rates have been recalculated using these new Indigenous population estimates so that meaningful comparisons between reporting periods can be made over time. Rates presented in this report should not be compared with previously published rates that used population estimates based on the 2006 Census.

Results of a recent Queensland project, ‘Closing the Gap in Breast Cancer Screening’, suggest that different screening behaviour of Indigenous women may play a significant role in their lower participation rates. This project aimed to address barriers to screening for Indigenous women through culturally appropriate messages, art shows and partnerships with local Indigenous groups, in order to build trust, educate and support Indigenous women to attend BreastScreen Australia. The project reported an increase in Indigenous participation from 49% to 56% in 2 years.

Initiatives such as these are common to state and territory BreastScreen programs. These strategies and initiatives are designed to be culturally sensitive and appropriate to the knowledge, attitudes and beliefs of Aboriginal and Torres Strait Islander women. They include dedicated and appropriate communication resources, group bookings for Indigenous women who would prefer to attend as a group, and the use of Indigenous artwork. BreastScreen workers liaise closely with Aboriginal Health Workers and Aboriginal and Torres Strait Islander community groups to increase acceptance of screening.

In the last quarter of 2014–15, the Australian Government ran the National BreastScreen Australia Campaign to support the expansion of the program to women aged 50–74. The campaign included additional communication activities for Aboriginal and Torres Strait Islander consumers, with materials developed in consultation with Aboriginal and Torres Strait Islander women.

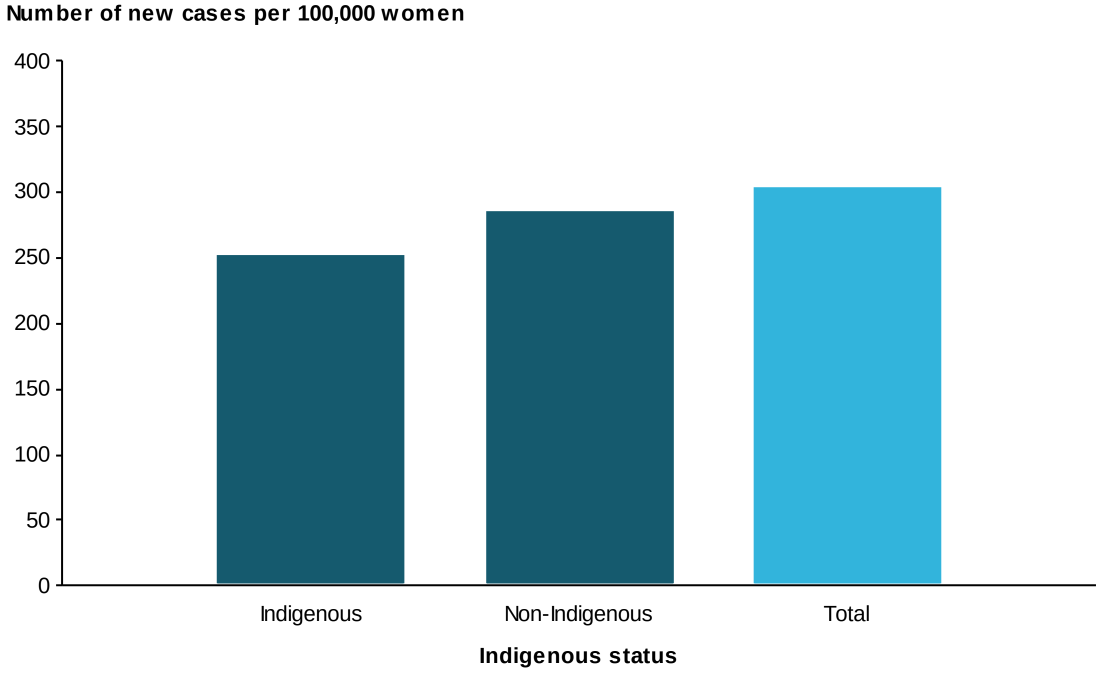
Access to BreastScreen services for Indigenous women is a national policy feature of BreastScreen Australia, which has developed National Accreditation Standards (NAS) Measures to ensure that this policy feature is met by services accredited through BreastScreen Australia (see Box 3.3 for more information on NAS Measures and accreditation). These NAS Measures, along with other NAS Measures related to access and participation in BreastScreen Australia, underpin BreastScreen Australia’s aim to maximise the proportion of women in the target population who are screened every 2 years. Table 3.1 shows the NAS Measures related to participation.

5.2 Breast cancer outcomes in Indigenous women

The source of national cancer incidence data in Australia is the Australian Cancer Database (ACD), which is compiled from data supplied by state and territory cancer registries. The cancer registers rely on pathology forms as their primary source of information—which do not include Indigenous status in all states and territories. However, the cancer registers collect information from additional sources, such as hospital records and death records, which allows for information on Indigenous status to be collected where possible.

The level of identification of Indigenous status in the ACD for the period 2009–2013 is considered sufficient to enable analysis in 5 jurisdictions, with data from New South Wales, Victoria, Queensland, Western Australia and the Northern Territory. While the majority (89.9%) of Australian Indigenous people live in these 5 jurisdictions, the degree to which data for these jurisdictions are representative of data for all Indigenous people is unknown (ABS 2012).

Analysis of data from these jurisdictions showed that, in 2009–2013, Indigenous women aged 50–74 had a lower incidence rate of breast cancer, at 251 new cases per 100,000 women, compared with 285 new cases for non-Indigenous women (Figure 5.3)—with a similar trend for all ages (99 compared with 111 per 100,00 women).



Note: Rates age-standardised to the Australian population as at 30 June 2001; ‘Total’ rate includes women with a ‘not stated’ Indigenous status and is therefore greater than the ‘Non-Indigenous’ rate.

Source: AIHW Australian Cancer Database 2014. Data for this figure are available in Table A7.8.

Figure 5.3: Incidence of breast cancer in women aged 50–74 (New South West, Victoria, Queensland, Western Australia and the Northern Territory), by Indigenous status, 2009–2013

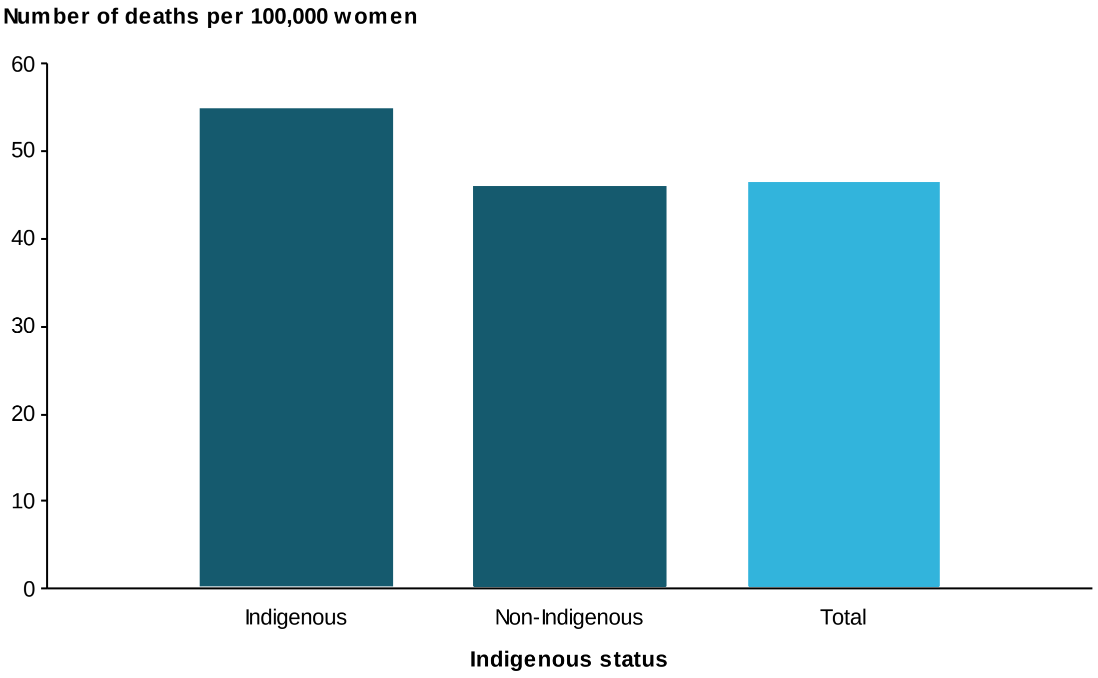
Survival

Crude survival was also calculated, and found to be lower for Indigenous women, compared with non-Indigenous women—crude survival was 73.7% for Indigenous women of all ages, compared with 84.3% for non-Indigenous women of all ages during the period 2009–2013. Similarly, crude survival was lower in Indigenous women when restricted to women aged 50–74 (75.4% compared with 89.0% for non-Indigenous women).

Mortality

The source of mortality data is the AIHW National Mortality Database, in which information on Indigenous status is considered to be adequate for reporting for 5 jurisdictions: New South Wales, Queensland, Western Australia, South Australia and the Northern Territory.

In 2011–2015, the mortality rate from breast cancer was higher in Indigenous women aged 50–74, at 55 deaths per 100,000 women, compared with 46 deaths for non-Indigenous women (Figure 5.4). While participation in BreastScreen Australia has a direct effect on the incidence of breast cancer, additional factors come into play for mortality from breast cancer, such as the stage of cancer at diagnosis, and access to treatment.



Notes

1. Deaths from 2011–2014 are derived by year of death; deaths in 2015 are derived by year of registration of death. Deaths registered in 2013 and earlier are based on the final version of cause of death data; deaths registered in 2014 and 2015 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
2. Rates age-standardised to the Australian population as at 30 June 2001.
3. 'Total' rate includes women with a 'not stated' Indigenous status.

Source: AIHW National Mortality Database. Data for this figure are available in Table A8.7.

Figure 5.4: Mortality from breast cancer in women aged 50–74 (New South Wales, Queensland, Western Australia, South Australia and the Northern Territory), by Indigenous status, 2011–2015

6 Monitoring other aspects of BreastScreen Australia

6.1 Expenditure on BreastScreen Australia

In Australia, screening is recommended for 3 cancers: breast, cervical and bowel. Each cancer has a national screening program, with both Australian Government and state and territory government components.

The Australian Government provides funding to the states and territories for public health services through National Health Reform Payments (known as National Specific Purpose Payments prior to 1 July 2012) and National Partnership Payments. State and territory governments have full discretion over the application of National Health Reform Payments for public health funding, including the amount expended on BreastScreen Australia and the National Cervical Screening Program (NCSP). The funding for the National Bowel Cancer Screening Program is through a specific National Partnership Payment.

Table 6.1 shows expenditure for the 3 national cancer screening programs (expenditure by Australian, state and territory governments combined) for the 2015–16 financial year.

In 201516, an estimated $268.6 million was spent on BreastScreen Australia.

Table 6.1: Government funding for cancer screening programs, 2015–16, $ million

Screening program	Australian Government	State and territory government	Total expenditure for 2015–16
BreastScreen Australia	15.9(a)	252.7	268.6(b)
National Cervical Screening Program	55.5(a)	28.8	84.3(c)
National Bowel Cancer Screening Program	52.9(d)	3.2	56.1(e)

(a) Includes only direct expenditure on the program by the Australian Government, and not the funding provided to the states and territories through the National Healthcare Agreement.

(b) Excludes mammography for breast cancer screening that occurs outside BreastScreen Australia.

(c) Excludes the proportion of the costs associated with general practitioner (GP), specialist and nurse attendances that would have been for Pap tests. As a result, it cannot be compared with expenditure for 2008–09, which included an estimate for these costs (AIHW 2013).

(d) Includes payments from the Australian Government to the states and territories for the National Bowel Cancer Screening Program.

(e) Excludes Medicare Benefits Schedule (MBS) flow-on costs; excludes GP incentives payments; excludes bowel screening that occurs outside the National Bowel Cancer Screening Program.

Note: These expenditure data only include recurrent expenditure; health infrastructure payments for cancer have been excluded, as well as any health workforce expenditure.

Sources: AIHW Health Expenditure Database; Medicare Australia statistics.

Appendix A: Supporting data tables

A1 Participation

Table A1.1: Participation of women aged 50–69 in BreastScreen Australia, 1996–1997 to 2015–2016

Reporting period	Participants[(a)]	Population[(b)]	Crude rate[(c)]	AS rate[(d)]
1996–1997	845,143	1,637,010	51.6	51.7
1997–1998	927,735	1,691,811	54.8	54.9
1998–1999	976,182	1,744,201	56.0	56.0
1999–2000	1,012,184	1,798,652	56.3	56.3
2000–2001	1,064,246	1,856,598	57.3	57.3
2001–2002	1,102,642	1,915,145	57.6	57.6
2002–2003	1,118,823	1,974,192	56.7	56.6
2003–2004	1,145,008	2,033,831	56.3	56.2
2004–2005	1,188,955	2,094,183	56.8	56.7
2005–2006	1,242,210	2,155,430	57.6	57.5
2006–2007	1,262,334	2,217,714	56.9	56.7
2007–2008	1,273,317	2,282,672	55.8	55.5
2008–2009	1,319,771	2,349,050	56.2	55.9
2009–2010	1,352,112	2,416,676	55.9	55.6
2010–2011	1,373,731	2,487,062	55.2	54.8
2011–2012	1,407,065	2,557,284	55.0	54.6
2012–2013	1,439,748	2,624,718	54.9	54.4
2013–2014	1,456,822	2,687,296	54.2	53.7
2014–2015	1,493,154	2,738,328	54.5	54.0
2015–2016	1,537,437	2,789,512	55.1	54.6

(a) ‘Participants’ are the number of women aged 50–69 screened through BreastScreen Australia in each 2-year reporting period. The reporting periods cover 1 January of the initial year to 31 December of the latter year indicated.

(b) ‘Population’ is the average of the ABS estimated resident population, for women aged 50–69, for the 2 reporting years.

(c) ‘Crude 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.

(d) ‘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, age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of BreastScreen Australia data.

Table A1.2: BreastScreen Australia participation by age, 2015–2016

	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75+
Number	88,231	145,464	394,483	396,587	388,715	357,652	235,103	64,077
Crude rate	10.6	18.0	50.0	53.2	58.8	60.2	53.0	7.2

Note: 'Crude rate' is the number of women screened in 2015–2016, as a percentage of the ABS estimated resident population.

Source: AIHW analysis of BreastScreen Australia data.

Table A1.3: BreastScreen Australia participation by state and territory, women aged 50–69 and women aged 50–74, 2015–2016

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
50–69 years									
Number	480,604	377,884	315,396	161,189	128,135	41,183	24,660	8,386	1,537,437
Crude rate	53.4	54.3	56.5	56.8	59.7	58.3	58.2	37.1	55.1
AS rate	52.8	53.9	55.9	56.3	58.9	57.3	57.7	37.2	54.6
50–74 years									
Number	557,284	432,033	365,276	183,987	149,294	47,753	27,904	9,009	1,772,540
Crude rate	53.2	53.5	56.5	56.6	59.5	57.8	57.6	36.6	54.8
AS rate	52.7	53.2	56.0	56.2	58.8	57.0	57.0	36.3	54.3

Notes

1. 'Crude rate' is the number of women screened in 2015–2016, as a percentage of the ABS estimated resident population; 'age-standardised (AS) rate' is the number of women screened in 2015–2016, as a percentage of the ABS estimated resident population, age-standardised to the Australian population at 30 June 2001.
2. Direct comparisons between the states and territories of Australia are not advised, due to the substantial differences that exist between the jurisdictions including for population, geographical size and structure, policies and other factors.

Source: AIHW analysis of BreastScreen Australia data.

Table A1.4: BreastScreen Australia participation by remoteness area, women aged 50–69 and women aged 50–74, 2015–2016

	Major cities	Inner regional	Outer regional	Remote	Very remote	Australia[(a)]
50–69 years						
Number	1,020,199	334,279	155,887	18,198	7,737	1,537,437
Crude rate	54.1	57.5	57.8	53.1	43.5	55.1
AS rate	53.7	56.6	57.1	52.8	43.6	54.6
50–74 years						
Number	1,170,114	391,499	180,393	20,760	8,567	1,772,540
Crude rate	53.7	57.3	57.5	53.2	43.8	54.8
AS rate	53.3	56.5	56.9	53.0	44.1	54.3

(a) Includes women in the 'not stated' category; therefore, columns may not sum to the Australia column.

Notes

1. 'Crude rate' is the number of women screened in 2015–2016 as a percentage of the ABS estimated resident population; 'age-standardised (AS) rate' is the number of women screened in 2015–2016 as a percentage of the ABS estimated resident population, 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 Statistical Geography Standard (ASGS) for 2011. Not all postcodes can be assigned to a remoteness area, therefore categories do not add exactly to the total for Australia. Caution is required when examining differences across remoteness areas (see Appendix D).

Source: AIHW analysis of BreastScreen Australia data.

Table A1.5: BreastScreen Australia participation by socioeconomic group, women aged 50–69 and women aged 50–74, 2015–2016

	1 (lowest)	2	3	4	5 (highest)	Australia[(a)]
50–69 years						
Number	296,244	314,105	307,615	305,323	310,157	1,537,437
Crude rate	52.7	55.7	55.0	55.7	55.8	55.1
AS rate	51.9	54.9	54.5	55.3	55.5	54.6
50–74 years						
Number	345,787	365,755	353,904	348,518	354,203	1,772,540
Crude rate	52.5	55.4	54.8	55.3	55.5	54.8
AS rate	51.8	54.8	54.3	54.9	55.2	54.3

(a) Includes women in the ‘not stated’ category; therefore, columns may not sum to the Australia column.

Notes

1. ‘Crude rate’ is the number of women screened in 2015–2016 as a percentage of the ABS estimated resident population; ‘age-standardised (AS) rate’ is the number of women screened in 2015–2016 as a percentage of the ABS estimated resident population, age-standardised to the Australian population at 30 June 2001.
2. Women were allocated to a socioeconomic group using their residential postcode according to the Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage for 2011. Not all postcodes can be assigned to a socioeconomic group, therefore categories do not add exactly to the total for Australia. Caution is required when examining differences across socioeconomic groups (see Appendix D).

Source: AIHW analysis of BreastScreen Australia data.

Table A1.6: BreastScreen Australia participation by main language spoken at home, women aged 50–69 and women aged 50–74, 2015–2016

	English-speaking	Non-English-speaking	Australia[(a)]
50–69 years			
Number	1,287,942	245,408	1,537,437
Crude rate	55.6	52.0	55.1
AS rate	55.0	51.6	54.6
50–74 years			
Number	1,491,010	276,818	1,772,540
Crude rate	55.7	49.8	54.8
AS rate	55.2	49.6	54.3

(a) Includes women in the ‘not stated’ category for main language other than English spoken at home; therefore, columns may not sum to the Australia column.

Notes

1. Some jurisdictions do not use the ‘not stated’ category, and there may also be differences in how these data are collected. This means that the analysis based on main language spoken at home should be interpreted with caution.
2. ‘Crude rate’ is the number of women screened in 2015–2016 as a percentage of the ABS estimated resident population; ‘age-standardised (AS) rate’ is the number of women screened in 2015–2016 as a percentage of the ABS estimated resident population, age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of BreastScreen Australia data.

Table A1.7: BreastScreen Australia participation by Indigenous status, women aged 50–69 and women aged 50–74, 2015–2016

	Indigenous	Non-Indigenous	Australia[(a)]
50–69 years			
Number	18,890	1,511,138	1,537,437
Crude rate	39.1	55.1	55.1
AS rate	39.4	54.6	54.6
50–74 years			
Number	20,505	1,743,863	1,772,540
Crude rate	39.0	54.8	54.8
AS rate	39.1	54.3	54.3

(a) Includes women in the ‘not stated’ category for Indigenous status; therefore, columns may not sum to the Australia column.

Notes

1. Indigenous status is self-reported; therefore, accuracy of Indigenous participation rates will be affected if women choose not to identify as Indigenous at the time of screening.
2. ‘Crude rate’ is the number of women screened in 2015–2016 as a percentage of the ABS estimated resident population; ‘age-standardised (AS) rate’ is the number of women screened in 2015–2016 as a percentage of the ABS estimated resident population, age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of BreastScreen Australia data.

Table A1.8: Number and age-standardised rate of women aged 50–69 participating in BreastScreen Australia, by Indigenous status, 1996–1997 to 2015–2016

Reporting period	Indigenous participants	Indigenous crude rate	Indigenous AS rate	Non-Indigenous participants	Non-Indigenous crude rate	Non-Indigenous AS rate
1996–1997	4,660	25.0	25.0	643,182	39.7	39.8
1997–1998	5,398	27.8	27.8	713,175	42.6	42.7
1998–1999	5,965	29.3	29.4	748,367	43.4	43.4
1999–2000	6,479	30.4	30.5	773,574	43.5	43.5
2000–2001	7,011	31.4	31.5	813,461	44.3	44.4
2001–2002	7,504	31.9	32.1	849,334	44.9	44.9
2002–2003	7,985	32.3	32.6	985,439	50.5	50.5
2003–2004	8,132	31.2	31.5	1,131,173	56.3	56.3
2004–2005	8,595	31.2	31.6	1,175,197	56.9	56.8
2005–2006	9,284	32.0	32.4	1,226,306	57.7	57.5
2006–2007	9,720	31.7	32.1	1,246,513	57.0	56.8
2007–2008	10,294	31.9	32.3	1,256,472	55.8	55.6
2008–2009	10,902	31.9	32.3	1,302,050	56.2	55.9
2009–2010	11,374	31.5	32.0	1,332,597	56.0	55.6
2010–2011	11,971	31.5	31.9	1,341,869	54.8	54.4
2011–2012	13,164	32.9	33.3	1,384,064	55.0	54.5
2012–2013	14,786	35.1	35.5	1,418,450	54.9	54.5
2013–2014	15,969	36.0	36.5	1,434,926	54.3	53.8
2014–2015	17,210	37.1	37.5	1,468,798	54.6	54.0
2015–2016	18,890	39.1	39.4	1,511,138	55.1	54.6

Notes

1. Indigenous status is self-reported; therefore, accuracy of Indigenous participation rates will be affected if women choose not to identify as Indigenous at the time of screening.
2. 'Crude rate' is the number of women screened as a percentage of the ABS estimated resident population; 'age-standardised (AS) rate' is the number of women screened as a percentage of the ABS estimated resident population, age-standardised to the Australian population at 30 June 2001.
3. The reporting periods cover 1 January of the initial year to 31 December of the latter year indicated.

Source: AIHW analysis of BreastScreen Australia data.

A2 Rescreening

Table A2.1: Rescreening by screening round, women aged 50–67, 2004 to 2014

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
First screening round											
AS rate	62.7	59.3	49.9	55.9	59.9	59.4	58.3	59.6	56.4	57.2	59.7
Second screening round											
AS rate	70.5	66.8	58.5	62.6	71.2	69.8	67.8	67.8	65.5	66.8	70.1
Third and subsequent screening rounds											
AS rate	81.0	78.4	73.5	76.1	81.6	82.3	82.8	81.6	81.5	83.1	85.0

Note: 'Age-standardised (AS) rate' is the number of women rescreened within 27 months as a percentage of women screened, age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Table A2.2: Rescreening by age and screening round, women screened during 2014

	Age group (years)		
	40–49	50–72	75+
First screening round			
Crude rate	42.7	62.1	20.5
Second screening round			
Crude rate	65.3	72.4	28.0
Third and subsequent screening rounds			
Crude rate	81.5	85.1	41.7

Note: 'Crude rate' is the number of women rescreened within 27 months as a percentage of women screened.

Source: AIHW analysis of BreastScreen Australia data.

Table A2.3: Rescreening by state and territory and screening round, women aged 50–67 and women aged 50–72 screened during 2014

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
50–67 years									
First screening round									
Crude rate	65.7	61.3	61.5	55.1	64.2	63.5	57.7	45.1	62.1
AS rate	62.7	57.4	61.7	51.1	59.8	64.3	57.5	43.9	59.7
Second screening round									
Crude rate	74.6	73.8	70.9	64.7	74.9	70.8	68.4	54.7	72.5
AS rate	72.4	69.7	70.7	62.1	71.1	70.7	63.8	52.9	70.1
Third and subsequent screening rounds									
Crude rate	86.6	84.2	85.6	82.0	86.7	85.9	82.7	71.6	85.2
AS rate	86.4	84.1	85.5	81.7	86.6	85.6	82.9	71.4	85.0
50–72 years									
First screening round									
Crude rate	65.6	61.3	61.7	55.2	64.0	64.0	57.8	44.9	62.1
AS rate	62.6	57.7	62.4	51.9	59.2	65.2	57.9	43.1	60.0
Second screening round									
Crude rate	74.5	73.6	71.1	64.7	74.8	70.9	68.5	54.1	72.4
AS rate	72.3	69.4	71.2	62.4	71.2	70.7	64.9	51.1	70.1
Third and subsequent screening rounds									
Crude rate	86.4	84.1	85.6	81.6	86.3	85.9	83.2	71.8	85.1
AS rate	86.3	84.0	85.5	81.6	86.4	85.7	83.2	71.5	85.0

Note: ‘Crude rate’ is the number of women rescreened within 27 months as a percentage of women screened’; ‘age-standardised (AS) rate’ is the number of women rescreened within 27 months as a percentage of women screened, age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

A3 Recall to assessment

Table A3.1: Recall to assessment, women aged 50–69, first and subsequent screening rounds, 2006 to 2016

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
First screening round											
Number	7,743	7,948	9,213	9,454	9,110	8,420	8,395	10,214	9,149	9,475	9,806
Crude rate	10.2	10.3	10.3	11.2	11.4	11.1	10.8	11.9	12.3	11.8	11.5
AS rate	9.9	9.9	9.9	10.7	11.1	10.7	10.8	11.6	12.2	11.7	11.2
Subsequent screening rounds											
Number	23,078	22,472	23,604	25,164	25,880	24,022	22,406	25,681	26,974	26,655	26,671
Crude rate	4.0	4.0	4.1	4.1	4.1	3.7	3.4	3.9	3.9	3.8	3.7
AS rate	4.0	4.0	4.1	4.2	4.2	3.8	3.4	3.9	4.0	3.8	3.7

Note: 'Crude rate' is the number of women recalled for assessment as a percentage of women screened; 'age-standardised (AS) rate' is the number of women recalled for assessment as a percentage of women screened, age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Table A3.2: Recall to assessment by age, first and subsequent screening rounds, 2016

	Age group (years)							
	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75+
First screening round								
Number	2,577	2,831	6,429	1,813	969	595	327	85
Crude rate	9.3	11.6	11.7	11.2	10.9	11.0	12.1	12.1
Subsequent screening rounds								
Number	881	2,746	6,105	6,778	6,971	6,817	4,964	1,507
Crude rate	5.5	5.4	4.1	3.5	3.5	3.7	3.9	4.4

Note: 'Crude rate' is the number of women recalled for assessment as a percentage of women screened.

Source: AIHW analysis of BreastScreen Australia data.

Table A3.3: Recall to assessment by state and territory, women aged 50–69 and women aged 50–74, first and subsequent screening rounds, 2016

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
50–69 years									
First screening round									
Number	3,976	2,320	1,530	737	754	195	169	125	9,806
Crude rate	11.8	11.4	13.1	9.1	11.4	9.9	8.7	14.4	11.5
AS rate	11.4	11.1	12.9	8.4	11.0	9.6	9.5	13.8	11.2
Subsequent screening rounds									
Number	7,608	6,327	6,485	2,110	3,129	505	375	132	26,671
Crude rate	3.4	3.7	4.2	2.7	4.9	2.6	3.3	3.8	3.7
AS rate	3.4	3.7	4.2	2.7	4.9	2.7	3.4	3.7	3.7
50–74 years									
First screening round									
Number	4,103	2,370	1,637	756	771	197	173	126	10,133
Crude rate	11.8	11.4	13.2	9.1	11.4	9.6	8.7	14.3	11.5
AS rate	11.5	11.2	13.0	8.4	11.0	9.1	9.5	13.4	11.3
Subsequent screening rounds									
Number	9,032	7,421	7,665	2,573	3,706	651	441	146	31,635
Crude rate	3.4	3.7	4.3	2.8	4.9	2.8	3.4	3.8	3.7
AS rate	3.4	3.7	4.3	2.8	4.9	2.7	3.4	3.7	3.7

Note: 'Crude rate' is the number of women recalled for assessment as a percentage of women screened; 'age-standardised (AS) rate' is the number of women recalled for assessment as a percentage of women screened, age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

A4 Invasive breast cancer detection

Table A4.1: All-size invasive breast cancer detection in women aged 50–69, first and subsequent screening rounds, 2006 to 2016

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
First screening round											
Number	442	489	585	549	581	537	631	715	633	643	699
Crude rate	58.4	63.6	67.2	65.2	72.7	70.7	80.8	83.1	84.9	80.1	81.9
AS rate	71.8	77.6	75.5	79.5	91.6	82.1	103.6	107.9	108.2	102.4	100.2
Subsequent screening rounds											
Number	2,589	2,437	2,834	2,859	2,879	2,862	3,011	3,279	3,490	3,491	3,670
Crude rate	44.4	43.0	48.7	46.8	45.9	44.4	45.4	49.4	50.8	49.2	50.6
AS rate	44.0	42.3	47.8	45.4	44.4	42.9	43.9	47.6	48.3	46.7	48.2

Note: 'Crude rate' is the number of women with all size invasive breast cancer detected per 10,000 women screened; 'age-standardised (AS) rate' is the number of women with all size invasive breast cancer detected per 10,000 women screened, age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Table A4.2: Small (≤15 mm) invasive breast cancer detection in women aged 50–69, all screening rounds, 2006 to 2016

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number	1,898	1,798	2,103	2,132	2,082	2,077	2,122	2,317	2,379	2,430	2,516
Crude rate	28.8	27.9	31.4	30.7	29.4	28.8	28.6	30.9	31.2	30.7	31.1
AS rate	29.2	28.0	31.4	30.5	29.2	28.4	28.2	30.4	30.5	30.0	30.2

Note: 'Crude rate' is the number of women with small (≤15 mm) invasive breast cancer detected per 10,000 women screened; 'age-standardised (AS) rate' is the number of women with small (≤15 mm) invasive breast cancer detected per 10,000 women screened, age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Table A4.3: All-size and small (≤15 mm) invasive breast cancer detection by age, all screening rounds, 2016

	Age group (years)							
	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75+
All-size								
Number	136	270	872	974	1,234	1,289	1,091	413
Crude rate	31.1	36.0	42.8	46.6	60.1	67.2	84.0	119.2
Small (≤15 mm)								
Number	58	124	443	553	726	794	689	216
Crude rate	13.3	16.5	21.7	26.5	35.3	41.4	53.0	62.3

Note: 'Crude rate' is the number of women with all-size and small (≤15 mm) invasive breast cancer detected per 10,000 women screened.

Source: AIHW analysis of BreastScreen Australia data.

Table A4.4: Proportion of small (≤15 mm) invasive breast cancers detected in women aged 50–69, all screening rounds, 2006 to 2016

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Proportion (%)	62.6	61.4	61.5	62.6	60.2	61.1	58.3	58.0	57.7	58.8	57.6

Note: Figures are the number of women with small (≤15 mm) invasive breast cancer detected, as a proportion of the number of women with invasive breast cancer detected.

Source: AIHW analysis of BreastScreen Australia data.

Table A4.5: All-size and small (≤15 mm) invasive breast cancer detection by state and territory, women aged 50–69 and women aged 50–74, first and subsequent screening rounds, 2016

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
50–69 years									
All-size, first screening round									
Number	259	170	110	73	48	21	15	3	699
Crude rate	76.6	83.2	94.4	90.4	72.5	107.1	77.5	34.5	81.9
AS rate	98.7	101.3	106.9	111.9	87.5	109.6	95.7	23.7	100.2
All-size, subsequent screening rounds									
Number	1,145	839	829	360	350	66	69	12	3,670
Crude rate	51.0	48.9	54.2	46.5	54.5	34.4	60.9	34.4	50.6
AS rate	48.0	47.2	52.1	44.6	50.5	32.2	55.9	31.2	48.2
Small (≤15 mm), all screening rounds									
Number	832	546	525	245	243	66	51	8	2,516
Crude rate	32.2	28.5	31.9	28.7	34.3	31.2	38.5	18.4	31.1
AS rate	31.3	27.9	30.8	28.1	33.0	30.1	37.5	18.3	30.2
50–74 years									
All-size, first screening round									
Number	276	175	123	77	49	21	15	3	739
Crude rate	79.2	84.0	99.4	92.8	72.3	102.4	75.7	34.0	83.9
AS rate	102.7	102.9	111.8	116.4	85.8	102.5	89.4	22.1	103.3
All-size, subsequent screening rounds									
Number	1,458	1,090	1,049	479	446	96	87	16	4,721
Crude rate	55.1	54.4	58.6	52.4	58.8	41.3	66.1	42.0	55.4
AS rate	50.0	49.8	54.2	47.2	52.6	35.0	58.7	37.2	50.4
Small (≤15 mm), all screening rounds									
Number	1,049	694	660	330	312	91	59	10	3,205
Crude rate	35.0	31.4	34.5	33.1	37.7	36.0	39.0	21.3	34.1
AS rate	32.7	29.4	32.1	30.1	34.7	32.1	37.8	21.0	31.7

Notes

1. ‘Crude rate’ is the number of women with all size and small (≤15 mm) invasive breast cancer detected per 10,000 women screened; ‘age-standardised (AS) rate’ is the number of women with all size and small (≤15 mm) invasive breast cancer detected per 10,000 women screened, age-standardised to the population of women attending a BreastScreen Australia service in 2008.
2. State and territory differences need to be taken into consideration when interpreting breast cancer detection results.
3. A small number of women may be screened in one jurisdiction but have their breast cancer detected in another.

Source: AIHW analysis of BreastScreen Australia data.

A5 Ductal carcinoma in situ detection

Table A5.1: DCIS detection by year, women aged 50–69, first and subsequent screening rounds, 2006 to 2016

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
First screening round											
Number	130	144	142	152	142	141	153	207	168	179	198
Crude rate	17.2	18.7	15.9	18.0	17.8	18.6	19.6	24.1	22.5	22.3	23.2
AS rate	18.8	21.3	15.6	19.6	17.9	20.9	22.8	29.2	23.7	24.5	26.6
Subsequent screening rounds											
Number	571	633	678	723	734	740	750	876	1,027	918	928
Crude rate	9.8	11.2	11.7	11.8	11.7	11.5	11.3	13.2	14.9	12.9	12.8
AS rate	9.7	11.1	11.5	11.7	11.5	11.2	11.0	12.8	14.6	12.5	12.5

Note: 'Crude rate' is the number of women with DCIS detected per 10,000 women screened; 'age-standardised (AS) rate' is the number of women with DCIS detected per 10,000 women screened, age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Table A5.2: DCIS detection by age, all screening rounds, 2016

	Age group (years)				
	40–49	50–59	60–69	70–74	75+
Number	147	526	600	214	61
Crude rate	12.4	12.7	15.1	16.5	17.6

*Note: '*Crude rate' is the number of women with DCIS detected per 10,000 women screened.

Source: AIHW analysis of BreastScreen Australia data.

Table A5.3: DCIS detection by state and territory, women aged 50–69 and women aged 50–74, all screening rounds, 2016

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
50–69 years									
Number	346	283	230	123	96	28	15	5	1,126
Crude rate	13.4	14.7	14.0	14.4	13.5	13.2	11.3	11.5	13.9
AS rate	13.3	14.6	13.7	14.3	13.6	14.0	11.3	11.5	13.8
50–74 years									
Number	397	331	285	151	115	37	19	5	1,340
Crude rate	13.3	15.0	14.9	15.1	13.9	14.6	12.5	10.7	14.3
AS rate	13.2	14.7	14.2	14.6	13.8	14.5	11.9	10.7	14.0

Notes

1. 'Crude rate' is the number of women with DCIS detected per 10,000 women screened; 'age-standardised (AS) rate' is the number of women with DCIS detected per 10,000 women screened, 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 need to be taken into consideration when interpreting DCIS detection results.
3. A small number of women may be screened in one jurisdiction but have their DCIS detected in another.

Source: AIHW analysis of BreastScreen Australia data.

A6a Interval cancers

Box A1: Different policies across state and territory BreastScreen programs affects interval cancer detection rates

Please note that differences in state and territory policies for managing women with symptoms may affect interval cancer rates.

For example, in some jurisdictions, women with a negative screening mammogram but who have symptoms are referred for diagnostic follow-up outside BreastScreen Australia, rather than being recalled for assessment within BreastScreen Australia. Any cancers found in these women will be counted as ‘interval cancers’, leading to a higher apparent interval cancer rate. Conversely, states and territories that do recall women to assessment if they have symptoms (even in the face of a negative screening mammogram) may have lower apparent interval cancer rates. This affects the comparability of this indicator between jurisdictions.

Table A6.1: Interval cancer rate for women aged 50–69, screened in index years 2011, 2012 and 2013, 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									
AS rate	9.5	4.2	5.1	13.0	10.3	8.0	3.9	0.0	7.5
95% CI	6.7–12.9	2.1–6.9	2.6–8.9	6.7–21.5	3.6–20.1	2.6–18.7	0.8–11.4	0.0–0.0	6.0–9.3
Subsequent screening rounds									
AS rate	6.7	5.5	7.5	7.9	8.9	5.6	4.9	4.1	6.8
95% CI	6.0–7.4	4.8–6.2	6.5–8.6	6.7–9.2	7.5–10.5	3.8–8.0	2.8–8.0	1.1–10.4	6.4–7.2

Notes

1. Queensland data for 2013 were not available to be included in this report.
2. ‘Age-standardised (AS) rate’ is the number of interval cancers detected per 10,000 women years, age-standardised to the population of women attending a BreastScreen Australia service in 2008; ‘95% CI’ are 95% confidence intervals.

Source: AIHW analysis of BreastScreen Australia data.

Table A6.2: Interval cancer rate for women aged 50–69, screened in index years 2011, 2012 and 2013, 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									
AS rate	9.3	8.6	10.7	7.9	9.2	16.7	21.2	9.9	9.7
95% CI	6.6–12.4	6.0–11.7	6.2–16.9	4.4–12.7	3.7–17.0	5.6–36.4	2.7–57.9	2.1–29.1	8.1–11.6
Subsequent screening rounds									
AS rate	11.6	12.6	11.4	11.2	13.4	12.0	12.2	13.7	12.0
95% CI	10.7–12.5	11.6–13.7	10.2–12.7	9.8–12.9	11.5–15.4	9.1–15.4	8.3–17.2	6.8–24.5	11.5–12.5

Notes

1. Queensland data for 2013 were not available to be included in this report.
2. ‘Age-standardised (AS) rate’ is the number of interval cancers detected per 10,000 women years, age-standardised to the population of women attending a BreastScreen Australia service in 2008; ‘95% CI’ are 95% confidence intervals.

Source: AIHW analysis of BreastScreen Australia data.

Table A6.3: Interval cancers for women screened in index years 2011, 2012 and 2013, by age, all screening rounds, 0–12 months and 13–24 months follow-up

	Age group (years)			
Time since screen (months)	**40–49**	**50–59**	**60–69**	**70+**
0–12				
Number	261	704	665	204
Crude rate	8.2	6.6	7.1	9.8
13–24				
Number	361	1,111	1,134	293
Crude rate	12.1	11.0	12.9	15.1

Notes

1. Queensland data for 2013 were not available to be included in this report.
2. Crude rate' is the number of interval cancers detected per 10,000 women years.

Source: AIHW analysis of BreastScreen Australia data.

Table A6.4: Interval cancer rate for women aged 50–69, screened in index years 2011, 2012 and 2013, by state and territory, first and subsequent screening rounds, 0–24 months follow-up

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
First screening round									
AS rate	9.4	6.4	7.9	10.6	9.8	12.3	12.2	4.0	8.6
95% CI	7.4–11.6	4.7–8.4	5.3–11.3	6.8–15.3	5.2–15.7	5.8–22.3	2.6–28.6	0.8–11.7	7.5–9.8
Subsequent screening rounds									
AS rate	9.0	9.0	9.4	9.5	11.0	8.6	8.2	8.4	9.3
95% CI	8.4–9.5	8.4–9.7	8.6–10.3	8.5–10.5	9.9–12.3	6.9–10.6	6.1–10.9	4.7–13.9	9.0–9.6

Notes

1. Queensland data for 2013 were not available to be included in this report.
2. 'Age-standardised (AS) rate' is the number of interval cancers detected per 10,000 women years, age-standardised to the population of women attending a BreastScreen Australia service in 2008; '95% CI' are 95% confidence intervals.

Source: AIHW analysis of BreastScreen Australia data.

Box A2: Confidence intervals

Confidence intervals (CIs) are only presented in this report for interval cancer rates. This is because it has been deemed important to show the degree of error due to rare events in small populations, to avoid potential misinterpretation of data and/or to present data consistently with other publications.

Where shown, 95% CIs can be used to determine if a statistically significant difference exists between compared values: where the CIs do not overlap, the difference between rates is greater than that which could be explained by chance and is therefore regarded as statistically significant. Because overlapping CIs do not imply that the difference between 2 rates is definitely due to chance, it can only be stated that no statistically significant differences were found—and not that no differences exist.

Judgment should be exercised in deciding whether or not any differences shown are of clinical significance.

A6b Program sensitivity

Table A6.5: Program sensitivity for women aged 50–69, screened in index years 2011, 2012 and 2013, 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									
AS rate	91.8	95.2	95.1	88.6	86.3	92.3	95.4	100.0	92.7
Subsequent screening rounds									
AS rates	86.8	89.2	85.9	85.2	82.8	89.1	90.1	90.2	86.8

Notes

1. Queensland data for 2013 were not available to be included in this report.
2. ‘Age-standardised (AS) rate’ is the number of screen-detected cancers as a percentage of all cancers (screen-detected and interval cancers), age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Table A6.6: Program sensitivity for women aged 50–69, screened in index years 2011, 2012 and 2013, by state and territory, first and subsequent screening rounds, 0–24 months follow-up

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
First screening round									
AS rates	84.7	86.3	91.2	91.9	76.8	88.0	83.4	91.2	86.2
Subsequent screening rounds									
AS rates	72.2	71.6	80.7	81.7	67.0	81.5	74.9	72.9	74.2

Notes

1. Queensland data for 2013 were not available to be included in this report.
2. ‘Age-standardised (AS) rate’ is the number of screen-detected cancers as a percentage of all cancers (screen-detected and interval cancers), age-standardised to the population of women attending a BreastScreen Australia service in 2008.

Source: AIHW analysis of BreastScreen Australia data.

Table A6.7: Program sensitivity for women screened in index years 2011, 2012 and 2013, all screening rounds, by age, 0–12 months and 0–24 months follow-up

	Age group (years)			
Time since screen (months)	**40–49**	**50–59**	**60–69**	**70+**
0–12				
Crude rate	80.0	86.7	89.7	91.1
0–24				
Crude rate	67.4	74.5	78.3	82.7

Notes

1. Queensland data for 2013 were not available to be included in this report.
2. ‘Crude rate’ is the number of screen detected cancers as a percentage of all cancers (screen detected and interval cancers).

Source: AIHW analysis of BreastScreen Australia data.

A7a Invasive breast cancer incidence

Table A7.1: Incidence of invasive breast cancer, 1982 to 2014 (with estimates to 2018)

	New cases		AS rate	
Year of diagnosis	**50–74**	**All ages**	**50–74**	**All ages**
1982	2,974	5,311	182.0	81.1
1983	2,929	5,372	178.1	80.7
1984	3,184	5,709	190.7	83.6
1985	3,208	5,915	189.0	84.3
1986	3,321	6,084	195.1	85.1
1987	3,523	6,699	203.1	91.3
1988	3,577	6,729	203.8	89.6
1989	3,842	7,179	217.2	93.6
1990	3,916	7,427	219.7	95.0
1991	4,302	8,039	237.9	100.4
1992	4,179	8,015	228.6	98.1
1993	4,778	8,786	257.9	105.5
1994	5,494	9,760	289.6	114.6
1995	5,592	10,081	292.0	116.4
1996	5,360	9,743	274.5	109.7
1997	5,709	10,207	284.5	112.2
1998	6,073	10,755	295.2	115.5
1999	6,118	10,675	290.4	112.1
2000	6,566	11,413	303.6	117.0
2001	6,907	11,834	311.1	118.4
2002	7,023	12,098	308.3	118.4
2003	6,740	11,890	288.3	113.7
2004	7,074	12,223	295.7	114.6
2005	6,969	12,307	283.9	113.1
2006	7,425	12,766	294.3	114.9
2007	7,341	12,692	282.5	111.4
2008	8,031	13,698	300.2	117.7
2009	8,176	13,851	296.3	116.1
2010	8,640	14,400	304.1	118.0
2011	8,650	14,569	295.9	116.9
2012	9,142	15,348	304.0	120.7
2013	9,828	16,431	318.2	126.7
2014	10,230	16,614	322.3	125.0
2015	10,118	16,566	310.7	122.0
2016	10,438	17,099	313.4	123.2
2017	10,727	17,586	315.6	124.2
2018	11,035	18,087	317.9	125.1

Notes

1. ‘Age-standardised (AS) rate’ is the number of new cases of breast cancer per 100,000 women, age-standardised to the Australian population at 30 June 2001.
2. Estimated incidence data for 2015–2018 are based on 2004–2013 incidence data (including NSW estimates for 2013). Actual incidence data for 2015–2018 may differ from estimated data for 2015–2018 due to current and ongoing program or practice changes.

Source: AIHW Australian Cancer Database 2014.

Table A7.2: Incidence of invasive breast cancer, by age, 2014

	Age group (years)									
	40–44	**45–49**	**50–54**	**55–59**	**60–64**	**65–69**	**70–74**	**75–79**	**80–84**	**85+**
New cases	1,069	1,631	2,018	1,980	2,229	2,280	1,723	1,155	831	923
Crude rate	127.0	208.5	255.1	274.8	347.0	404.9	414.2	358.7	330.5	318.0

Note: 'Crude rate' is the number of new cases of breast cancer per 100,000 women.

Source: AIHW Australian Cancer Database 2014.

Table A7.3: Incidence of invasive breast cancer, by age, 1982–1991, 1992–2001 and 2002–2011

	Age group (years)									
	40–44	**45–49**	**50–54**	**55–59**	**60–64**	**65–69**	**70–74**	**75–79**	**80–84**	**85+**
1982–1991										
Crude rate	106.6	155.9	167.2	184.3	212.7	233.0	255.4	275.7	294.6	312.6
1992–2001										
Crude rate	116.9	185.0	246.1	280.4	302.1	311.7	311.7	318.1	318.0	308.3
2002–2011										
Crude rate	122.8	192.2	241.3	275.6	337.0	362.1	307.5	303.8	306.8	312.6

Note: 'Crude rate' is the number of new cases of breast cancer per 100,000 women.

Source: AIHW Australian Cancer Database 2014.

Table A7.4: Incidence of invasive breast cancer, by age and histology group, 2013

Type of breast cancer	40–49	50–59	60–69	70+
Invasive ductal carcinoma	2,308	3,281	3,307	3,147
Invasive lobular carcinoma	271	464	603	677
Medullar carcinoma and atypical medullary carcinoma	4	13	8	3
Tubular carcinoma and invasive cribriform carcinoma	43	69	80	47
Mucinous carcinoma	48	43	92	178
Invasive papillary carcinoma	22	46	85	91
Inflammatory carcinoma	13	14	9	7
Mesenchymal	2	3	3	4
Other–specified	47	59	86	112
Unspecified	32	32	39	226

Source: AIHW Australian Cancer Database 2014.

Table A7.5: Incidence of invasive breast cancer in women aged 50–74, by state and territory, 2009–2013

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
New cases	14,549	10,710	9,049	4,354	3,553	1,175	760	286	44,436
AS rate	303.2	296.6	316.0	298.2	303.2	306.3	345.3	267.4	304.0

Note: 'Age-standardised (AS) rate' is the number of new cases of breast cancers per 100,000 women, age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database 2014.

Table A7.6: Incidence of invasive breast cancer in women aged 50–74, by remoteness, 2009–2013

	Major cities	Inner regional	Outer regional	Remote	Very remote	Australia
New cases	30,070	9,410	4,218	493	222	44,436
AS rate	306.1	304.0	292.9	278.3	261.2	304.0

Notes

1. Remoteness classification is based on area of usual residence (Statistical Local Area Level 2) at the time of diagnosis.
2. ‘Australia’ does not match the total, because some women were not allocated to a remoteness area.
3. ‘Age-standardised (AS) rate’ is the number of new cases of breast cancers per 100,000 women age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database 2014.

Table A7.7: Incidence of invasive breast cancer in women aged 50–74, by socioeconomic group, 2009–2013

	1 (lowest)	2	3	4	5 (highest)	Australia
New cases	8,764	8,829	8,755	8,477	9,579	44,436
AS rate	292.5	288.8	296.7	309.3	333.0	304.0

Notes

1. Socioeconomic group was allocated using the ABS Index of Relative Socio-economic Disadvantage.
2. ‘Australia’ does not match the total because some women were not allocated to a socioeconomic group.
3. ‘Age-standardised (AS) rate’ is the number of new cases of breast cancers per 100,000 women, age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database 2014.

Table A7.8: Incidence of invasive breast cancer in women aged 50–74 (New South Wales, Victoria, Queensland, Western Australia and the Northern Territory), by Indigenous status, 2009–2013

	Indigenous[a]	Non-Indigenous[a]	Total[a]
New cases	463	36,098	38,948
Crude rate	242.9	288.1	306.2
AS rate	251.0	285.2	303.3

(a) Data shown for ‘Indigenous’, ‘Non-Indigenous’ and ‘Total’ are for New South Wales, Victoria, Queensland, Western 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 that this report was prepared. ‘Total’ includes women whose Indigenous status was not stated.

Notes

1. Some states and territories use an imputation method for determining Indigenous cancers, which may lead to differences between these data and those shown in jurisdictional cancer incidence reports.
2. ‘Crude rate’ is the number of new cases of breast cancer per 100,000 women; ‘age-standardised (AS) rates’ are the number of breast cancers detected per 100,000 women, age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database 2014.

A7b Ductal carcinoma in situ incidence

Table A7.9: Incidence of DCIS, 1996 to 2013

	New cases of DCIS		AS rate	
Year of diagnosis	**50–74**	**All ages**	**50–74**	**All ages**
1996	603	924	31.2	10.6
1997	697	1,073	35.1	12.1
1998	808	1,201	39.4	13.1
1999	828	1,216	39.5	13.0
2000	926	1,352	43.0	14.1
2001	1,041	1,478	47.0	15.1
2002	981	1,432	43.2	14.3
2003	1,038	1,486	44.4	14.4
2004	1,103	1,595	46.2	15.2
2005	1,128	1,608	45.8	15.0
2006	1,105	1,573	43.8	14.4
2007	1,164	1,676	44.8	15.0
2008	1,295	1,789	48.3	15.5
2009	1,346	1,879	48.9	16.0
2010	1,392	1,923	49.0	16.0
2011	1,441	1,993	49.2	16.1
2012	1,543	2,091	51.1	16.5
2013	1,713	2,343	55.3	18.1

Notes

1. New South Wales have been collecting DCIS incidence data from early 2000, with their collection considered complete from 2002. New South Wales do not report in situ data, which means that they are unable to validate the data in this report.
2. 'Age-standardised (AS) rate' is the number of new cases of DCIS per 100,000 women, age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database 2014.

Table A7.10: Incidence of DCIS, by age, 2013

	Age group (years)			
	40–49	**50–59**	**60–69**	**70+**
New cases of DCIS	371	739	760	399
Crude rate	23.0	49.7	64.9	32.1

Notes

1. New South Wales do not report in situ data, which means that they are unable to validate the data in this report.
2. 'Crude rate' is the number of new cases of DCIS per 100,000 women.

Source: AIHW Australian Cancer Database 2014.

Survival after a diagnosis of breast cancer

Table A7.11: Five-year relative survival from breast cancer, by age, 2010–2014

Age group	5-year relative survival (%)
<20	n.p.
20–24	86.7
25–29	88.0
30–34	87.5
35–39	90.4
40–44	92.5
45–49	93.4
50–54	92.5
55–59	92.4
60–64	93.1
65–69	93.7
70–74	90.0
75+	80.3
All ages	90.6
Ages 50–74	92.5

n.p. not published

Note: Relative survival was calculated with the period method, using the period 2010–2014 (Brenner & Gefeller 1996). (Note that this period does not contain incidence data for 2014 for NSW.)

Source: AIHW Australian Cancer Database 2014.

Table A7.12: Trend in 5-year relative survival from breast cancer in women aged 50–74, 1985–1989 to 2010–2014

Year	5-year relative survival (%)
1985–1989	72.7
1990–1994	79.8
1995–1999	85.9
2000–2004	89.6
2005–2009	91.0
2010–2014	92.5

Note: ‘Relative survival’ was calculated with the ‘period’ method, using the period 2010–2014 (Brenner & Gefeller 1996). (Note that this period does not contain incidence data for 2014 for NSW.)

Source: AIHW Australian Cancer Database 2014.

Table A7.13: Relative survival at diagnosis and 5-year conditional survival from breast cancer in women aged 50–74, 2010–2014

	Relative survival	Conditional survival	
Years after diagnosis	Relative survival (%)	Years already survived	5-year conditional relative survival (%)
1	98.7	. .	. .
2	97.1	. .	. .
3	95.4	. .	. .
4	93.9	. .	. .
5	92.5	0	92.5
6	91.4	1	92.6
7	90.4	2	93.1
8	89.4	3	93.7
9	88.3	4	94.0
10	87.5	5	94.6
11	86.5	6	94.7
12	85.9	7	95.0
13	85.1	8	95.2
14	84.2	9	95.4
15	83.5	10	95.4
16	82.5	11	95.4
17	81.7	12	95.1
18	80.9	13	95.0
19	80.2	14	95.3
20	79.4	15	95.1

Note: Relative survival was calculated with the ‘period’ method, using the period 2010–2014 (Brenner & Gefeller 1996). (Note that this period does not contain incidence data for 2014 for NSW.)

Source: AIHW Australian Cancer Database 2014.

A8 Mortality from breast cancer

Table A8.1: Mortality from breast cancer, 1982 to 2015 (with estimates to 2018)

	Number of deaths		AS rate	
Year of death	**50–74**	**All ages**	**50–74**	**All ages**
1982	1,160	1,987	71.2	30.4
1983	1,250	2,040	75.1	30.2
1984	1,255	2,166	75.0	31.6
1985	1,238	2,196	72.6	31.2
1986	1,224	2,165	70.8	29.9
1987	1,274	2,293	73.6	31.1
1988	1,302	2,361	73.5	31.2
1989	1,307	2,449	73.0	31.6
1990	1,320	2,422	72.8	30.6
1991	1,357	2,526	74.1	31.3
1992	1,240	2,429	66.7	29.4
1993	1,357	2,611	72.0	30.8
1994	1,372	2,669	71.5	30.9
1995	1,381	2,635	70.4	29.7
1996	1,335	2,620	67.1	28.8
1997	1,318	2,604	64.8	27.9
1998	1,260	2,541	60.7	26.5
1999	1,282	2,512	60.4	25.6
2000	1,247	2,521	57.3	24.9
2001	1,303	2,594	58.4	25.0
2002	1,349	2,681	59.2	25.2
2003	1,352	2,710	57.9	24.9
2004	1,347	2,665	56.3	24.0
2005	1,346	2,710	55.0	23.8
2006	1,311	2,624	52.3	22.4
2007	1,358	2,722	52.4	22.6
2008	1,347	2,746	50.4	22.3
2009	1,393	2,785	50.8	22.2
2010	1,372	2,837	48.4	21.7
2011	1,447	2,901	49.6	21.8
2012	1,437	2,823	47.9	20.8
2013	1,434	2,863	46.3	20.4
2014	1,408	2,837	44.3	19.8
2015	1,432	2,939	43.9	20.1
2016	1,550	3,046	45.8	20.2
2017	1,570	3,087	45.2	19.9
2018	1,591	3,128	44.6	19.7

Notes

1. Deaths from 1982 to 2014 were derived by year of death; deaths in 2015 were derived by year of registration of death. Deaths registered in 2013 and earlier are based on the final version of cause of death data; deaths registered in 2014 and 2015 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
2. 'Age-standardised (AS) rate' is the number of deaths from breast cancer per 100,000 women, age-standardised to the Australian population at 30 June 2001.
3. Estimated mortality data for 2016–2018 are based on Joinpoint analysis of 2004–2013 mortality data. Actual mortality data for 2016–2018 may differ from estimated data for 2016–2018 due to current and ongoing program or practice changes.

Source: AIHW National Mortality Database.

Table A8.2: Mortality from breast cancer, by age, 2015

	Age group (years)									
	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+
Deaths	81	146	232	288	279	332	301	332	306	574
Crude rate	9.7	18.3	29.3	39.1	42.6	56.9	69.3	99.9	121.9	193.2

Notes

1. Deaths in 2015 were derived by year of registration of death; these are based on the preliminary version of cause of death data and are subject to further revision by the ABS.
2. 'Crude rate' is the number of deaths from breast cancer per 100,000 women.

Source: AIHW National Mortality Database.

Table A8.3: Mortality from breast cancer, by age, 1982–1991, 1992–2001 and 2002–2011

	Age group (years)									
	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+
1982–1991										
Crude rate	22.8	35.8	55.5	65.4	76.1	89.6	100.4	116.1	146.9	220.1
1992–2001										
Crude rate	19.2	32.3	46.7	58.7	68.7	77.7	91.1	112.0	141.2	199.0
2002–2011										
Crude rate	14.1	23.6	34.9	46.7	58.6	67.7	76.7	94.4	130.8	190.1

Notes

1. Deaths from 1982 to 2011 were derived by year of death, and are based on the final version of cause of death data.
2. 'Crude rate' is the number of deaths from breast cancer per 100,000 women.

Source: AIHW National Mortality Database.

Table A8.4: Mortality from breast cancer in women aged 50–74, by state and territory, 2011–2015

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Deaths	2,387	1,764	1,394	676	585	196	99	57	7,158
AS rate	47.2	46.1	45.6	43.8	47.5	48.1	44.3	51.2	46.3

Notes

1. Deaths from 2011 to 2014 were derived by year of death; deaths in 2015 were derived by year of registration of death. Deaths registered in 2013 and earlier are based on the final version of cause of death data; deaths registered in 2014 and 2015 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
2. 'Age-standardised (AS) rate' is the number of deaths from breast cancer per 100,000 women, age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Table A8.5: Mortality from breast cancer in women aged 50–74, by remoteness area, 2011–2015

	Major cities	Inner regional	Outer regional	Remote	Very remote	Australia
Deaths	4,755	1,562	708	73	35	7,158
AS rate	46.0	47.3	46.2	39.3	41.5	46.3

Notes

1. Remoteness classification is based on the area of usual residence (Statistical Local Area Level 2) at time of death.
2. Deaths from 2011 to 2014 were derived by year of death; deaths in 2015 were derived by year of registration of death. Deaths registered in 2013 and earlier are based on the final version of cause of death data; deaths registered in 2014 and 2015 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
3. 'Age-standardised (AS) rate' is the number of deaths from breast cancer per 100,000 women, age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Table A8.6: Mortality from breast cancer in women aged 50–74, by socioeconomic group, 2011–2015

	1 (lowest)	2	3	4	5 (highest)	Australia
Deaths	1,532	1,551	1,430	1,269	1,351	7,158
AS rate	48.5	47.7	45.8	43.7	44.9	46.3

Notes

1. Socioeconomic group was allocated using the ABS Index of Relative Socio-economic Disadvantage. 'Australia' does not match the total because some women were not allocated to a socioeconomic group.
2. Deaths from 2011 to 2014 were derived by year of death; deaths in 2015 were derived by year of registration of death. Deaths registered in 2013 and earlier are based on the final version of cause of death data; deaths registered in 2014 and 2015 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
3. 'Age-standardised (AS) rate' is the number of deaths from breast cancers per 100,000 women, age-standardised to the Australian population at 30 June 2001.

Source: AIHW National Mortality Database.

Table A8.7: Mortality from breast cancer in women aged 50–74 (New South Wales, Queensland, Western Australia, South Australia and the Northern Territory), by Indigenous status, 2011–2015

	Indigenous[(a)]	Non-Indigenous[(a)]	Total[(a)]
Deaths	106	4,961	5,099
Crude rate	51.0	46.6	47.0
AS rate	54.8	45.9	46.4

(a) Data shown for 'Indigenous', '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 that this report was prepared. Total includes those whose Indigenous status was not stated.

Notes

1. Deaths from 2011 to 2014 were derived by year of death; deaths in 2015 were derived by year of registration of death. Deaths registered in 2013 and earlier are based on the final version of cause of death data; deaths registered in 2014 and 2015 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
2. 'Crude rate' is the number of deaths from breast cancer per 100,000 women; 'age-standardised (AS) rates' are the number of deaths from breast cancers per 100,000 women, age-standardised to the Australian population at 30 June 2001.

Source: AIHW National Mortality Database.

Appendix B: BreastScreen Australia information

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.

BreastScreen Australia provides free biennial breast cancer screening to women through dedicated screening and assessment services. Women have a screening mammogram performed at a screening unit (which may be fixed, relocatable or mobile). Women whose images are suspicious for breast cancer are 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.

Box B1: Objectives of BreastScreen Australia

The objectives of the BreastScreen Australia Program are to:

1. Reduce the mortality and morbidity attributable to breast cancer.
2. Maximise early detection of breast cancer in the target population.
3. Maximise the proportion of women in the target population who are screened every two years.
4. Provide high-quality services that are equitable, acceptable and appropriate to the needs of the population and equally accessible to all women in the target age group.
5. Provide screening and assessment services in accredited Screening and Assessment Services as part of the BreastScreen Australia program.
6. Provide high standards of program management, service delivery, monitoring, evaluation and accountability.

Source: BreastScreen Australia 2016.

Box B2: All BreastScreen services now use digital mammography

Digital mammography is a technique for recording breast X-ray images in computer code instead of on X-ray film, (as with conventional film mammography). Digital mammography is as accurate as film mammography in screening asymptomatic women for breast cancer.

Advantages of digital mammography include increased efficiencies, improved working environment for radiographers, less physical storage requirements, and reduced need for radiologists to be on site to read mammograms.

In 2009, it was announced that $120 million would be provided over 4 years to ensure BreastScreen Australia would be fully digital by June 2013.

All BreastScreen services now use digital mammography.

Box B3: National policy features of BreastScreen Australia

Services accredited under BreastScreen Australia are expected to operate according to the National Accreditation Standards (NAS) of BreastScreen Australia, along with the national policy features and protocols detailed in this box.

1: Access and participation

Appropriate levels of access and participation in the target and eligible populations:

a. Women are selected for screening on the basis of age alone. (That is, women 40 years of age and above are eligible to participate and recruitment strategies are targeted at women aged 50–74)

b. The screening interval is every two years.

c. Screening is provided at minimal or no cost to the women, and free of charge to eligible women who would not attend if there were a charge.

d. Patterns of participation are representative of the socioeconomic, ethnic and cultural profiles of the target population.

2: Cancer detection

Breast cancer detection is maximised in the target population and harm is minimised:

a. Screening employs mammography as the primary screening method.

b. All women are screened with two view mammography. Reasons for any variation from this policy are documented.

c. All mammograms are taken by a mammographic technologist or radiographer appropriately trained in screening mammography.

d. All mammographic images are read and reported independently, in a blind relationship, by two or more readers, at least one of whom shall be a radiologist.

e. All mammography results are combined into a single recommendation, which indicates whether or not further assessment for the presence of breast cancer is required.

3: Assessment

Assessment and diagnosis of breast cancer is appropriate, safe and effective:

a. A comprehensive approach is employed in the assessment of breast abnormalities.

b. A multidisciplinary team is involved in the assessment of women recalled from screening.

c. The pre-operative diagnosis of breast cancer is maximised, and recommendations for surgery for benign lesions are minimised.

d. The outcomes for all women recommended for surgery are collected, reviewed and utilised in continuing professional education for members of the multidisciplinary team.

e. Women’s general practitioners are kept informed of the results of screening and assessment, unless a woman directs otherwise.

(continued)

Box B3 (continued): National policy features of BreastScreen Australia

4: Timeliness

Screening and assessment services are provided to women in a timely and efficient manner:

a. Women have timely access to screening.

b. The time from screening to assessment is minimised.

c. The results of screening and assessment are provided promptly and directly to the woman concerned in ways which are sensitive to her possible anxiety.

5: Data management and information systems

Effective data and information management systems:

a. Data are collected, stored and managed using secure, quality, contemporary data management and communication systems that comply with relevant state and national standards, and that enable valid, reliable system and service performance analysis and evaluation.

b. Data are used for strategic purposes, quality improvement of services and for clinical and service management.

c. Data are collected in line with the requirements of the BreastScreen Australia Data Dictionary.

d. Data are to be submitted annually to the Australian Institute of Health and Welfare, for use in a national program monitoring report, and annual performance data reports for review by the National Quality Management Committee.

6: Client focus

Services are of high quality and client focused:

a. High quality information is provided to inform women, and women feel appropriately engaged and supported.

b. Screening services are provided in a manner which is acceptable to women in accessible, non-threatening and comfortable environments.

c. Women and health-care providers are given comprehensive and easily understood information about the Program, from screening up to and including diagnosis of breast cancer.

d. Counselling and information are an integral part of the Program.

e. Women are advised of the benefits and risks of mammography.

f. Women are provided with written information and actively involved in decisions about their management, particularly in relation to further assessment and treatment.

7: Governance and management

Effective structures and processes are in place to ensure high-quality governance and management:

a. Screening and assessment are carried out at BreastScreen Australia accredited services.

b. Key stakeholders and stakeholder groups participate in the monitoring and management of the Program.

Performance indicators

The performance of a population-based cancer screening program such as BreastScreen Australia needs to be assessed as it relates to the underlying aims of the program. At the national level, this is achieved by reporting 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 jurisdictional BreastScreen programs. These national performance indicators represent key measures of the progress BreastScreen Australia is making towards reducing morbidity and mortality from breast cancer; they are listed in Table B1.

Table B1: Performance indicators for BreastScreen Australia

Performance indicators	
1 Participation	The percentage of women aged 50–74 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 DCIS 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

Note: Further details and definitions of performance indicators are available in previous BreastScreen Australia monitoring reports and in the *BreastScreen Australia data dictionary: version 1.1* (AIHW 2015b).

Source: BreastScreen Australia data dictionary: version 1.1 (AIHW 2015b).

National Accreditation Standards (NAS) Measures

Provision of a high-quality service to women is of great importance to BreastScreen Australia. For this reason, services accredited under BreastScreen Australia are expected to operate according to the National Accreditation Standards (NAS) of BreastScreen Australia, along with national policy features and protocols. The accreditation system, of which the NAS are an integral part, intends to drive continuous quality improvement in the delivery of breast screening services to ensure women receive safe, effective and high-quality care.

The BreastScreen Australia NAS have been developed to ensure that all women receive breast screening services that are of a consistently high quality, regardless of where they attend for screening or assessment.

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 benchmarks are useful in helping to interpret the data presented, although in considering how these national data compare with the NAS, it should be noted that the NAS were not designed to be used as standards for the BreastScreen Australia performance indicators.

NAS Measures that relate to these data, along with data analysed by the AIHW, appear in tables 3.1, 3.4 and 3.7 in this report.

Contact details and online resources for BreastScreen Australia components are provided in Table B2.

Table B2: Contacts and links for the state, territory and Australian government components of BreastScreen Australia

BreastScreen New South Wales	
Tel: (02) 8374 5777 Fax: (02) 8374 5699 Email: information@cancerinstitute.org.au	<www.bsnsw.org.au>
BreastScreen Victoria	
Tel: (03) 9660 6888 Fax: (03) 9662 3881 Email: info@BreastScreen.org.au	<www.BreastScreen.org.au>
BreastScreen Queensland	
Tel: (07) 3328 9467 Fax: (07) 3328 9487 Email: cssb@health.gov.au	<www.health.qld.gov.au/breastscreen>
BreastScreen Western Australia	
Tel: (08) 9323 6700 Fax: (08) 9323 6799 Email: BreastScreenwa@health.wa.gov.au	<www.BreastScreen.health.wa.gov.au>
BreastScreen South Australia	
Tel: (08) 8274 7100 Fax: (08) 8373 4395 Email: HealthBSSAEnquiries@sa.gov.au	<www.breastscreensa.sa.gov.au>
BreastScreen Tasmania	
Tel: (03) 6216 4300 Fax: (03) 6216 4326 Email: canscreen@dhhs.tas.gov.au	<http://www.dhhs.tas.gov.au/service_information/services_files/breastscreen_tasmania>
BreastScreen ACT	
Tel: (02) 6205 4444 Fax: (02) 6205 1394 Email: BreastScreen@act.gov.au	<www.health.act.gov.au/our-services/women-youth-and-children/breastscreen>
BreastScreen NT	
Tel: (08) 8922 6449 Fax: (08) 8922 6440 Email: wcpp.ths@nt.gov.au	<https://nt.gov.au/wellbeing/cancer-services/breastscreennt>
Department of Health	
Email: cancerscreening@health.gov.au	<http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/breast-screening-1>
AIHW	
Email: screening@aihw.gov.au	<http://www.aihw.gov.au/cancer/screening/breast>

Appendix C: Data sources

Data used in this report are derived from multiple sources and are summarised in Table C1.

Table C1: Data sources for BreastScreen Australia monitoring report 2018

Data used to monitor BreastScreen Australia	Data source
Monitoring BreastScreen Australia using BreastScreen data	
Performance Indicator 1 Participation	State and territory BreastScreen registers; ABS population data
Performance Indicator 2 Rescreening	State and territory BreastScreen registers
Performance Indicator 3 Recall to assessment	State and territory BreastScreen registers
Performance Indicator 4 Invasive breast cancer detection	State and territory BreastScreen registers
Performance Indicator 5 DCIS detection	State and territory BreastScreen registers
Performance Indicator 6 Sensitivity	State and territory BreastScreen registers
Monitoring BreastScreen Australia using AIHW data	
Performance Indicator 7 Incidence	AIHW Australian Cancer Database; ABS population data
Performance Indicator 8 Mortality	AIHW National Mortality Database; ABS population data
Monitoring other aspects of BreastScreen Australia	
Expenditure on BreastScreen Australia	AIHW Health expenditure database

State and territory BreastScreen registers

Data for the performance indicators *Participation, Rescreening, Recall to assessment, Invasive breast cancer detection, DCIS detection*, and *Sensitivity* are sourced from the BreastScreen register in each state and territory, according to definitions and data specifications in the *BreastScreen Australia data dictionary version 1.1* (AIHW 2015b). These data are compiled into national figures by the AIHW to allow national monitoring of BreastScreen Australia.

The Data Quality Statement for BreastScreen Australia data can be found on the AIHW website at <http://meteor.aihw.gov.au/content/index.phtml/itemId/ 668821>.

AIHW Australian Cancer Database

All forms of cancer, except basal and squamous cell carcinomas of the skin, are notifiable diseases in each Australian state and territory. This means there is legislation in each jurisdiction that requires hospitals, pathology laboratories and various other institutions to report all cases of cancer to their central cancer registry. An agreed subset of the data collected by these cancer registries is supplied annually to the AIHW, where they are compiled into the Australian Cancer Database (ACD). The ACD currently contains data on all cases of cancer diagnosed from 1982 to 2013 for all states and territories, and for 2014 for all jurisdictions except New South Wales.

Cancer reporting and registration is a dynamic process, and records in the state and territory cancer registries may be modified if new information is received. As a result, the number of cancer cases reported by the AIHW for any particular year may change slightly over time and may not always align with state and territory reporting for that same year.

The Data Quality Statement for the ACD 2014 can be found at <http://meteor.aihw.gov.au/content/index.phtml/itemId/687104>.

AIHW National Mortality Database

The AIHW National Mortality Database (NMD) contains information provided by the registries of births, deaths and marriages and the National Coronial Information System, and coded by the ABS, for deaths from 1964 to 2015. Registration of deaths is the responsibility of each state and territory's registry of births, deaths and marriages. These data are then collated and coded by the ABS and are maintained at the AIHW in the NMD.

In the NMD, both the year in which death occurred and the year in which it was registered are provided. For the purposes of this report, actual mortality data are based on the year the death occurred, except for the most recent year (2015), for which the number of people whose death was registered is used. Previous investigation has shown that the year of death and its registration coincide for the most part. However, in some instances, deaths at the end of each calendar year may not be registered until the following year. Thus, year-of-death information for the latest available year is generally an underestimate of the actual number of deaths that occurred in that year.

In this report, deaths registered in 2013 and earlier are based on the final version of cause of death data; deaths registered in 2014 and 2015 are based on revised and preliminary versions, respectively and are subject to further revision by the ABS.

The data quality statements underpinning the AIHW NMD can be found on the following ABS internet pages:

- ABS quality declaration summary for Deaths, Australia (ABS cat. no. 3302.0) <http://www.abs.gov.au/ausstats/abs%40.nsf/mf/3302.0>
- ABS quality declaration summary for Causes of death, Australia (ABS cat. no. 3303.0) <http://www.abs.gov.au/ausstats/abs%40.nsf/mf/3303.0>.

For more information on the AIHW NMD, see Deaths data, at <https://www.aihw.gov.au/about-our-data/our-data-collections/national-mortality-database/deaths-data>.

Aboriginal and Torres Strait Islander deaths

The ABS Death Registrations collection identifies a death as Aboriginal and Torres Strait Islander where the deceased is recorded as Aboriginal, Torres Strait Islander, or both, on the Death Registration Form (DRF). The Indigenous status is also derived from the Medical Certificate of Cause of Death (MCCD) for South Australia, Western Australia, Tasmania, the Northern Territory and the Australian Capital Territory from 2007. For New South Wales and Victoria, the Indigenous status of the deceased is derived from the DRF only. If the Indigenous status reported in the DRF does not agree with that in the MCCD, an identification from either source that the deceased was an Aboriginal and/or Torres Strait Islander person is given preference over identifying them as non-Indigenous.

ABS population data

Throughout this report, population data were used to derive rates of participation in breast cancer screening, breast cancer incidence and breast cancer mortality. The population data were sourced from the ABS using the most up-to-date estimates available at the time of analysis.

To derive their estimates of the resident populations, the ABS uses the 5-yearly Census of Population and Housing data, adjusted as follows:

- All respondents in the Census are placed in their state or territory, Statistical Area and postcode of usual residence; overseas visitors are excluded.
- An adjustment is made for persons missed in the Census.
- Australians temporarily overseas on Census night are added to the usual residence Census count.

Estimated resident populations are then updated each year from the Census data, using indicators of population change, such as births, deaths and net migration. More information is available from the ABS website at <www.abs.gov.au>.

For the Indigenous comparisons in this report, the most recently released Indigenous experimental estimated resident populations, as released by the ABS, were used. Those estimates were based on the 2011 Census of Population and Housing.

ABS population data for participation calculations

Participation rates were calculated using the average of the estimated resident female population for the 2-year reporting period.

Note that there is the potential for variation in published participation rates between the AIHW and state and territory reports, because of different sources of estimated resident population data.

ABS population data for incidence and mortality calculations

Incidence and mortality rates were calculated using the estimated resident population for single-year calculations, and the aggregate of the estimated resident populations for the 5 relevant years for 5-year calculations (or 4 years in the case of incidence for different socioeconomic groups).

Australian Burden of Disease Study 2011

The ABDS 2011 provides Australian-specific burden of disease estimates for the Australian population and the Aboriginal and Torres Strait Islander population for 2011 and 2003. The study uses and adapts the methods of global studies to produce estimates that are more relevant to the Australian health policy context.

The 2011 reference year was chosen, as this was the latest year of data available for most of the key mortality and morbidity data sources used in the study at its start.

Results from the ABDS 2011 provide an important resource for health policy formulation, service planning and population health monitoring, including the gap between Indigenous and non-Indigenous health. The results provide a foundation for further assessments, such as in relation to health interventions that aim to prevent or treat diabetes and its complications, and disease expenditure.

Appendix D: Classifications

Age

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

Remoteness area

The remoteness areas (RAs) divide Australia into broad geographical regions that share common characteristics of remoteness for statistical purposes, and are based on the Accessibility and Remoteness Index of Australia produced by the Australian Population and Migration Research Centre at the University of Adelaide. The remoteness structure divides each state and territory into several regions on the basis of their relative access to services. There are 6 classes of RA in the remoteness structure: *Major cities*, *Inner regional*, *Outer regional*, *Remote*, *Very remote* and *Migratory*. The category *Major cities* includes Australia’s capital cities, except for Hobart and Darwin, which are classified as *Inner regional*.

For participation calculations, women were allocated to an RA using their residential postcode, as supplied at the time of screening. Caution is required when examining differences across RAs for the following reasons: firstly, postcodes used to allocate women may not represent their location of usual residence; secondly, because these are based on the 2011 Census, the accuracy of RA classifications diminishes, due to subsequent changes in demographics; and thirdly, some postcodes (and hence some individual women) are unable to be allocated to an RA.

Socioeconomic group

The Index of Relative Socio-economic Disadvantage (IRSD) is one of four Socio-Economic Indexes for Areas (SEIFAs) developed by the ABS. This index is based on factors such as average household income, education levels and unemployment rates. The IRSD is not a person-based measure; rather, it is an area-based measure of socioeconomic disadvantage in which small areas of Australia are classified on a continuum from disadvantaged to affluent. This information is used as a proxy for the socioeconomic disadvantage of people living in those areas and may not be correct for each person in that area.

In this report, the first socioeconomic group (quintile 1) corresponds to geographical areas containing the 20% of the population with the greatest socioeconomic disadvantage according to the IRSD (that is, the lowest socioeconomic group), and the fifth group (quintile 5) corresponds to the 20% of the population with the least socioeconomic disadvantage (that is, the highest socioeconomic group).

For participation, women were allocated to a socioeconomic group using their residential postcode supplied at the time of screening. Caution is required when examining differences across socioeconomic groups for the following reasons: firstly, postcodes used to allocate women may not represent their location of usual residence; secondly, because these are based on the 2011 Census, the accuracy of socioeconomic group classifications diminishes due to subsequent changes in demographics; thirdly, many postcodes (and hence women) are unable to be allocated to a socioeconomic group.

Classification of invasive breast cancer and ductal carcinoma in situ

Histology

Invasive breast cancer

Histology codes to classify invasive breast cancer into the groups that appear in Table 4.1 in this report were developed with the assistance of the state and territory cancer registries. Groupings for invasive breast cancers are listed in Table D1.

Table D1: Breast cancer by histology group

Breast cancer group	Type of breast cancer (ICD-O-3 codes)
Invasive ductal carcinoma	Pleomorphic carcinoma (8022)
	Carcinoma with osteoclast-like giant cells (8035)
	Basaloid carcinoma (8123)
	Scirrhous adenocarcinoma (8141)
	Carcinoma simplex (8231)
	Infiltrating duct carcinoma, NOS (8500)
	Duct carcinoma, desmoplastic type (8514)
	Infiltrating ductular carcinoma (8521)
	Infiltrating duct and lobular carcinoma (8522)
	Infiltrating duct mixed with other types of carcinoma (8523)
	Paget disease and infiltrating duct carcinoma of breast (8541)
	Paget disease and intraductal carcinoma of breast (8543)
Invasive lobular carcinoma	Pleomorphic lobular carcinoma, NOS (8519)
	Lobular carcinoma, NOS (8520)
	Infiltrating lobular mixed with other types of carcinoma (8524)
Medullary carcinoma and atypical medullary carcinoma	Medullary carcinoma, NOS (8510)
	Atypical medullary carcinoma (8513)
	Medullary carcinoma with lymphoid stroma (8512)
Tubular carcinoma and invasive cribriform carcinoma	Tubular adenocarcinoma (8211)
	Cribriform carcinoma, NOS (8201)
Mucinous carcinoma	Mucinous adenocarcinoma (8480)
	Mucin-producing adenocarcinoma (8481)
	Signet ring cell carcinoma (8490)

(continued)

Table D1 (continued): Breast cancer by histology group

Breast cancer group	Type of breast cancer (ICD-O-3 codes)
Invasive papillary carcinoma	Intraductal papillary adenocarcinoma with invasion (8503)
	Papillary adenocarcinoma, NOS (8260)
	Intracystic (papillary) adenocarcinoma (8504)
	Papillary carcinoma, NOS (8050)
	Solid papillary carcinoma (8509)
	Invasive micropapillary carcinoma (8507)
Inflammatory carcinoma	Inflammatory carcinoma (8530)
Mesenchymal	Sarcoma, NOS (8800)
	Spindle cell sarcoma (8801)
	Giant cell sarcoma (8802)
	Epithelioid sarcoma (8804)
	Undifferentiated sarcoma (8805)
	Fibrosarcoma (8810)
	Fibromyxosarcoma (8811)
	Low grade myofibroblastic sarcoma (8825)
	Malignant fibrous histiocytoma (8830)
	Liposarcoma, NOS (8850)
	Well differentiated liposarcoma, NOS (excluding superficial soft tissue) (8851)
	Myxoid liposarcoma (8852)
	Pleomorphic liposarcoma (8854)
	Leiomyosarcoma (8890)
	Angiomyosarcoma (8894)
	Myosarcoma (8895)
	Rhabdomyosarcoma (8900)
	Alveolar rhabdomyosarcoma (8920)
	Stromal sarcoma, NOS (8935)
	Haemangiosarcoma (9120)
	Haemangioendothelioma, malignant (9130)
	Haemangiopericytoma, malignant (9150)
	Lymphangiosarcoma (9170)
	Osteosarcoma, NOS (9180)
	Chondrosarcoma, NOS (9220)
Other—specified	Metaplastic carcinoma, NOS (8575)
	Adenocarcinoma with squamous differentiation (8570)
	Adenocarcinoma with spindle cell metaplasia (8572)
	Squamous cell carcinoma, NOS (8070)

(continued)

Table D1 (continued): Breast cancer by histology group

Breast cancer group	Type of breast cancer (ICD-O-3 codes)
Other—specified (continued)	Squamous cell carcinoma, keratinising, NOS (8071)
	Squamous cell carcinoma, large cell nonkeratinising, NOS (8072)
	Squamous cell carcinoma, spindle cell (8074)
	Spindle cell carcinoma, NOS (8032)
	Carcinosarcoma, NOS (8980)
	Adenocarcinoma with cartilaginous and osseous metaplasia (8571)
	Pseudosarcomatous carcinoma (8033)
	Malignant myoepithelioma (8982)
	Adenocarcinoma, NOS (8140)
	Phyllodes tumour, malignant (9020)
	Paget disease, mammary (8540)
	Adenocarcinoma with apocrine metaplasia (8573)
	Apocrine adenocarcinoma (8401)
	Neuroendocrine carcinoma, NOS (8246)
	Small cell carcinoma, NOS (8041)
	Carcinoma with neuroendocrine differentiation (8574)
	Large cell neuroendocrine carcinoma (8013)
	Carcinoid, NOS (8240)
	Atypical carcinoid tumour (8249)
	Adenocarcinoma with mixed subtypes (8255)
	Mixed cell adenocarcinoma (8323)
	Secretory carcinoma of breast (8502)
	Acinar cell carcinoma (8550)
	Mucoepidermoid carcinoma (8430)
	Lipid-rich carcinoma (8314)
	Glycogen-rich carcinoma (8315)
	Clear cell adenocarcinoma, NOS (8310)
	Sebaceous carcinoma (8410)
	Mixed tumour, malignant (8940)
	Lymphoepithelial carcinoma (8082)
	Basal cell adenocarcinoma (8147)
	Trabecular carcinoma (8190)
	Solid carcinoma, NOS (8230)
	Adenomyoepithelioma, malignant (8983)
	Adenoid cystic carcinoma (8200)
	Epithelial-myoepithelial carcinoma (8562)
	Peripheral neuroectodermal tumour, NOS (9364)
	Granular cell tumour, malignant (9580)
	Adenosquamous carcinoma (8560)

(continued)

Table D1 (continued): Breast cancer by histology group

Breast cancer group	Type of breast cancer (ICD-O-3 codes)
	Comedocarcinoma, NOS (8501)
Unspecified	Neoplasm, malignant (8000)
	Tumour cells, malignant (8001)
	Malignant tumour, spindle cell type (8004)
	Carcinoma, NOS (8010)
	Large cell carcinoma, NOS (8012)
	Carcinoma, undifferentiated (8020)
	Carcinoma, anaplastic (8021)
	Giant cell and spindle cell carcinoma (8030)
	Giant cell carcinoma (8031)

Non-invasive breast tumours

Histology codes to classify non-invasive breast tumours were also developed with the assistance of the state and territory cancer registries. Groupings for non-invasive breast tumours are listed in Table D2. Only the histology codes for DCIS are relevant to this report, because other non-invasive breast tumours have not been reported here.

In interpreting incidence of non-invasive breast tumours, it should be noted that non-invasive tumours that are diagnosed within 4 months of an invasive breast cancer are excluded. This is referred to as the ‘4-month rule’ and is based on the consensus view that, in such a situation, the invasive breast cancer was almost certainly present at the time of the DCIS diagnosis, but was not detected.

The effect of applying this rule was the removal of any non-invasive records in which an invasive breast cancer was diagnosed in less than or equal to 121 days of a non-invasive tumour.

Table D2: Non-invasive breast tumours by histology group

Breast cancer group	Type of breast cancer (ICD-O-3 codes)
Ductal carcinoma in situ (DCIS)	Papillary carcinoma in situ, NOS (8050)
	Cribriform carcinoma in situ (8201)
	Ductal carcinoma in situ, solid type (8230)
	Papillary adenocarcinoma, NOS, in situ (8260)
	Apocrine adenocarcinoma in situ (8401)
	Intraductal carcinoma, non-infiltrating, NOS (8500)
	Comedocarcinoma, non-infiltrating (8501)
	Secretory carcinoma of breast in situ (8502)
	Non-infiltrating intraductal papillary adenocarcinoma (8503)
	Non-infiltrating intracystic carcinoma (8504)
	Intraductal micropapillary carcinoma (8507)
	Cystic hypersecretory carcinoma in situ (8508)

(continued)

Table D2 (continued): Non-invasive breast tumours by histology group

Breast cancer group	Type of breast cancer (ICD-O-3 codes)
	Solid papillary carcinoma in situ (8509)
	Non infiltrating ductular carcinoma (8521)
	Intraductal carcinoma and lobular carcinoma in situ (8522)
	Ductal carcinoma in situ mixed with other types of carcinoma in situ (8523)
	Paget disease, in situ, and intraductal carcinoma of breast (8543)
Lobular carcinoma in situ (LCIS)	Pleomorphic lobular carcinoma in situ (8519)
	Lobular carcinoma in situ, NOS (8520)
Other specified carcinoma in situ	Squamous cell carcinoma in situ, NOS (8070)
	Adenocarcinoma in situ (8140)
	Mucinous adenocarcinoma in situ, NOS (8480)
	Paget disease, in situ, mammary (8540)
	Adenocarcinoma in situ with squamous metaplasia (8570)
Unspecified	Carcinoma in situ, NOS (8010)

Appendix E: 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 and sex 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 similarly 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 provide information on the incidence of a particular event in an age group, relative to the total number of people at risk of that event in the same age group. It is calculated by dividing the number of events occurring in each specified age group by the corresponding 'at-risk' population in the same age group, and then multiplying the result by a constant (for example, 100,000) to derive the rate. Age-specific rates are often expressed per 100,000 population.

Age-standardised rates

A crude rate provides information on the number of, for example, new cases of cancer or deaths from cancer in the population at risk in a specified period. No age adjustments are made when calculating a crude rate. Since the risk of cancer is heavily dependent on age, crude rates are not suitable for looking at trends or making comparisons across groups in cancer incidence and mortality.

More meaningful comparisons can be made by using age-standardised rates, with such rates adjusted for age in order to facilitate comparisons between populations that have different age structures—for example, between Indigenous people and other Australians. This standardisation process effectively removes the influence of age structure on the summary rate.

Two methods are commonly used to adjust for age: direct and indirect standardisation. In this report, the direct standardisation approach presented by Jensen and others (1991) is used. To age-standardise using the direct method, the first step is to obtain population numbers and numbers of cases (or deaths) in age ranges—typically 5-year age ranges. The next step is to multiply the age-specific population numbers for the standard population (in this case, the Australian population as at 30 June 2001) by the age-specific incidence rates (or death rates) for the population of interest (such as those in a certain socioeconomic group or those who lived in *Major cities*). The next step is to sum across the age groups and divide this sum by the total of the standard population to give an age-standardised rate for the population of interest. Finally, this is expressed per 1,000 or 100,000, as appropriate.

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 of 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 around 19 chances in 20 that the difference will be less than 2 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 and others (1991). This method calculates approximate confidence intervals for a weighted sum of Poisson parameters.

Interpretation of confidence intervals

Some indicators have a 95% confidence interval 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 the 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% chance 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.

It is important to note that the overlapping of confidence intervals does not imply that the difference between 2 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 2 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.

Glossary

Aboriginal or Torres Strait Islander: A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander. See also **Indigenous**.

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

age-standardised rate: A method of removing the influence of age when comparing populations with different age structures. This is usually necessary because the rates of many diseases vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same 'standard' structure, which allows comparison of disease rates.

assessment: Further investigation of a mammographic abnormality or symptom reported at screening.

Australian Statistical Geography Standard (ASGS): Common framework defined by the Australian Bureau of Statistics for collection and dissemination of geographically classified statistics. The ASGS replaced the Australian Standard Geographical Classification (ASGC) in July 2011.

benign: Not **malignant**.

biopsy: Small sample of tissue that is taken to obtain a definitive diagnosis of an abnormality.

BRCA1 or BRCA2 mutation: BRCA1 and BRCA2 are human genes that produce tumour suppressor proteins. These proteins help repair damaged DNA and, therefore, play a role in ensuring the stability of the cell's genetic material. When either of these genes is mutated, or altered, such that its protein product either is not made or does not function correctly, DNA damage may not be repaired properly. As a result, cells are more likely to develop additional genetic alterations that can lead to cancer.

cancer death: A death where the **underlying cause of death** is indicated as cancer. People with cancer who die of other causes are not counted in the **mortality** statistics in this publication.

cancer (malignant neoplasm): A large range of diseases in which some of the body's cells become defective, and begin to multiply out of control. These cells can invade and damage the area around them, and can also spread to other parts of the body to cause further damage.

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.

DALY (disability-adjusted life years): Measure (in years) of healthy life lost, either through premature death defined as dying before the expected life span at the age of death (YLL) or, equivalently, through living with ill health due to illness or injury (YLD).

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

false negative: A test that has incorrectly observed that the disease is not present.

false positive: A test that has incorrectly observed that the disease is present.

first screening round: See **screening round**.

in situ: A Latin term meaning in place or position; undisturbed.

incidence: The number of new cases (for example, of an illness or event) occurring during a given period, usually 1 year.

index screening year: The year for which an **interval cancer** rate and program sensitivity rate are determined.

index screens: All screening examinations performed within the index screening year.

Indigenous: A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander. See also **Aboriginal or Torres Strait Islander**.

interval cancer (invasive): (as defined for national reporting purposes by Kavanagh and others (1999), with minor changes endorsed by the then-named 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 bloodstained nipple discharge in the breast in which the breast cancer is 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 spread locally and have the potential to spread to nearby healthy or normal tissue or to more distant parts of the body.

malignant: Abnormalities in cells or tissues consistent with **cancer**.

mammogram: A radiographic depiction of the breast.

menarche: The first menstrual period.

menopause: Permanent cessation of menstruation.

morbidity: Illness.

mortality: The number of deaths occurring during a given period.

new case (of cancer): A person who has a new cancer diagnosed for the first time. One person may 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 and others (1991).

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.

screening episode: 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. For example, if she attends for a fourth screening round, she has been screened 3 times before.

significant difference: Where rates are referred to as significantly different, or one rate is deemed significantly higher or lower than another, these differences are statistically significant. Rates are deemed statistically significantly different when their **confidence intervals** do not overlap, since their difference is greater than what could be explained by chance. See 'confidence intervals' in Appendix E 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 bloodstained or watery nipple discharge.

target population: Women in the population who are actively targeted by BreastScreen Australia; this is done on the basis of age, and was women aged 50–69 until July 2013, after which time this changed to women aged 50–74.

tumour: An abnormal growth of tissue. Can be **benign** (not a cancer) or **malignant** (cancer).

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.

underlying cause of death: The condition, disease or injury initiating the sequence of events leading directly to death; that is, the primary, chief or principal cause.

women-years: The denominator for the interval cancer rate, it is the 'number of years at risk' of being diagnosed with an interval cancer, and takes into account women who screen annually rather than every 2 years (who would be at risk for the first year after their screen but not the second).

YLD (years lived with disability): A measure of the years of what could have been a healthy life but were instead spent in states of less than full health. YLD represent non-fatal burden.

YLL (years of life lost): Years of life lost due to premature death, defined as dying before the global ideal life span at the age of death. YLL represent fatal burden.

Note: Terms in **bold** within definitions are defined elsewhere in the glossary.

References

ABS (Australian Bureau of Statistics) 2012. Census of Population and Housing: characteristics of Aboriginal and Torres Strait Islander Australians, 2011. ABS cat. no. 2076.0. Canberra: ABS. Viewed 6 September 2018, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/2076.0main+features1102011>.

AIHW (Australian Institute of Health and Welfare) 2010. Risk of invasive breast cancer in women diagnosed with ductal carcinoma in situ in Australia between 1995 and 2005. Cancer series no. 51. Cat. no. CAN 47. Canberra: AIHW.

AIHW 2013. Health system expenditure on cancer and other neoplasms in Australia 2008–09. Cancer series no. 81. Cat. no. CAN 78. Canberra: AIHW.

AIHW 2015a. Breast cancer in young women: key facts about breast cancer in women in their 20s and 30s. Cancer series no. 96. Cat. no. CAN 94. Canberra: AIHW.

AIHW 2015b. BreastScreen Australia data dictionary: version 1.1. Cancer series no. 92. Cat. no. CAN 90. Canberra: AIHW.

AIHW 2016. Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011. Australian Burden of Disease Study series no. 3. Cat. no. BOD 4. Canberra: AIHW.

AIHW 2017a. Australian Cancer Incidence and Mortality (ACIM) books: breast cancer. Canberra: AIHW. Viewed 6 September 2018, <http://www.aihw.gov.au/acim-books>.

AIHW 2017b. Burden of cancer in Australia: Australian Burden of Disease Study 2011. Australian Burden of Disease Study series no. 12. Cat. no. BOD 13. Canberra: AIHW.

AIHW 2017c. Cancer in Australia 2017. Cancer series no. 101. Cat. no. CAN 100. Canberra: AIHW.

AIHW & NBCC (National Breast Cancer Centre) 2007. Breast cancer survival by size and nodal status in Australia. Cancer series no. 39. Cat. no. CAN 34. Canberra: AIHW.

Breast Cancer Network Australia 2013. Family history fact sheet. Melbourne: Breast Cancer Network Australia. Viewed 6 September 2018, <https://www.bcna.org.au/media/2135/bcna_fact_sheet_family_history_1.pdf>.

BreastScreen Australia 2004. BreastScreen Australia National Accreditation Standards, developed by the National Quality Management Committee of BreastScreen Australia, endorsed by the Australian Screening Advisory Committee, November 2004. Canberra: Department of Health and Ageing.

BreastScreen Australia EAC (Evaluation Advisory Committee) 2009. BreastScreen Australia evaluation: evaluation final report. Canberra: Department of Health and Ageing. Viewed 6 September 2018, <https://healthprioritiesinaus.weebly.com/uploads/1/0/0/8/10084267/breastscreen_aust_report.pdf>.

BreastScreen WA 2008. BreastScreen WA: statistical report 2000–2005. Perth: BreastScreen WA.

Brenner H & Gefeller O 1996. An alternative approach to monitoring cancer patient survival. Cancer 78(9):2004–10.

Cancer Australia 2009. Early detection of breast cancer. Sydney: Cancer Australia. Viewed 6 September 2018, <https://canceraustralia.gov.au/publications-and-resources/position-statements/early-detection-breast-cancer>.

Cancer Australia 2014. Overdiagnosis from mammographic screening. Sydney: Cancer Australia. Viewed 6 September 2018, <https://canceraustralia.gov.au/publications-and-resources/position-statements/overdiagnosis-mammographic-screening>.

Cancer Australia 2015. Advice about familial aspects of breast cancer and epithelial ovarian cancer: a guide for health professionals. Sydney: Cancer Australia. Viewed 6 September 2018, <https://canceraustralia.gov.au/publications-and-resources/cancer-australia-publications/advice-about-familial-aspects-breast-cancer-and-epithelial-ovarian-cancer>.

Cancer Research UK 2014. Breast cancer risk factors. London: Cancer Research UK. Viewed 6 September 2018, <http://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/risk-factors>.

De P, Neutel CI, Olivotto I & Morrison H 2010. Breast cancer incidence and hormone replacement therapy in Canada. Journal of the National Cancer Institute 102(19):1489–95.

Dobson AJ, Kuulasmaa K, Eberle E & Scherer J 1991. Confidence intervals for weighted sums of Poisson parameters. Statistics in Medicine 10(3):457–62.

Duffy SW, Tabar L, Olsen AH, Vitak B, Allgood PC, Chen TH et al. 2010. Absolute numbers of lives saved and overdiagnosis in breast cancer screening, from a randomized trial and from the Breast Screening Programme in England. Journal of Medical Screening 17(1):25–30.

Eusebi V, Feudale E, Foschini MP, Micheli A, Conti A, Riva C et al. 1994. Long-term follow-up of in situ carcinoma of the breast. Seminars in Diagnostic Pathology 11(3):223–35.

IARC (International Agency for Research on Cancer) 2002. IARC handbooks of cancer prevention. Volume 7: breast cancer screening. Lyon, France: IARC Press.

Irwig L, Glasziou P, Barratt A & Salkeld G 1997. Review of the evidence about the value of mammographic screening in 40–49 year old women. Sydney: NHMRC (National Health and Medical Research Council) and NBCC (National Breast Cancer Centre).

Jensen OM, Parkin DM, MacLennan R, Muir CS & Skeet RG (eds) 1991. Cancer registration: principles and methods. IARC scientific publication no. 95. Lyon: International Agency for Research on Cancer.

Kavanagh AM, Amos AF & Marr GM 1999. The ascertainment and reporting of interval cancers within the BreastScreen Australia Program. Sydney: NHMRC (National Health and Medical Research Council) and NBCC (National Breast Cancer Centre).

Kuchenbaecker KB, Hopper JL, Barnes DR, Phillips KA, Mooij TM, Roos-Blom MJ et al. 2017. Risks of breast, ovarian, and contralateral breast cancer for BRCA1 and BRCA2 mutation carriers. Journal of the American Medical Association 317(23):2402–16.

Lauby-Secretan B, Scoccianti C, Loomis D, Benbrahim-Tallaa L, Bouvard V, Bianchini F et al. 2015. Breast-Cancer Screening—viewpoint of the IARC Working Group. New England Journal of Medicine 372(24):2353–58.

McPherson K, Steel CM & Dixon JM 2000. Breast cancer—epidemiology, risk factors, and genetics. British Medical Journal 321(7261):624–28.

NBOCC (National Breast and Ovarian Cancer Centre) 2009. National Breast and Ovarian Cancer Centre and Royal Australasian College of Surgeons National Breast Cancer audit. Public Health Monitoring Series 2007 data. Sydney: NBOCC.

Sim MJH, Siva SP, Ramli IS, Fritschi L, Tresham J & Wylie EJ 2012. Effect of false-positive screening mammograms on rescreening in Western Australia. Medical Journal of Australia 196(11):693–95.

UICC (Union for International Cancer Control) 2014. IARC release the latest world cancer statistics. Geneva: UICC. Viewed 6 September 2018, <http://www.uicc.org/iarc-release-latest-world-cancer-statistics>.

WCRF/AICR (World Cancer Research Fund & American Institute for Cancer Research) 2007. Food, nutrition, physical activity, and the prevention of cancer: a global perspective. Washington DC: AICR.

List of tables

Table 3.1: NAS Measures for participation and rescreening calculated using BreastScreen Australia data supplied for the *BreastScreen Australia monitoring report 2018* 13

Table 3.2: Interval cancer rate and program sensitivity, by time since screen, women aged 50–69 screened in 2011–2013 15

Table 3.3: Interval cancer rate and program sensitivity, by age, women screened in 2011–2013 16

Table 3.4: NAS Measures for interval cancers calculated using BreastScreen Australia data supplied for the *BreastScreen Australia monitoring report 2018* 17

Table 3.5: Number of women aged 50–74 who had invasive breast cancer or DCIS detected, first and subsequent screening rounds, 2016 18

Table 3.6: Invasive breast cancer and DCIS detection in women aged 50–74, first and subsequent screening rounds, 2016 19

Table 3.7: NAS Measures for the detection of invasive breast cancers and DCIS and recall to assessment using data supplied for the *BreastScreen Australia monitoring report 2018* 24

Table 4.1: Incidence of breast cancer in women aged 50–74, by type, 2013 28

Table 4.2: Prevalence of breast cancer in women, by age group, Australia, end of 2013 33

Table 4.3: Leading causes of cancer burden (DALY), leading causes of fatal cancer burden (YLL), and leading causes of non-fatal cancer burden (YLD), females, 2011 39

Table 6.1: Government funding for cancer screening programs, 2015–16, $ million 45

Table A1.1: Participation of women aged 50–69 in BreastScreen Australia, 1996–1997 to 2015–2016 46

Table A1.2: BreastScreen Australia participation by age, 2015–2016 47

Table A1.3: BreastScreen Australia participation by state and territory, women aged 50–69 and women aged 50–74, 2015–2016 47

Table A1.4: BreastScreen Australia participation by remoteness area, women aged 50–69 and women aged 50–74, 2015–2016 47

Table A1.5: BreastScreen Australia participation by socioeconomic group, women aged 50–69 and women aged 50–74, 2015–2016 48

Table A1.6: BreastScreen Australia participation by main language spoken at home, women aged 50–69 and women aged 50–74, 2015–2016 48

Table A1.7: BreastScreen Australia participation by Indigenous status, women aged 50–69 and women aged 50–74, 2015–2016 49

Table A1.8: Number and age-standardised rate of women aged 50–69 participating in BreastScreen Australia, by Indigenous status, 1996–1997 to 2015–2016 50

Table A2.1: Rescreening by screening round, women aged 50–67, 2004 to 2014 51

Table A2.2: Rescreening by age and screening round, women screened during 2014 51

Table A2.3: Rescreening by state and territory and screening round, women aged 50–67 and women aged 50–72 screened during 2014 52

Table A3.1: Recall to assessment, women aged 50–69, first and subsequent screening rounds, 2006 to 2016 53
Table A3.2: Recall to assessment by age, first and subsequent screening rounds, 2016 53
Table A3.3: Recall to assessment by state and territory, women aged 50–69 and women aged 50–74, first and subsequent screening rounds, 2016 54
Table A4.1: All-size invasive breast cancer detection in women aged 50–69, first and subsequent screening rounds, 2006 to 2016 55
Table A4.2: Small (≤15 mm) invasive breast cancer detection in women aged 50–69, all screening rounds, 2006 to 2016 55
Table A4.3: All-size and small (≤15 mm) invasive breast cancer detection by age, all screening rounds, 2016 55
Table A4.4: Proportion of small (≤15 mm) invasive breast cancers detected in women aged 50–69, all screening rounds, 2006 to 2016 56
Table A4.5: All-size and small (≤15 mm) invasive breast cancer detection by state and territory, women aged 50–69 and women aged 50–74, first and subsequent screening rounds, 2016 56
Table A5.1: DCIS detection by year, women aged 50–69, first and subsequent screening rounds, 2006 to 2016 57
Table A5.2: DCIS detection by age, all screening rounds, 2016 57
Table A5.3: DCIS detection by state and territory, women aged 50–69 and women aged 50–74, all screening rounds, 2016 57
Table A6.1: Interval cancer rate for women aged 50–69, screened in index years 2011, 2012 and 2013, by state and territory, first and subsequent screening rounds, 0–12 months follow-up 58
Table A6.2: Interval cancer rate for women aged 50–69, screened in index years 2011, 2012 and 2013, by state and territory, first and subsequent screening rounds, 13–24 months follow-up 58
Table A6.3: Interval cancers for women screened in index years 2011, 2012 and 2013, by age, all screening rounds, 0–12 months and 13–24 months follow-up 59
Table A6.4: Interval cancer rate for women aged 50–69, screened in index years 2011, 2012 and 2013, by state and territory, first and subsequent screening rounds, 0–24 months follow-up 59
Table A6.5: Program sensitivity for women aged 50–69, screened in index years 2011, 2012 and 2013, by state and territory, first and subsequent screening rounds, 0–12 months follow-up 60
Table A6.6: Program sensitivity for women aged 50–69, screened in index years 2011, 2012 and 2013, by state and territory, first and subsequent screening rounds, 0–24 months follow-up 60
Table A6.7: Program sensitivity for women screened in index years 2011, 2012 and 2013, all screening rounds, by age, 0–12 months and 0–24 months follow-up 60
Table A7.1: Incidence of invasive breast cancer, 1982 to 2014 (with estimates to 2018) 61
Table A7.2: Incidence of invasive breast cancer, by age, 2014 62
Table A7.3: Incidence of invasive breast cancer, by age, 1982–1991, 1992–2001 and 2002–2011 62
Table A7.4: Incidence of invasive breast cancer, by age and histology group, 2013 62

Table A7.5: Incidence of invasive breast cancer in women aged 50–74, by state and territory, 2009–2013 62

Table A7.6: Incidence of invasive breast cancer in women aged 50–74, by remoteness, 2009–2013 63

Table A7.7: Incidence of invasive breast cancer in women aged 50–74, by socioeconomic group, 2009–2013 63

Table A7.8: Incidence of invasive breast cancer in women aged 50–74 (New South Wales, Victoria, Queensland, Western Australia and the Northern Territory), by Indigenous status, 2009–2013 63

Table A7.9: Incidence of DCIS, 1996 to 2013 64

Table A7.10: Incidence of DCIS, by age, 2013 64

Table A7.11: Five-year relative survival from breast cancer, by age, 2010–2014 65

Table A7.12: Trend in 5-year relative survival from breast cancer in women aged 50–74, 1985–1989 to 2010–2014 65

Table A7.13: Relative survival at diagnosis and 5-year conditional survival from breast cancer in women aged 50–74, 2010–2014 66

Table A8.1: Mortality from breast cancer, 1982 to 2015 (with estimates to 2018) 67

Table A8.2: Mortality from breast cancer, by age, 2015 68

Table A8.3: Mortality from breast cancer, by age, 1982–1991, 1992–2001 and 2002–2011 68

Table A8.4: Mortality from breast cancer in women aged 50–74, by state and territory, 2011–2015 68

Table A8.5: Mortality from breast cancer in women aged 50–74, by remoteness area, 2011–2015 68

Table A8.6: Mortality from breast cancer in women aged 50–74, by socioeconomic group, 2011–2015 69

Table A8.7: Mortality from breast cancer in women aged 50–74 (New South Wales, Queensland, Western Australia, South Australia and the Northern Territory), by Indigenous status, 2011–2015 69

Table B1: Performance indicators for BreastScreen Australia 73

Table B2: Contacts and links for the state, territory and Australian government components of BreastScreen Australia 74

Table C1: Data sources for BreastScreen Australia monitoring report 2018 75

Table D1: Breast cancer by histology group 79

Table D2: Non-invasive breast tumours by histology group 82

List of figures

Figure 1.1: Anatomy: The breast and adjacent lymph nodes 1

Figure 2.1: Transition of the target age range of BreastScreen Australia, from women aged 50–69 to women aged 50–74, between the financial years 2013–14 and 2016–17 5

Figure 3.1: Participation of women aged 50–69 in BreastScreen Australia, 1996–1997 to 2015–2016 7

Figure 3.2: Rescreening by screening round, women aged 50–72 screened during 2014 8

Figure 3.3: Participation trends for women aged 50–74, 2011–2012, 2013–2014 and 2015–2016 9

Figure 3.4: Participation in BreastScreen Australia by age, 2015–2016 10

Figure 3.5: Rescreening by screening round, women aged 40–49, 50–72 and 75+ screened in 2014 10

Figure 3.6: Participation of women aged 50–74 in BreastScreen Australia, by remoteness area, and by socioeconomic group, 2015–2016.. 11

Figure 3.7: Number Number of invasive breast cancers, showing the proportion of small (≤15 mm) to other sizes (>15 mm), detected in women aged 50–69, all screening rounds, 1996–2016 20

Figure 3.8: Recall to assessment, women aged 50–69, first and subsequent screening rounds, 1996–2016 21

Figure 3.9: Invasive breast cancer detection (all sizes), women aged 50–69, first and subsequent screening rounds, 1996–2016 22

Figure 3.10: DCIS detection, women aged 50–69, first and subsequent screening rounds, 1996–2016 22

Figure 3.11: Recall to assessment by age, first and subsequent screening rounds, 2016 23

Figure 3.12: Invasive breast cancer detection by age, first, subsequent and all screening rounds, 2016 24

Figure 4.1: Incidence of breast cancer in women aged 50–74, 1982 to 2014 26

Figure 4.2: Incidence of breast cancer by age, 1982–1991, 1992–2001 and 2002–2011 27

Figure 4.3: Incidence of breast cancer in women aged 50–74, by remoteness area, and by socioeconomic group, 2009–2013.. 29

Figure 4.4: Five-year relative survival from breast cancer, by age, 2010–2014 31

Figure 4.5: Trends in 5-year relative survival from breast cancer in women aged 50–74 1985–1989 to 2010–2014 32

Figure 4.6: Relative survival at diagnosis and 5-year conditional survival from breast cancer in women aged 50–74, 2010–2014 32

Figure 4.7: Mortality from breast cancer in women aged 50–74, 1982–2015......................... 35

Figure 4.8: Mortality from breast cancer by age, 1982–1991, 1992–2001 and 2002–2011 36

Figure 4.9: Mortality from breast cancer in women aged 50–74, by remoteness area and by socioeconomic group, 2011–2015.. 37

Figure 5.1: Participation of women aged 50–74 in BreastScreen Australia, by Indigenous status, 2015–2016 41

Figure 5.2: Participation of women aged 50–69 in BreastScreen Australia, by Indigenous status, 1996–1997 to 2015–2016 41

Figure 5.3: Incidence of breast cancer in women aged 50–74 (New South West, Victoria, Queensland, Western Australia and the Northern Territory), by Indigenous status, 2009–2013 43

Figure 5.4: Mortality from breast cancer in women aged 50–74 (New South Wales, Queensland, Western Australia, South Australia and the Northern Territory), by Indigenous status, 2011–2015........ 44

List of boxes

Box 1.1: People of all ages can develop breast cancer 3
Box 1.2: ‘Overdiagnosis’ of breast cancer by BreastScreen Australia 4
Box 2.1: Reporting BreastScreen Australia’s new target age group of 50–74 5
Box 3.1: Participation is measured over 2 calendar years 6
Box 3.2: Crude versus age-standardised rates 7
Box 3.3: BreastScreen Australia and National Accreditation Standards 12
Box 3.4: Interval cancers 14
Box 3.5: Ductal carcinoma in situ (DCIS) 18
Box 4.1: Estimated incidence to 2018 25
Box 4.2: Invasive breast cancer detected through BreastScreen Australia 25
Box 4.3: DCIS cases detected through BreastScreen Australia 30
Box 4.4: Estimated mortality to 2018 34
Box 5.1: Indigenous populations 42

Related publications

The *BreastScreen Australia monitoring report* is an annual report. This and previous BreastScreen Australia monitoring reports and their supplementary data tables are available at <http://www.aihw.gov.au/publications/breast-cancer>.

You may also be interested in the following related publications:

AIHW (Australian Institute of Health and Welfare) 2015. Breast cancer in young women: key facts about breast cancer in women in their 20s and 30s. Cancer series no. 96. Cat. no. CAN 94. Canberra: AIHW.

AIHW 2015. BreastScreen Australia data dictionary: version 1.1. Cancer series no. 92. Cat. no. CAN 90. Canberra: AIHW.

AIHW 2017. Australian Cancer Incidence and Mortality (ACIM) books: breast cancer. Canberra: AIHW. Viewed 6 September 2018, <http://www.aihw.gov.au/acim-books>.

AIHW 2017. Burden of cancer in Australia: Australian Burden of Disease Study 2011. Australian Burden of Disease Study series no. 12. Cat. no. BOD 13. Canberra: AIHW.

AIHW 2017. Cancer in Australia 2017. Cancer series no. 101. Cat. no. CAN 100. Canberra: AIHW.

AIHW 2018. Cervical screening in Australia 2018. Cat. no. CAN 111. Canberra: AIHW.

AIHW 2018. National Bowel Cancer Screening Program: monitoring report 2018. Cat. no. CAN 112. Canberra: AIHW.

AIHW 2018. Analysis of bowel cancer outcomes for the National Bowel Cancer Screening Program 2018. Cat. no. CAN 113. Canberra: AIHW.

AIHW 2018. Analysis of cancer outcomes and screening behaviour for national cancer screening programs in Australia. Cancer series no. 111. Cat. no. CAN 115. Canberra: AIHW.

Supplementary online data tables

Additional tables are available as online Excel tables at <www.aihw.gov.au>, under the ‘Additional material’ tab for this report. These tables contain detailed statistics for many of the tables and figures presented in summary form in both the body of the report and Appendix A. Supplementary data tables have the prefix ‘S’ (for example, ‘Table S1.1’).

There are 8 Excel files, one for each performance indicator:

Indicator 1:	Participation
Indicator 2:	Rescreening
Indicator 3:	Recall to assessment
Indicator 4:	Invasive breast cancer detection
Indicator 5:	DCIS detection
Indicator 6:	Sensitivity
Indicator 7:	Incidence
Indicator 8:	Mortality.

Around 55% of women in the targeted age group of 50–74 participated in the BreastScreen Australia in 2015–2016, with more than 1.7 million screening.

Breast cancer mortality has decreased since BreastScreen Australia began, from 74 deaths per 100,000 women aged 50–74 in 1991 to 44 deaths per 100,000 women in 2015.

aihw.gov.au

Stronger evidence,
better decisions,
improved health and welfare