National Cancer Prevention Policy
2007–09

Screening to detect cancer early

Breast cancer

Cancer Council Australia

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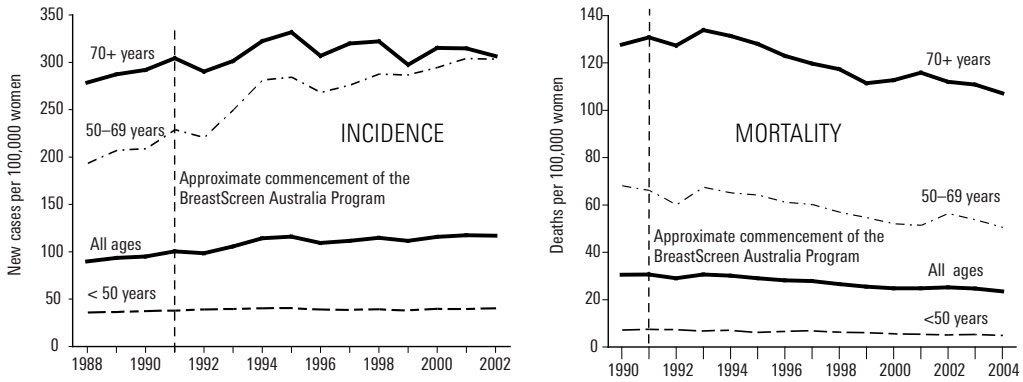
Screening mammography is the only tool we have for early detection that has been shown to reduce population mortality from breast cancer.

Breast cancer in Australia

In 2005, breast cancer was estimated to be the most common cancer (apart from non-melanoma skin cancer) diagnosed in women in Australia, with 12,957 new cases diagnosed. It is estimated that this will increase to 14,818 new cases in 2011 (AIHW, AACR, NCSG & McDermid 2005). Breast cancer was also the most common cause of cancer death among Australian women in 2005, with 2,719 deaths recorded (ABS 2007). Between 1990 and 2005, the rate of deaths from breast cancer decreased by about 2% per year (ABS 2007; AIHW 2005).

The risk of developing and dying from breast cancer increases with age. In 2005 approximately 23% of women with breast cancer were aged under 50 years, 51% were aged between 50 and 69 years and 26% were aged 70 years and over. A woman has one chance in eight of being diagnosed with breast cancer before the age of 85 (AIHW, AACR, NCSG & McDermid 2005).

Figure 2.1 Time trends in breast cancer age-specific incidence and mortality rates



Source: AIHW & NBCC 2006

Figure 2.1 illustrates the trends in breast cancer incidence and mortality in Australia and shows that there have been increases in incidence and falls in mortality for each age group, with the largest changes occurring in women aged 50 to 69 years. Incidence in the 50 to 69 years age group increased from 197.1 new cancers per 100,000 women in 1987 to 304.0 per 100,000 women in 2002 . The rapid increase in the detection of breast cancer between 1991 and 1995 corresponds to the introduction of a national screening program which detects cancers that would otherwise not be identified until later (AIHW, AACR, NCSG & McDermid 2005).

Age-standardised mortality rates for women aged 50 to 69 years have declined since 1993. The mortality rate for women in this target group was 66.8 deaths per 100,000 women in

1987, compared to 51.3 deaths per 100,000 women in 2004. A similar pattern of decline in mortality rates occurred in women aged 70 and over, while rates for women under 50 years remained consistently below 15 deaths per 100,000 women over the period 1987–2001 (AIHW & NBCC 2006).

Can breast cancer be prevented?

Despite epidemiological evidence of possible risk factors for breast cancer, at this stage there is limited potential for prevention. Most risk factors are not readily amenable to change, while lifestyle-related factors that could potentially be modified are associated with only a small proportion of breast cancer risk. It is important to acknowledge that most of these risk factors are not established causes of disease, instead serving as surrogate markers to differentiate individuals at different levels of risk.

Apart from being female, the strongest risk factor for breast cancer is age; in Australia in 2005 the estimated rates of breast cancer varied from 1.5 per 100,000 in women aged 20 to 24 years, to 7.4 per 100,000 in women aged 25 to 29 years, to 305.7 per 100,000 in women aged 80 to 84 years (AIHW, AACR, NCSG & McDermid 2005).

Having a mother, sister or daughter and/or father, brother or son who has had breast cancer also increases the risk of breast cancer; the more first-degree relatives affected and the younger the age of diagnosis, the higher the breast cancer risk. Despite the strength of family history as a risk factor for breast cancer, inherited genetic susceptibility accounts for only about 5% of cases; for eight out of nine women who develop breast cancer, there is no strong family history of the disease (CGHFBC 2001).

Two important genes have been identified that are associated with an inherited susceptibility to breast and ovarian cancer: BRCA1 and BRCA2). Variations in other genes have also been associated with breast cancer risk (Singletary 2003).

Other risk factors that are not easily modified include early menarche, late menopause, and no children or a first child at 30 years or older (Singletary 2003; NBCC 2006).

Breastfeeding is also associated with a reduction in the risk of breast cancer, with women's risk decreasing by 4.3% for each year they breastfeed (CGHFBC 2002).

Studies have demonstrated that use of hormone replacement therapy (HRT) is associated with an increased risk of breast cancer that increases with duration of therapy and age (Baber, O'Hara & Boyle 2003; Million Women Study Collaborators 2003; Gertig et al. 2003; Rossouw et al. 2002). There is some suggestion that women taking HRT also have an increased risk of dying from breast cancer (Million Women Study Collaborators 2003). A recent comprehensive Australian review suggests little or no increase in risk for oestrogen-alone HRT but an increased risk for combination HRT containing oestrogen and progesterone (NHMRC 2005). Based on the review and Australian incidence figures, it has been estimated that four additional breast cancers will be seen per 1000 women in their 50s taking combination HRT for five years. The risk decreases with time after cessation of treatment. A reanalysis of more than 50 studies on oral contraceptives and breast cancer found a small increase in the risk of developing breast cancer, but this risk returned to normal within 10 years of discontinuing oral contraceptives (CGHFBC 1996).

Modifiable lifestyle factors have also been shown to have various associations with breast cancer. There is convincing evidence that alcohol consumption of more than two standard drinks a day increases the risk of breast cancer (WCRF & AICR 1997; NBCC 2006). It has been estimated that in Australia, approximately 5% of breast cancers are attributable to

alcohol consumption (NBCC 2006). There is evidence of a dose–response relationship with alcohol consumption, with the relative risk of breast cancer increasing by 7.1% for each additional 10 g per day of alcohol (CGHFBC 2002). (Refer also to the alcohol chapter.)

Diet, physical activity and the maintenance of a healthy weight may play some role in protecting against breast cancer. Various reviews have found moderate to weak evidence of the cancer-protective effect of vegetables and fruit (WCRF & AICR 1997; UK Department of Health 1998).

The World Health Organization estimates that 10% of breast cancer worldwide can be attributed to physical inactivity (WHO 2002). An Australian appraisal of the impact of physical inactivity suggests that the population-attributable risk for breast cancer is 9% (Stephenson et al. 2000).

A number of reviews have concluded that there is now clear evidence that physical activity can protect against breast cancer (IARC Working Group 2002; Thune & Furberg 2001). The risk reduction is around 20% to 40%. The association has been reported for both pre- and postmenopausal women, but it is as yet unclear which time period(s) in a woman's lifespan are most important for physical activity in the development of breast cancer (IARC Working Group 2002).

Overweight and obesity in postmenopausal women are also associated with increased risk of breast cancer (Singletary 2003); there is an increase in risk of around 30% in women with a body mass index at or above 28 kg/m2 compared to those with a body mass index below 21 kg/m2 (Boyle et al. 2003).

The potential for chemoprevention of breast cancer (in particular oestrogen receptor positive cancers)—through the use of selective oestrogen receptor modulators such as tamoxifen and raloxifene and, more recently, aromatase inhibitors—is undergoing investigation in randomised controlled trials. Evidence suggests that tamoxifen and raloxifene can reduce the risk of breast cancer by about 50%. However, as tamoxifen is associated with an increased risk of endometrial cancer, blood clots, uterine bleeding, hot flushes and other menopausal symptoms, the potential benefits of tamoxifen do not outweigh the potential risks in otherwise well women (Cuzick et al. 2003). The use of raloxifene appears to be associated with fewer side effects. None of these drugs is currently approved for prevention of breast cancer in Australia.

Tests and programs for breast cancer

Mammography

Screening mammography is the best method available for detecting breast cancer early (IARC 2002). It is the only tool we have for early detection that has been shown to reduce population mortality from breast cancer.

Research on the effectiveness of mammography screening for breast cancer has occurred through randomised controlled trials in North America and Europe. These trials have indicated that the natural history of breast cancer can be interrupted and mortality reduced through the detection of invasive disease when tumours are small and at an early stage. In addition, mammography in the context of an organised population screening program is effective in the detection of a large proportion of early tumours in asymptomatic women. The International Agency for Research on Cancer concluded that routine mammographic screening reduced risk of dying of breast cancer by 25% in women aged 50 to 69 years (IARC 2002).

Breast self-examination

Breast self-examination (BSE) as a method of early detection has come under considerable scrutiny.

Evidence from meta-analyses (Kosters & Gotzsche 2003; Hackshaw & Paul 2003; Humphrey et al. 2002) and randomised controlled trials (Thomas et al. 2002; Semiglazov et al. 2003) shows that BSE does not result in a reduction in the size or stage of tumours at diagnosis or a decrease in mortality from breast cancer. Findings from a UK study that enrolled a cohort of women comparable to the Australian population demonstrated no impact of BSE on mortality after 16 years of follow-up (UK Trial of Early Detection of Breast Cancer Group 1999).

Breast awareness

In Australia, even with a fully established mammographic screening program, more than half of all breast cancers are found by a woman or her doctor after noticing a change in the breast. Although screen-detected breast cancers are typically smaller, the majority of non-screen-detected breast cancers are found at an early stage and treated conservatively (i.e. with surgery that removes as little of the breast as possible). This supports efforts to promote early detection beyond the mammographic screening program (RACGP 2005, 2006a & 2006b).

In the absence of proof that routine, systematic BSE reduces deaths from breast cancer across the population, the National Breast Cancer Centre and The Cancer Council Australia advocate a 'breast awareness' approach to encourage women to report new or unusual breast changes. This involves women being familiar with the normal look and feel of their breasts, so they may be better able to recognise an unusual change.

Breast awareness encourages familiarity as part of general body awareness and health care. No specific technique or regularity is promoted, as there is no evidence of the effectiveness of any one approach.

Because many breast cancers cannot be felt, the breast awareness approach should be seen as a supplement to—not a substitute for—regular mammograms in women within the target age range for mammographic screening.

Clinical breast examination

The effectiveness of clinical breast examination (CBE) as a screening method has also been questioned. The International Agency for Research on Cancer concluded that 'there is inadequate evidence that screening with clinical breast examination, whether alone or in addition to screening mammography, can reduce mortality from breast cancer' (IARC 2002).

The National Breast Cancer Centre's position statement on the early detection of breast cancer (NBCC 2004) summarises the latest evidence. For asymptomatic women at average risk of breast cancer there is insufficient evidence to encourage CBE as a population screening tool. However, as there is no evidence to discourage the practice of CBE, individual women may wish to discuss their specific needs with their doctors. Those at high risk should discuss ongoing monitoring with their doctors. Options may include CBE.

The policy context

The national breast cancer screening program, BreastScreen Australia, began in 1991 (BreastScreen Australia 2004a). It is funded by the Australian Government (Giles & Amos 2003) and co-funded and administered by state and territory governments. BreastScreen services operate under and are measured against the BreastScreen Australia National Accreditation Standards (BreastScreen Australia 2004a). The standards are used not only to drive quality improvement but also to balance the costs and benefits of the program to women in the target age group. It is a free service that targets asymptomatic women aged 50 to 69 years and is accessible to all women aged 40 years or above. Women in the target age range are sent reminders for repeat screens every two years. No doctor's referral is required to attend screening, which is performed by two-view mammography. All mammograms are independently reviewed by two readers, with recall for further assessment of any abnormalities detected during film reading. The screening services are delivered through specialised units, either fixed or mobile, that operate as part of a designated BreastScreen Screening and Assessment Service, which carries out multidisciplinary assessment of screen-detected abnormalities. All procedures up to the definitive cytological or histological diagnosis of breast cancer are undertaken within BreastScreen Australia.

Women in the target group are recruited through direct mail-outs based on the electoral roll, community education, advertising campaigns, brochures and health care providers (AIHW 1998). The Cancer Council supports recruitment of women through the activities of its state and territory cancer councils in community education, promotional literature and the Cancer Council Helpline. State and territory cancer councils also support BreastScreen Australia through professional education and by running cancer registries that monitor and evaluate the program in relation to cancer rates and mortality.

BreastScreen Australia performance

Participation rate

Monitoring and evaluation are important for BreastScreen Australia. The most recent national data on breast cancer screening in Australia is in the *BreastScreen Australia monitoring report 2003–04* (AIHW 2007).

The total number of women screened by BreastScreen Australia over the two years 2003–04 was 1,627,115, of whom 70.3% were in the target age group (50 to 69 years). The proportion of the target group screened (the participation rate) is at 55.6% (2003–04).

There was some variation between participation rates in the states and territories, from a low of 44.4% in the Northern Territory to a high of 63.1% in South Australia.

Table 2.1 Age-standardised participation by women aged 50–69 years in BreastScreen Australia 2003–04 by states and territories

	Australia	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Rate %	55.6	50.1	58.8	58.2	56.5	63.1	57.3	51.8	43.4

Source: AIHW 2007

The Australian Bureau of Statistics National Health Survey data show that 64% of Australian women report having a mammogram every two years (ABS 2002). While not all mammograms will be for cancer screening purposes, this figure suggests that

a significant proportion of women are having mammograms outside the BreastScreen Australia program. This is of some concern to The Cancer Council because it means data are not recorded and the effects of screening for these women are not evaluated. If mammography screening is to be successful, it must be provided within an organised program that adheres to key standards of quality.

Small invasive cancer detection rate

This measures the rate of invasive breast cancers of 15 mm or less diagnosed in women attending BreastScreen Australia. It is expressed as the number of small cancers detected for every 10,000 women screened. In 2004, 64% of all invasive breast cancers among all women aged 40 or over were 15 mm or less. The age-standardised rate for the target group was 39.1 per 10,000 women for first-round screening and 26.8 per 10,000 women for subsequent rounds for women aged 40 years and over.

Program sensitivity: interval cancer rate

Program sensitivity is the proportion of invasive breast cancers that are detected by BreastScreen Australia out of all invasive cancers (interval cancers and screen-detected cancers) diagnosed in program-screened women during the screening interval. A low interval cancer rate suggests a successful program. An interval cancer is an invasive breast cancer that is diagnosed after a screening episode that detected no cancer and before the next scheduled screening episode.

The age-standardised interval cancer rate for women in the target group 0–12 months after attending their first screen in 2000–02 was 9.6 per 10,000 following their first screen and 10,1 per 10,000 following subsequent screens.

Detection rate of ductal carcinoma in situ

This indicator measures the rate of ductal carcinoma in situ (DCIS) diagnosed in women attending BreastScreen Australia. The ability to detect DCIS reflects good quality imaging and screen film reading. In 2004 the age-standardised DCIS detection rate for women in the target age group was 19.8 per 10,000 women and in subsequent rounds it was 10.4 per 10,000 women. (For more on DCIS, see below.)

The role of general practice

The role of general practice in breast cancer screening is potentially important, given that 86% of the population have at least one visit with the general practitioner every year (RACGP 2005).

General practitioners and general practice team members can contribute to promoting preventive health behaviours and identifying women at increased or high risk of developing breast cancer. Promoting breast awareness, mammography screening and individualised surveillance programs where appropriate are recognised activities of general practice as outlined in policy and guideline documents produced by Royal Australian College of General Practitioners (RACGP 2005, 2006a, 2006b). Findings from a national survey of well women indicated that GP recommendations to their female patients aged 50 to 69 to have a screening mammogram increased from 35% in 1995 to 62% in 2003. (Barratt et al. 1997; NBCC 2005)

Potential benefits and adverse effects of breast cancer screening

Screening aims to detect a significant proportion of breast cancers that are small and of a low grade, enabling better health outcomes from earlier treatment (AIHW, AACR & NBCC 1999). Research has clearly demonstrated a significant benefit from population mammography screening for women in the target age group. It has been estimated that for every 1460 women screened, 13.5 biopsies and 7.4 breast cancers detected, one death from breast cancer is prevented (AIHW, BreastScreen Australia & NCSP 1999). Screening 10,000 women in this age group is estimated to prevent approximately 10 to 20 deaths from breast cancer over 10 years (UK Trial of Early Detection of Breast Cancer Group 1999).

Mortality benefits from the screening program, if they occur, will not be seen until five to 10 years after a high participation rate is achieved. If 70% of Australian women in the target group participated in the screening program, death rates from breast cancer for women over 50 years offered screening would fall by approximately 25% to 30% (AHMAC 1990).

Screening may reduce the trauma associated with treatment. Tumours diagnosed at an earlier stage and smaller size require less extensive surgery and chemotherapy.

Potential adverse effects of screening

Mammographic screening may have adverse psychological effects for some women. Of particular concern is increased anxiety experienced as a result of false negative and false positive results (see introduction to Section 2). The potential negative physical and psychological effects associated with a false positive test include anxiety induced by fear of being diagnosed with breast cancer, physical effects of the performance of invasive diagnostic procedures, diagnosis of non-lethal lesions, and exposure to radiation.

DCIS (where the cancerous cells have not spread beyond the basement membrane of the breast ducts—described as non-invasive cancer) is often quoted as an example of an 'over-diagnosed' breast condition. As recently pointed out by Professor David Roder: 'The difficulty is that there is no way currently known to define in-situ lesions with any certainty as progressive or non-progressive. This definition cannot be made by looking under the microscope. The potential for over-diagnosis has arisen from statistical inferences, which are themselves based on assumptions. Differences in estimates are a function of differences in the assumptions made by researchers, much of which are uncertain and open to debate' (GP review 2006).

While the diagnosis and treatment of DCIS is still contested, and general reports suggest that women found through mammographic screening to have DCIS will be treated by surgery and/or radiotherapy without evidence of the benefits of treatment having been established (Rickard 1996), it should be noted that BreastScreen Victoria (2001) reports a steady decline in the proportion of women diagnosed with DCIS undergoing surgery. The issues about DCIS should not overwrite the effectiveness of the national breast cancer screening program in identifying invasive carcinoma of the breast.

Who should be screened?

Evidence of greatest benefit exists for the target age group (women aged 50 to 69 years). The Cancer Council recommends that all women in this age group have a mammogram every two years through BreastScreen Australia. Debate, however, is increasing around the benefit of extending screening to women in the decades either side of this age bracket.

An Australian review of the benefits of screening women aged 40 to 49 years concluded that there is less benefit in screening these women. The benefit is greater for those at the older end of the age bracket, and for those with a strong family history of breast cancer. The benefit of screening women aged 40 to 49 years is estimated at approximately one-third of that of women aged 50 to 69 years (Irwig et al. 1997). BreastScreen Australia policy states:

> *BreastScreen Australia selects women for screening on the basis of age alone. Women aged 40 years and above are eligible. Recruitment strategies will be targeted at women aged 50–69 years. The age for screening will be monitored and reviewed as new data becomes available (BreastScreen Australia 2004a).*

With increasing life expectancy, the value of screening women over 70 years has also come under investigation. Barratt et al. (2002) estimate that the benefit of screening women aged 70 to 79 years to be about 40% to 72% of that achieved in women aged 50 to 69 years; this declines further with increasing age and when quality-of-life adjustment is made. They estimate that extending screening to women aged 70 to 79 years is relatively cost-effective and similar to the cost-effectiveness of extending screening to women aged 40 to 49 years. The authors, however, also comment that the estimation of benefits, harms and costs would be improved with data—now lacking—from randomised trials in the appropriate age group.

Aims

The Cancer Council endorses the major aims of the BreastScreen Australia program (AIHW, BreastScreen & NCSP 1999):

- to ensure that the program is implemented in such a way that significant reductions can be achieved in morbidity and mortality attributable to breast cancer
- to maximise the early detection of breast cancer in the target population
- to ensure that screening for breast cancer in Australia is provided in dedicated accredited screening and assessment services as part of the BreastScreen Australia program
- to ensure equitable access for women aged 50–69 years to the program
- to ensure that services are acceptable and appropriate to the needs of the eligible population
- to achieve high standards of program management, service delivery, monitoring and evaluation and accountability (BreastScreen Australia 2004b).

What we want to achieve	How The Cancer Council Australia and its members (the state and territory cancer councils) will do this
A 70% two-yearly participation rate in the national program by women in the target group (50–69 years) and access on request to the program for women aged 40–49 years and 70 years or more	Maintain and support education programs to raise awareness in the community and among health professionals to promote informed participation of women aged 50–69 years in breast cancer screening Advocate for government support, including adequate funding, to ensure targets for participation are met, while maintaining a focus on equity and access for women Priority should be given to maximising the participation of Australian Aboriginal and Torres Strait Islander women and women of culturally and linguistically diverse backgrounds Recognising that many women have mammograms outside BreastScreen, advocate for integration of screening of all asymptomatic women aged 50–69 years into the BreastScreen Australia program
Referral to appropriate treatment services and collection of information about the outcome of treatment	Recognising the importance of providing consistent high-quality care for women diagnosed with breast cancer in Australia: • support or advocate for examination of the extent to which women diagnosed in the screening program are being treated in accordance with the NHMRC *Clinical practice guidelines for the management of early breast cancer* (2001), *Management of advanced breast cancer* (2001) and *Clinical Practice Guidelines for the Psychosocial Care of Adults with Cancer* (2003) Recognising the importance of informed consumer involvement in all aspects of breast cancer screening, diagnosis and management, advocate for active roles for consumers within peak breast cancer bodies in Australia
Sufficient workforce capacity to ensure the delivery of a best practice screening program to the target population (women 50–69)	Recognising the implications in the short and longer term of radiography and radiology workforce constraints for BreastScreen Australia, advocate for increased funding to provide additional places for the training of radiographers and radiologists
Timely evaluation of new technologies	Monitor development of relevant new technologies, (such as digital mammography and MRI), advocate for rapid evaluation of their relevance for screening and adoption of those that are positively evaluated
National evaluation of BreastScreen performance, capacity and policy issues by 2008	Support and contribute to national evaluation of the following areas: • reductions in breast cancer mortality due to screening, risks associated with screening, program governance and management, performance trends, accreditation system • workforce, new technologies and capacity issues • policy issues such as the appropriate target age range, screening interval, and screening of women at higher risk or those who present with symptoms

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