BreastScreen SA Statistical Report

2001
2002

Government
of South Australia

2001 and 2002 Statistical Report

BreastScreen SA

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March 2005

Acknowledgments

The production of the BreastScreen SA Statistical Report for the 2001 and 2002 calendar years has been made possible through the dedication and commitment of many people.

Special thanks and acknowledgment to Ms Ada Childs, Planning, Research and Evaluation Project Officer. Ada has been the principal author of this report and has dedicated herself to accurately reflecting the impressive outcomes of the program. Ms Jill Rogers, Planning, Research and Evaluation Project Officer has also made a significant contribution to the report.

The expert advice, guidance and support of members of the BreastScreen SA Medical Executive Committee, Management Team and Monitoring and Evaluation Unit are most gratefully acknowledged:

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Ms Anita Cornish, Screening Support and Evaluation Unit Manager (from June 2004)

Ms Karen Shepherd, Promotions and Education Manager

Congratulations and thanks to the wonderful staff of BreastScreen SA who work in the screening and assessments clinics and mobile units, clinical services, information systems and data management, administration and management for their continued commitment, dedication and hard work.

The continued support of the program given by the women of South Australia through their willingness to attend the program for screening mammography and, for some of them, subsequent assessment, is applauded and acknowledged.

BreastScreen SA.
BreastScreen SA : 2001 and 2002 Statistical report.

ISBN 0 7308 9360 X.

1. BreastScreen SA. 2. Breast - Cancer - Diagnosis - South Australia. 3. Breast - Cancer - South Australia - Statistics. 4. Breast - Cancer - Prevention - Statistics. 5. Breast - Cancer - South Australia - Prevention.

362.19699449

Foreword

The South Australian Department of Health is committed to reducing mortality and morbidity attributable to breast cancer. This commitment is evidenced through BreastScreen SA, the statewide population-based screening program for the early detection of breast cancer. The program provides access to free, high quality screening mammography at two-year intervals for South Australian women in the target age group of 50 to 69 years. Women aged 40 to 49 and over 70 years are also eligible to participate in the program. BreastScreen SA is a jointly funded initiative of the South Australian Department of Health and the Australian Government Department of Health and Ageing, and their ongoing support and commitment to the program is greatly appreciated.

The 2003 South Australian Cancer Registry Report shows that in 2001, breast cancer represented 15% of all cancer deaths in South Australian women. There were 983 women diagnosed with breast cancer in 2001 in South Australia and 222 women died from the disease. In 2001, BreastScreen SA diagnosed 417 (42%) of female breast cancers in South Australia. It is encouraging to note in the 2003 Cancer Registry Report that there has been an ongoing decrease in breast cancer mortality. Since the late 1980s, the age-standardised death rate has decreased by approximately 20% for South Australian women aged 50 to 69 and by approximately 16% for women aged over 70 years. This is considered to be attributable to mammographic screening and early detection within the target age group as well as treatment advances. Early detection increases the chances of simpler treatment and better outcomes for South Australian women.

BreastScreen SA's ongoing quality improvement program is faced by many challenges. The population of South Australian women aged 50 to 69 years continues to increase by two to three per cent each year and this trend is expected to continue for several years. Whilst the number of screening mammograms performed has tended to increase, there is a greater rate of growth in the population of women in the target age group. Increased demands for screening services impact on the capacity of clinics and mobile x-ray units to provide screening in a timely manner. In addition, BreastScreen SA operates within the current environment of a worldwide shortage of radiographers who specialise in mammography.

Despite such challenges, BreastScreen SA has continued its pursuit of excellence and the participation rate for women aged 50 to 69 increased to 64.6% for the two years ended 31 December 2001 and to 64.9% for the two years ended 31 December 2002. The small invasive breast cancer detection rate for first and subsequent screens for women aged 50 to 69 was 30.7 per 10,000 women screened in 2001 and 35.1 per 10,000 women screened in 2002. These rates are well above the BreastScreen Australia National Accreditation Standard of greater than or equal to 25 per 10,000 women screened. The successful re-accreditation of the program by BreastScreen Australia in March 2003 reflects the high quality services provided to South Australian women.

Routine data collection based on the national minimum data set and data quality assurance procedures ensure that BreastScreen SA meets the national reporting requirements of the Public Health Outcomes Funding Agreement, Productivity Commission, Australian Institute of Health and Welfare on behalf of BreastScreen Australia, as well as the South Australian Department of Health. This report arises from this minimum data set and provides an insight into the BreastScreen SA program for 2001 and 2002.

I am pleased to present the fourth BreastScreen SA Statistical Report.

Ms Lou Williamson
Program Manager

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Introduction

BreastScreen SA is the South Australian component of BreastScreen Australia, the national breast cancer screening program. The program was a part of the Statewide Division of the South Australian Department of Human Services (now the South Australian Department of Health) during 2001. In June 2002, the program joined the Metropolitan Health Division of the Department.

The state program began as a pilot screening project in 1988, and in February 1991 was the first to sign an agreement with the Commonwealth to participate in the National Program for the Early Detection of Breast Cancer (now known as BreastScreen Australia).

BreastScreen SA is a population-based government funded program, which aims to reduce mortality and morbidity attributable to breast cancer. The program provides free screening mammography on a statewide basis. Asymptomatic women aged 40 years and over are eligible to attend. However, the service aims primarily to screen women aged 50 to 69 years.

BreastScreen Australia National Accreditation Requirements (NAR) were introduced in 1994 with comprehensive quality standards applying to recruitment, screening and assessment services, follow-up of women diagnosed with breast cancer, technical quality assurance, education and counselling, consumer satisfaction, data management, service management and training. In March 1994, BreastScreen SA was the first service in Australia to achieve full accreditation in the national program. In April 1997, the service was the first to be fully re-accredited. In March 2000, BreastScreen SA again achieved re-accreditation.

The NAR were extensively reviewed over several years and, as a result, the BreastScreen Australia National Accreditation Standards (NAS) were endorsed by the BreastScreen Australia National Advisory Committee in July 2001 and implemented in July 2002. BreastScreen SA was the first program to be accredited under the NAS in March 2003.

Compliance with BreastScreen Australia NAR and NAS is critical to maintain the high standards necessary to achieve the aims of the program. Achieving accreditation is a very positive endorsement of the quality of the service. Past and present staff of BreastScreen SA are credited with establishing and maintaining the high quality program in South Australia.

The NAR applied until July 2002, when the NAS were implemented. However in this report, all references to accreditation standards will refer only to the NAS.

Service Provision in 2001 and 2002

BreastScreen SA has a single, centrally located State Coordination Unit (SCU) in Adelaide. The SCU has responsibility for quality assurance and improvement, so that all aspects of screening and assessment are of a high quality in order to achieve reductions in mortality and morbidity from breast cancer. The SCU is responsible for implementing, managing and evaluating the statewide program, and ensuring that the NAS are implemented and met. Where these standards are not met, the SCU has responsibility for developing and evaluating strategies and policies that assist the program to work towards meeting these standards.

Screening is provided through dedicated and accredited screening clinics. There are six fixed screening clinics in metropolitan Adelaide, and one part-time clinic operated at Berri in the Riverland until April 2001. A mobile x-ray unit now visits Berri on an annual basis.

Women living in rural and remote areas, for whom lack of transport may prevent participation in screening, are served by two mobile x-ray units, which visit rural and remote locations every two years, the recommended screening interval (see Figures 1, 2 and 3). In February 2000, a third mobile x-ray unit was introduced to provide screening every two years primarily for the outer metropolitan Adelaide areas, and for some rural locations.

A central Assessment Clinic in the Adelaide suburb of Wayville caters for the investigation of screen-detected breast abnormalities which occur in approximately 3% of all women who attend for routine screening.

Figure 1: BreastScreen SA service provision in 2001 and 2002

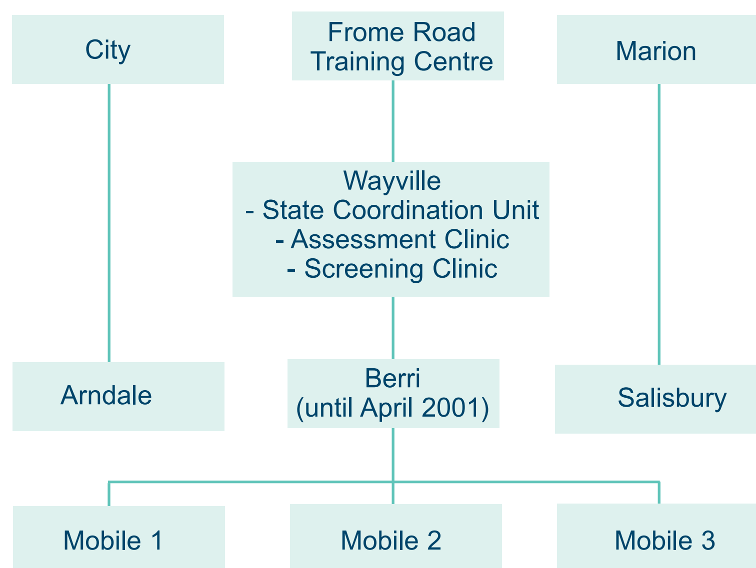


Figure 2: BreastScreen SA fixed and mobile unit locations, inner and outer metropolitan Adelaide, 2001 and 2002

CAPITAL letters indicate a fixed clinic

Figure 3: BreastScreen SA rural and remote locations in 2001 and 2002 for mobile units

Screening and the Target Population

Screening is the process of looking for disease in healthy people without symptoms. A screening mammogram is a breast x-ray. It is currently the most effective method for detecting breast cancers that are non-palpable (too small to be felt). If breast cancer is found at an early stage, there is a greater chance of successful treatment.

Screening is primarily recommended for women aged 50 to 69, commonly referred to as the 'target group'. It is estimated that for individual women in this age group, having a screening mammogram every two years reduces the chance of dying from breast cancer by up to 40%.[1, 2, 3] In March 2002, a working group convened by the World Health Organisation, International Agency for Research on Cancer, evaluated the evidence on breast cancer screening and concluded that trials have provided sufficient evidence of the efficacy of screening mammography for women between 50 and 69 years.[4] BreastScreen SA re-invites women in the target group when their next screening mammogram is due.

Research results are less clear about the benefits of screening mammograms for women aged 40 to 49 and over 70. Therefore, while BreastScreen SA does not actively recruit women in these age groups to the screening program, they are eligible for screening, and are welcome to phone for an appointment. Existing clients in their forties are re-invited when their next screening mammogram is due. All women aged 70 and over are provided with a reminder card indicating when their next mammogram is due.

In line with national policy, BreastScreen SA does not screen women less than 40 years of age. There is no evidence to suggest that routine screening mammograms for this age group would reduce the number of female deaths from breast cancer.

The majority of BreastScreen SA clients are eligible for screening every two years. Women who meet BreastScreen SA's criteria for a strong family history of breast cancer are eligible for screening every year. A woman is said to have a strong family history if she meets one of the following criteria:

- a first-degree relative (mother/sister/daughter, father/brother/son) with breast cancer diagnosed before the age of 50
- a first-degree relative with cancer in both breasts (diagnosed at any age)
- two or more first-degree relatives with breast cancer (diagnosed at any age).

Women with a personal history of breast cancer are also eligible for annual screening at BreastScreen SA if they were diagnosed more than 10 years ago or if they are no longer under the care of their specialist surgeon. They are also encouraged to see their general practitioner for an annual clinical breast examination.

Women who report a new breast symptom at the time of booking are advised to see their general practitioner for investigation. However, some women do present with breast symptoms at the time of screening. These women are screened and, if no mammographic abnormality is detected, they are also advised to visit their general practitioner for clinical assessment of their breast symptoms.

BreastScreen SA aims to achieve a high level of participation in order to reduce mortality and morbidity attributable to breast cancer. The aim is to screen 70% of women aged 50 to 69 every two years.

1 Duffy SW, Tabar L, Fagerbery G, Gad A, Grontoft O, South MC and Day NE (1991). Breast Screening, prognostic facts and survival - results from the Swedish Two-County Study, *British Journal of Cancer*; 64, 1133-38.

2 Fletcher SW, Black W, Harris R, Rimer V, Shapiro S. Report of the International Workshop on Screening for Breast Cancer (1993), *J Natl Cancer Inst*; 85(20): 1644-56.

3 Feig SA. Decreased breast cancer mortality through mammographic screening: results in clinical trials (1998), *Radiology*; 167, 659-65.

4 Press release No. 139 by the World Health Organisation, International Agency for Research on Cancer, 2002.

Recruitment Strategies

BreastScreen SA recruitment strategies are directed at the South Australian community of women aged over 40 years, particularly those aged 50 to 69. This broad group may be separated into smaller and more specific sub-groups of women, including those:

- residing in metropolitan locations
- residing in rural and remote locations
- from culturally and linguistically diverse (CALD) backgrounds
- of Indigenous (Aboriginal and Torres Strait Islander) descent
- from other special needs groups.

BreastScreen SA works with other groups in the community, including health care professionals (general practitioners, community health workers and women's health workers) and the South Australian media, to promote screening mammography.

A variety of strategies are employed to inform women about the screening program, and to recruit them for a screening mammogram every two years. Some recruitment strategies are appropriate for all audiences, while more specific strategies may be required for groups with special needs.

Information from the Electoral Roll provides the name, date of birth and postal address of women in the target group, and constitutes BreastScreen SA's most effective mechanism for personalised recruitment. The Electoral Commission has granted BreastScreen SA permission to use this information for recruitment purposes only.

Broad strategies to promote screening include advocating through existing women's networks, and providing speakers for information sessions and public meetings. Placing publicity and advertising in South Australian metropolitan and rural media successfully communicates the screening message to the target audience.

BreastScreen SA also provides information to health professionals, especially general practitioners, via seminars, a Clinical Audit Activity, a twice-yearly newsletter, practice visits and printed resources. Although women do not require a doctor’s referral to attend the screening program, research has shown that women are more likely to attend for regular screening if it is recommended by their general practitioner. Therefore, building collaborative partnerships with general practitioners continues to be an important recruitment strategy for BreastScreen SA.

To improve access and equity for CALD women, free printed information is available in a variety of languages, advertising is placed in local ethnic media and small grants are available for educational activities. Presentations are also made to a wide variety of groups from different cultural backgrounds.

BreastScreen SA collaborates with community groups and health workers to organise bus transport for groups of rural and metropolitan Indigenous women who do not have access to transport. Indigenous women from the Anangu Pitjantjatjara Lands have access to the screening service when a mobile x-ray unit visits Marla every two years. Presentations are given to Indigenous health workers who are invited to information seminars. These health workers are provided with a range of free resources for use in their respective communities.

Screening

Free services provided by BreastScreen SA include routine screening mammography and assessment of all screen-detected breast abnormalities.

The screening process involves:

- systematic recruitment of asymptomatic women aged 50 to 69; women with breast symptoms are advised to see their general practitioners for further investigation
- high quality, two-view mammography by specially trained radiographers
- independent film reading by two radiologists specially trained in mammography, with discordant calls read by a third radiologist
- written notification of results within two weeks to all women and their nominated general practitioners if no evidence of breast cancer is detected
- routine recall of women every two years (women with a strong family history of breast cancer, or a personal history of breast cancer diagnosed more than 10 years ago, are eligible for annual screening)
- recall for assessment of women with a screen-detected breast abnormality.

Assessment

Approximately 3% of women have a mammographic abnormality detected at screening and are recalled for assessment. They are contacted by a nurse counsellor to arrange an appointment to attend the Wayville Assessment Clinic in Adelaide. During 2001 and 2002, the free Assessment Clinics were conducted on Tuesdays, Wednesdays and Thursdays. Some women from rural areas were required to return to the mobile x-ray unit for further mammographic examination during 2001 and 2002, and some needed to attend the Wayville Assessment Clinic.

An experienced multidisciplinary assessment team consisting of radiographers, a medical officer, nurse counsellor, radiologist, pathologist and surgeon, provides clients with the best possible care.

BreastScreen SA uses the internationally accepted triple assessment process, which involves imaging, clinical assessment and pathology. The Assessment Clinic is undertaken at two levels. All women recalled for assessment attend Level 1 Assessment Clinic, which is conducted during the morning. Procedures undertaken include:

- further mammography and/or
- ultrasound
- clinical breast examination by a medical officer.

Level 2 Assessment Clinic, held in the afternoon, is for those women whose further imaging and/or clinical examination indicate a suspicious finding. The radiological grading is discussed by the radiologist, pathologist and surgeon, and the following investigations may be required:

- fine needle aspiration biopsy (FNAB) - either by palpation, or by ultrasound or stereotactic guidance
- core biopsy - by ultrasound, or stereotactic guidance, including vacuum assisted core biopsy (Mammotome).

A pathologist is on-site so that FNAB results are available on the same day, while core biopsy results are available the next working day.

If a lesion is non-palpable, it may be localised (using carbon or a metal clip) to assist the treating surgeon to find the lesion. These localisations are performed using ultrasound or stereotactic guidance. In addition, women attending Level 2 assessment have a surgical assessment.

Women undergoing assessment are supported and counselled by members of the clinical team. Women are informed of all available results on the same day, and have the opportunity to discuss them fully with the clinical team before leaving the Assessment Clinic.

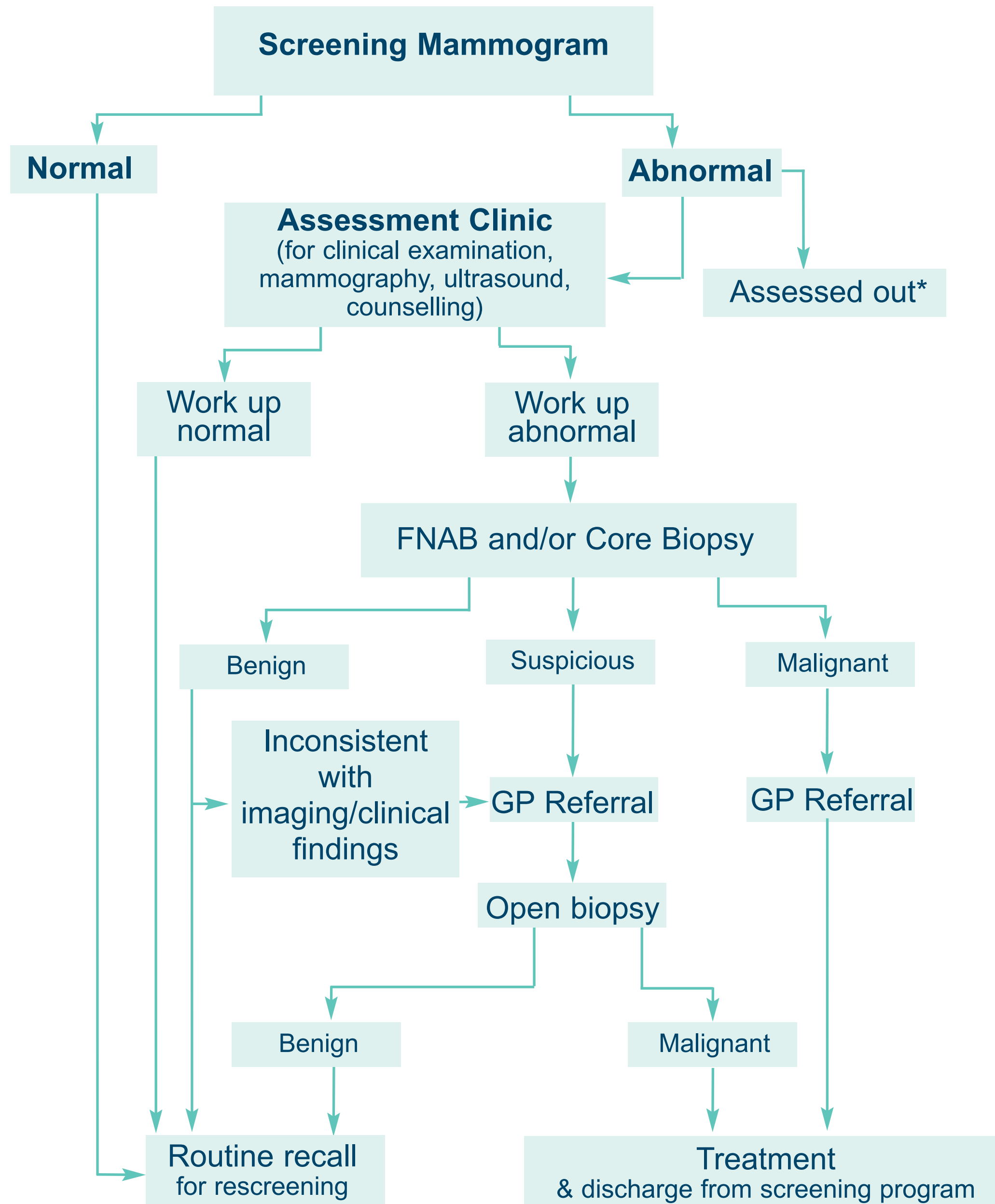
Following assessment, the clinical team may recommend to some women that open biopsy is required to obtain a histological diagnosis of a suspicious mammographic lesion. Other women will require treatment for breast cancer that has been diagnosed by cytology or core biopsy at the Assessment Clinic. The woman's general practitioner is always contacted and advised of the recommendations. An appointment is made for the woman to see her general practitioner, to discuss further arrangements and referral to a specialist of her choice.

It should be noted that diagnostic open biopsy is not included as part of the BreastScreen SA program.

Approximately three-quarters of the women who attend for assessment will be reassured that they do not have breast cancer, and will be re-invited to the program when their next screening mammogram is due.

The screening and assessment pathway (Figure 4) illustrates the steps a woman may undergo at BreastScreen SA.

Figure 4: The screening and assessment pathway



** A small number of women choose to have their assessment outside the program. In addition, women who have abnormal lymph nodes detected on their screening mammogram are referred to their general practitioner for further investigation.*

Quality Assurance and Training

Quality assurance

Service performance at BreastScreen SA is continually subjected to intensive quality control and audit processes, to ensure that the program complies with the stringent quality standards of the NAS.

Mammographic and processing equipment is regularly monitored using prescribed testing and quality control procedures to ensure high technical quality and optimum equipment performance. Quality assurance (QA) procedures are implemented to ensure high quality imaging, including the use of a formal evaluation system to ensure high quality mammography by radiographers.

Monthly meetings of the multidisciplinary clinical team are held to review all cases of special interest. For cases proceeding to diagnostic open biopsy and treatment, comprehensive information regarding the findings is collected prior to a triple audit process, carried out by the team of coordinators representing radiology, pathology and surgery. The cooperation of each medical discipline in the QA audit process is of the utmost importance to achieve optimal results.

The Screening Support and Evaluation Unit also undertakes extensive QA activities to ensure the integrity of program data. A proportion (20%) of client information and screening data entry is checked, while 100% of assessment and treatment data is subjected to QA activities.

Stringent checks are carried out by the Screening Support, Clinical, and Monitoring and Evaluation Teams to ensure that all women and their nominated general practitioners receive the correct results letters, and those who require further investigation are recalled. Regular monitoring of the database is undertaken to make certain that there are no inconsistencies or incomplete data.

The Monitoring and Evaluation Team provides regular statistics to management and clinical staff and these are used to monitor overall program performance outcomes. The radiologists, pathologists and radiographers also receive regular individual performance statistics. This information enables the coordinators of each discipline to oversee individual performance and provide additional training if necessary. Additional statistics are also regularly provided for QA and training purposes with respect to film quality for the radiographers.

Training

Radiology, pathology and surgical staff regularly meet in their respective groups to review their work. Peer review promotes skill development and a better understanding of mammographic screening and breast cancer.

To provide ongoing education for radiologists, the Clinical Director ensures that all cases investigated at the Assessment Clinic are available for weekly review. The Clinical Director also coordinates a comprehensive training program for radiology registrars. This involves one week of on-site instruction, and double-reading with expert BreastScreen SA readers.

Radiographer training is provided by experienced BreastScreen SA radiographer tutors at the Frome Road Training Centre, a joint initiative of BreastScreen SA and the University of South Australia. The Centre offers academic and clinical instruction to post-graduate radiographers in this specialist area of radiography - a "first" in mammography training in Australia. It also serves as a screening clinic.

The training program caters for radiographers within BreastScreen SA, and also attracts participants from intrastate, interstate and overseas. The South Australian training model has been adopted by interstate screening programs.

Administrative staff are encouraged to develop their skills and knowledge in all screening and assessment support functions. Both internal and external training is offered, and regular performance feedback is provided. Monthly meetings provide an effective forum for team building and communication.

Three professional development days for all staff are held each year, to foster a strong team culture within the organisation, and provide training and development opportunities. Presentations on a broad range of subjects are made by staff, visiting medical specialists and invited speakers. All staff are further supported to undertake training and professional development opportunities tailored to meet their individual needs.

2001 and 2002 Statistical Report Summary

Attendance

BreastScreen SA performed 69,801 screening mammograms in 2001, representing the highest number of screening mammograms performed since the program's inception in 1989. In 2002, there were 68,576 screening mammograms performed. The target group of women aged 50 to 69 years represented 77.4% of all screening mammograms performed in 2001 and 77.6% in 2002. Women returning for subsequent screens represented 84.6% of total screening mammograms performed in 2001 and 85.9% in 2002.

Demography

Women living in rural and remote areas represented 23.4% of screening mammograms in 2001 and 18.4% in 2002. Approximately one third of screening mammograms in both 2001 and 2002 were for women born outside Australia. Women who speak a language other than English at home represented 12.2% of screening mammograms in 2001 and 11.6% in 2002. Indigenous women represented 0.5% of screening mammograms in 2001 and 0.4% in 2002.

Participation rates

The participation rate for all women in South Australia aged 50 to 69 for the two years ended 31 December 2001 was 64.6%. The rate for the two years ended 31 December 2002 was 64.9%. Higher participation rates occurred for women living outside metropolitan Adelaide. Participation rates were lower for CALD women and for Indigenous women compared to all women screened.

Rescreen rates

The 2001 rescreen rate for women aged 50 to 69 was 67.8% for first screens and 82.4% for subsequent screens. The 2002 rescreen rate was 66.2% for first screens and 82.6% for subsequent screens.

Women recalled for assessment

There were 1,937 women recalled for assessment for screening mammograms performed in 2001 and 2,065 women recalled for screening mammograms performed in 2002. For women aged 50 to 69, the recall rate for screening mammograms performed in 2001 was 4.9% for first screens and 2.3% for subsequent screens, and the 2002 recall rate was 6.3% for first screens and 2.5% for subsequent screens. The overall recall rate for women aged 50 to 69 was 2.6% for all screening mammograms performed in 2001 and 2.9% for all screening mammograms performed in 2002.

Assessment procedures

Of the 1,900 women who attended Level 1 assessment for screening mammograms performed in 2001, there were 1,098 women (57.8%) cleared at Level 1 assessment and 802 (42.2%) recommended for Level 2 assessment. In 2002, there were 2,020 women who attended Level 1 assessment. Of these, there were 1,186 women (58.7%) cleared at Level 1 assessment and 834 (41.3%) recommended for Level 2 assessment. FNAB was the most common Level 2 assessment procedure used, and there was an increase in the use of core biopsy procedures.

Breast cancers detected

There were 417 breast cancers detected for women screened in 2001, comprising 80.8% invasive breast cancers and 19.2% ductal carcinoma in situ (DCIS). There were 434 breast cancers detected for women screened in 2002, comprising 81.1% invasive breast cancers and 18.9% DCIS.

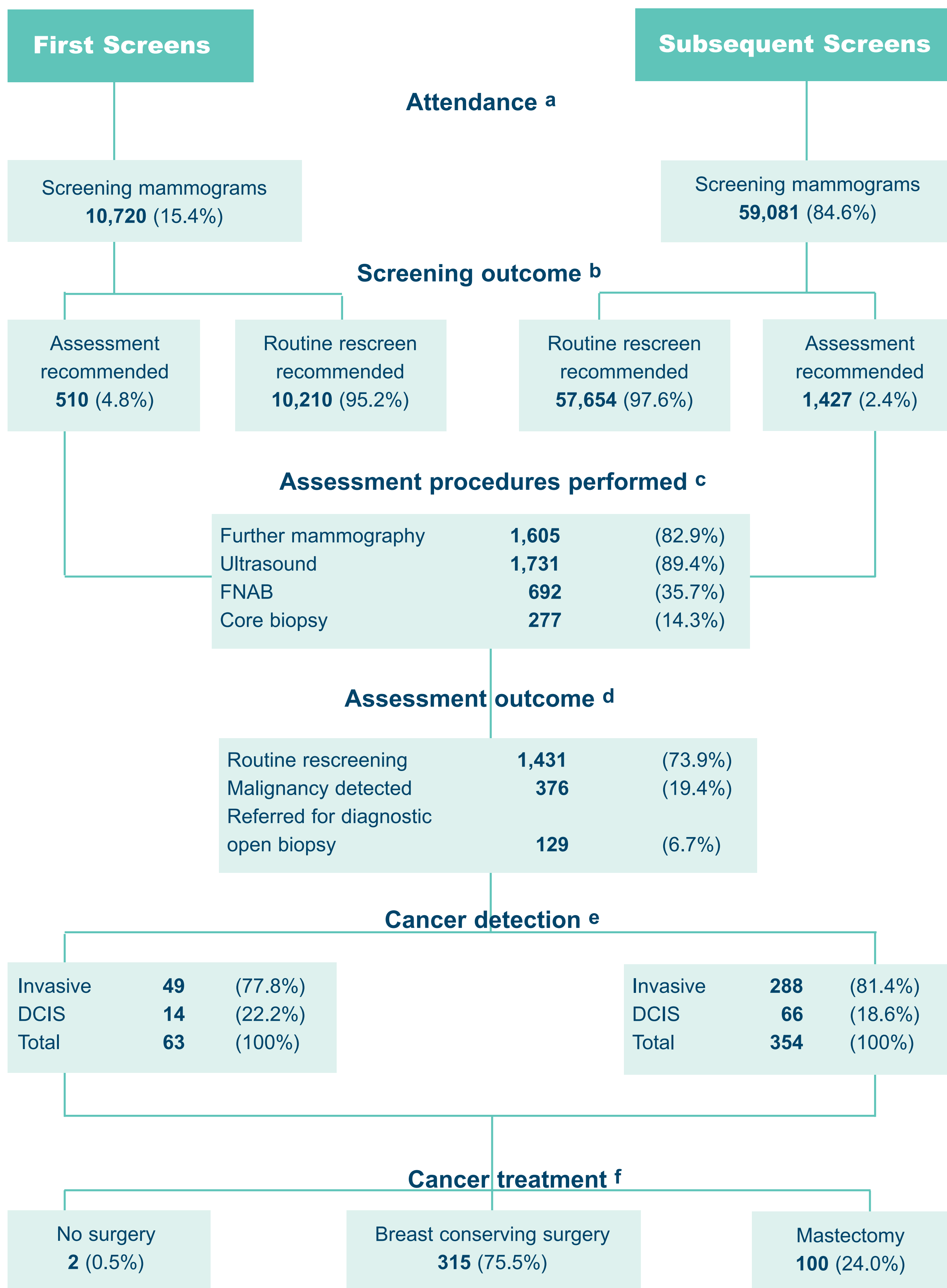
The NAS require that for women aged 50 to 69, the detection rate for invasive breast cancer for first screens should be greater than or equal to 50 per 10,000 women screened. In 2001, the invasive breast cancer detection rate for first screens for women aged 50 to 69 was 54.5 per 10,000 women screened, and in 2002 the detection rate was 83 per 10,000 women screened.

The NAS require that for women aged 50 to 69, the detection rate for invasive breast cancer for subsequent screens should be greater than or equal to 35 per 10,000 women screened. In 2001, the invasive breast cancer detection rate for subsequent screens for women aged 50 to 69 was 46.7 per 10,000 women screened, and in 2002 the detection rate was 50.6 per 10,000 women screened.

Small invasive breast cancers detected

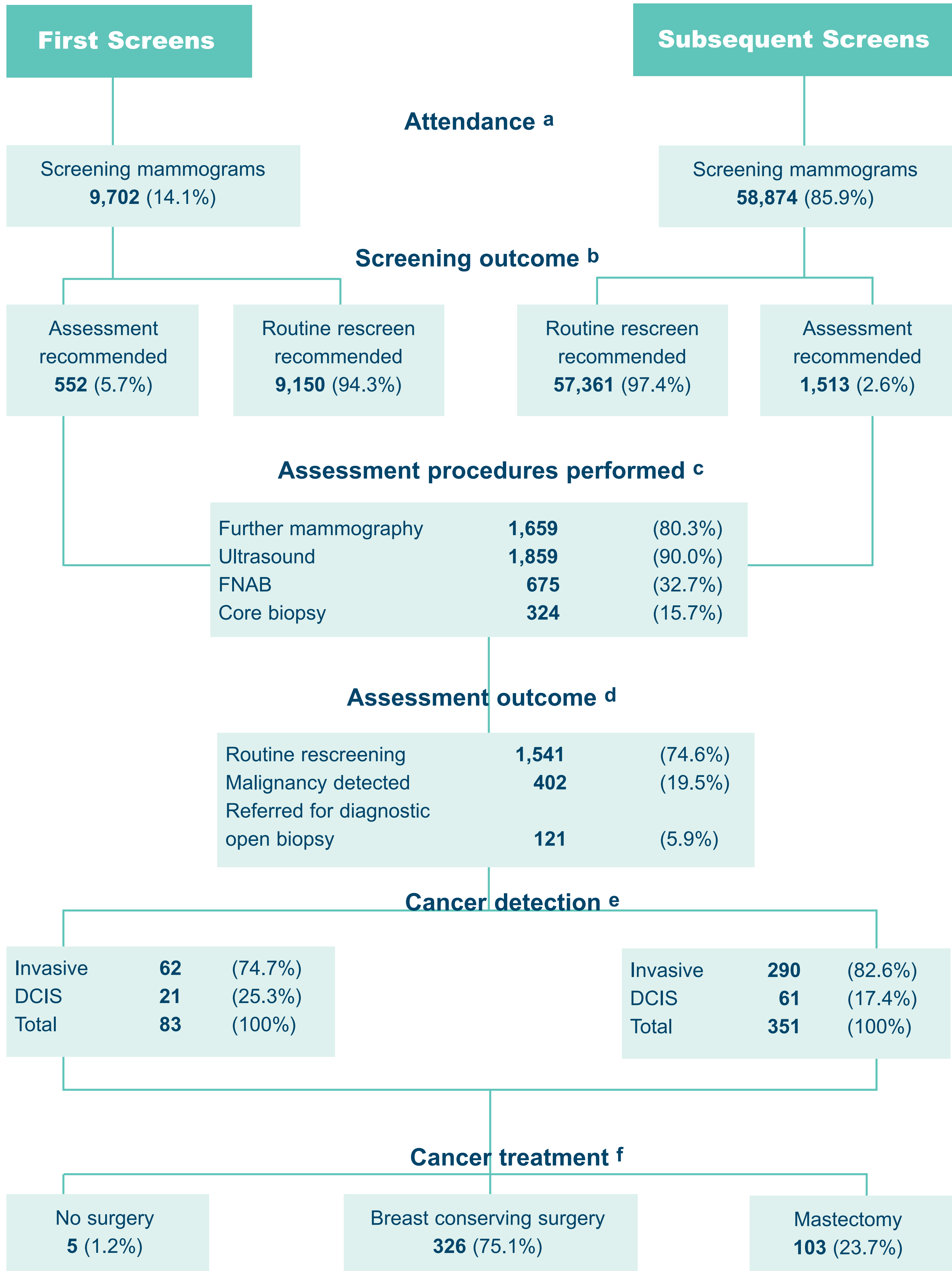
The NAS require a detection rate greater than or equal to 25 per 10,000 women screened for small invasive breast cancers (cancers less than or equal to 15mm) for women aged 50 to 69. The detection rate for small invasive breast cancer for women aged 50 to 69 was 30.7 per 10,000 women screened in 2001 and 35.1 per 10,000 women screened in 2002.

Figure 5: Summary of outcomes of breast cancer screening and assessment in 2001



Derived from: [a]Table 1; [b]Table 22; [c]Tables 23,24; [d]Table 30; [e]Table 32; [f]Table 40.

Figure 6: Summary of outcomes of breast cancer screening and assessment in 2002



Derived from: [a]Table 1; [b]Table 22; [c]Tables 23, 24; [d]Table 30; [e]Table 33; [f]Table 40.

Characteristics of Women Screened

The following information is derived primarily from data collected via the Information and Consent Form completed by each woman prior to screening. It includes details such as attendance history, demographic information, details of cultural and linguistic diversity, breast symptoms present at the time of screening, personal and family history of breast cancer, and use of hormone replacement therapy.

Attendance history

Table 1 shows the number of screening mammograms performed for each age group during 2001 and 2002, by attendance history. Attendance history refers to whether women attended BreastScreen SA for the first time ('first screens') or whether they had previously attended BreastScreen SA ('subsequent screens'). In total, there were 69,801 screening mammograms performed during 2001 and 68,576 screening mammograms performed during 2002, for women aged 40 and over.

The proportion of screening mammograms for women aged 50 to 69 was 77.4% of screening mammograms performed in 2001 and 77.6% in 2002. Screening mammograms for women aged 40 to 49 represented 14.7% of screening mammograms performed in 2001 and 14.2% of screening mammograms performed in 2002. The proportion of screening mammograms for women aged 70 years and over was 7.9% in 2001 and 8.2% in 2002.

There was a continued increase in attendance for subsequent screens with a corresponding decline in attendance for first screens. During 2001, there were 10,720 first screens comprising 15.4% of screening mammograms performed. In 2002, there were 9,702 women who attended for their first screen, representing 14.1% of total screening mammograms performed.

Of the women who attended for their first screen, 23.9% in 2001 and 25% in 2002 reported that they had a previous mammogram outside the BreastScreen SA program within the previous five-year period.

Table 1: Screening mammograms by attendance history and age – 2001 and 2002

	Age group						
Attendance history	40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
First screens	4425	5131	742	339	83	**5873**	10720
	43.2%	16.2%	3.3%	6.7%	19.7%	**10.9%**	15.4%
Subsequent screens	5811	26538	21648	4745	339	**48186**	59081
	56.8%	83.8%	96.7%	93.3%	80.3%	**89.1%**	84.6%
Total	10236	31669	22390	5084	422	**54059**	69801
	100%	100%	100%	100%	100%	**100%**	100%
Age distribution	14.7%	45.4%	32.1%	7.3%	0.6%	**77.4%**	100%
				2002			
First screens	3982	4812	609	227	72	**5421**	9702
	40.9%	15.0%	2.9%	4.4%	16.8%	**10.2%**	14.1%
Subsequent screens	5765	27270	20521	4961	357	**47791**	58874
	59.1%	85.0%	97.1%	95.6%	83.2%	**89.8%**	85.9%
Total	9747	32082	21130	5188	429	**53212**	68576
	100%	100%	100%	100%	100%	**100%**	100%
Age distribution	14.2%	46.8%	30.8%	7.6%	0.6%	**77.6%**	100%

Figure 7 shows first screens and subsequent screens in 2002 for women aged 40 and over, stratified by five-year age groups. Women aged 50 to 54 represented the largest number of women who attended for their first screen. This follows the trend for women screened since 1997, reflecting the positive response to recruitment strategies, such as use of the Electoral Roll, in targeting women aged 50 to 69.

Figure 7: Screening mammograms by attendance history and age – 2002

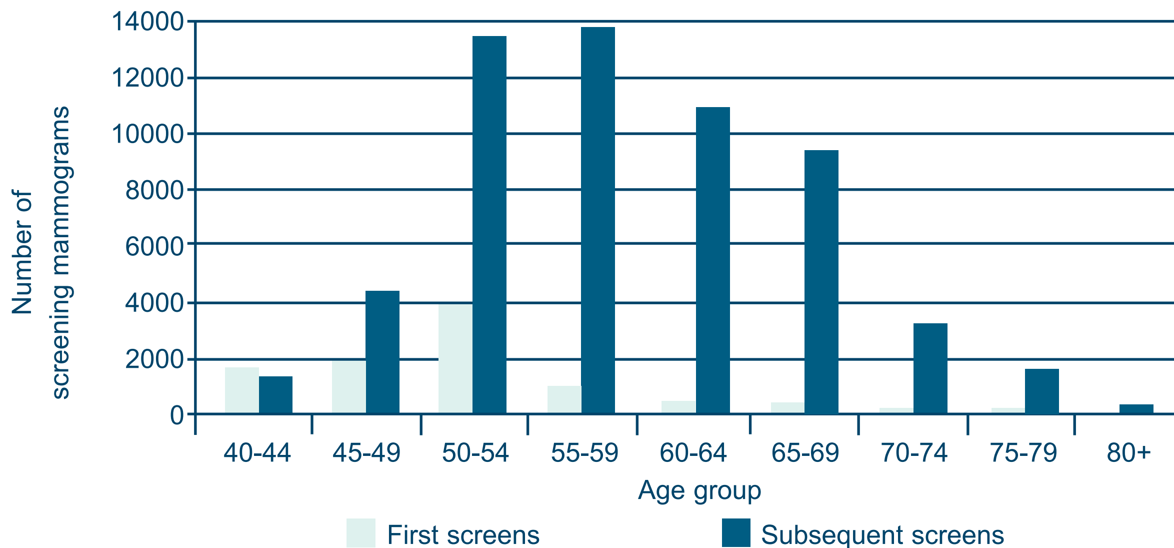


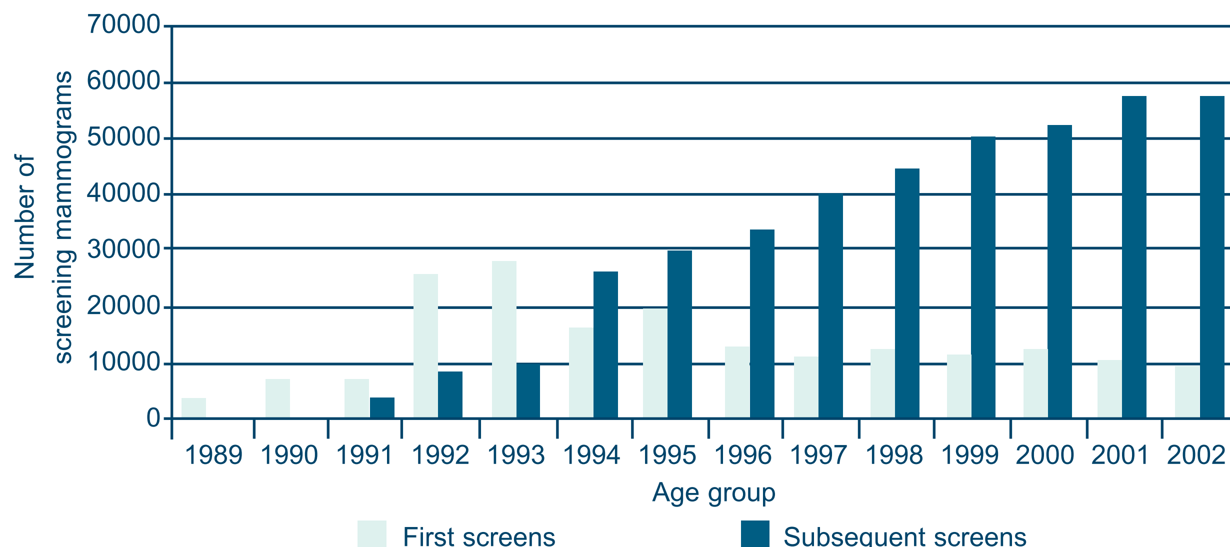
Table 2 and Figure 8 show that since screening commenced in January 1989, there has been an overall steady increase in the number of screening mammograms each year. By the end of 2002, a total of 201,531 women had 621,863 screening mammograms with BreastScreen SA since January 1989. The program has grown from 5,929 screening mammograms performed during the first year of operation to 68,576 screening mammograms performed in 2002.

Table 2: Screening mammograms by attendance history and year – 1989 to 2002

Year	First screens	Subsequent screens	Total screening mammograms	Cumulative total
1989	5928	1	5929	5929
1990	7400	7	7407	13336
1991	7757	3432	11189	24525
1992	26573	8272	34845	59370
1993	28456	9799	38255	97625
1994	17092	25958	43050	140675
1995	20049	30499	50548	191223
1996	14081	34295	48376	239599
1997	13030	41050	54080	293679
1998	14568	45543	60111	353790
1999	13110	51090	64200	417990
2000	13069	52427	65496	483486
2001	10720	59081	69801	553287
2002	9702	58874	68576	621863

The notable increase in the number of screening mammograms in 1992 is attributable to the expansion of the program. Clinics were relocated from the public hospital system into the community and a mobile service was introduced for women living in rural areas. The greatest number of new clients screened by BreastScreen SA occurred in 1993 as a result of program expansion. Overall, the number of first screens has steadily declined since then. The number of attendances for subsequent screens has steadily increased throughout the life of the program, apart from a slight decrease during 2002.

Figure 8: Screening mammograms by attendance history and year – 1989 to 2002



Area of residence

In South Australia, 81.8% of the population of women aged 40 and over resides in Adelaide or Outer Adelaide.[5] 'Adelaide' relates to the metropolitan Adelaide area defined as the Adelaide Statistical Division by the Australian Bureau of Statistics (ABS).[6] 'Outer Adelaide' is defined by the ABS as extending to the Mount Lofty Ranges in the east, to Mallala in the north and to Victor Harbor in the south. Another 6.4% of women aged 40 and over resides in the six major rural towns of Mount Gambier, Murray Bridge, Port Augusta, Port Lincoln, Port Pirie and Whyalla. The remaining 11.8% resides in other rural or remote areas.

Most of the women living in rural towns or in other rural or remote areas attend for screening on mobile x-ray units that visit every two years. Some women in Adelaide and Outer Adelaide also attend for screening on the third mobile x-ray unit that was introduced in February 2000. In 2001, the three mobile x-ray units performed 18,303 screening mammograms, representing 26.2% of total screening mammograms. During 2002, there were 19,207 screening mammograms performed by the mobile x-ray units, representing 28% of total screening mammograms.

5 ABS, Estimated Resident Population, June 2002.

6 ABS, Population by Age and Sex, South Australia, June 2002.

Table 3 shows the number of screening mammograms performed by area of residence for each age group. Screening mammograms performed in the Adelaide area represented 70.8% of total screening mammograms in 2001 and a similar proportion of 70.9% in 2002. The proportion of screening mammograms for women in Outer Adelaide was lower in 2001 than in 2002. Correspondingly, the proportion of screening mammograms in rural areas was higher in 2001 than in 2002. This reflects the itinerary of the mobile x-ray units for the two years. In 2001, the mobile x-ray units visited predominantly rural locations, whilst in 2002 they included visits to the two largest locations in Outer Adelaide.

Table 3: Screening mammograms by area of residence and age – 2001 and 2002

	Age group						
Area of residence	**40-49**	**50-59**	**60-69**	**70-79**	**80+**	**50-69**	**Total**
				2001			
Adelaide	7345	22427	15861	3498	299	**38288**	49430
	71.8%	70.8%	70.8%	68.8%	70.9%	**70.8%**	70.8%
Outer Adelaide	515	1936	1270	183	11	**3206**	3915
	5.0%	6.1%	5.7%	3.6%	2.6%	**5.9%**	5.6%
Rural towns	973	3000	1983	507	47	**4983**	6510
	9.5%	9.5%	8.9%	10.0%	11.1%	**9.2%**	9.3%
Other rural/remote	1389	4243	3246	891	65	**7489**	9834
	13.6%	13.4%	14.5%	17.5%	15.4%	**13.9%**	14.1%
Interstate	14	63	30	5	0	**93**	112
	0.1%	0.2%	0.1%	0.1%	0%	**0.2%**	0.2%
Total	10236	31669	22390	5084	422	**54059**	69801
	100%	100%	100%	100%	100%	**100%**	100%
				2002			
Adelaide	6642	23326	14897	3449	282	**38223**	48596
	68.1%	72.7%	70.5%	66.5%	65.7%	**71.8%**	70.9%
Outer Adelaide	1084	3170	2275	662	48	**5445**	7239
	11.1%	9.9%	10.8%	12.8%	11.2%	**10.2%**	10.6%
Rural towns	458	1435	1109	256	19	**2544**	3277
	4.7%	4.5%	5.2%	4.9%	4.4%	**4.8%**	4.8%
Other rural/remote	1541	4097	2822	816	80	**6919**	9356
	15.8%	12.8%	13.4%	15.7%	18.6%	**13.0%**	13.6%
Interstate	22	54	27	5	0	**81**	108
	0.2%	0.2%	0.1%	0.1%	0%	**0.2%**	0.2%
Total	9747	32082	21130	5188	429	**53212**	68576
	100%	100%	100%	100%	100%	**100%**	100%

Country of birth

The ABS 2001 Census data indicates that 34.9% of the population of women in South Australia aged 40 years and over were born overseas.[7] Table 4 shows the country of birth by age group for women who attended screening at BreastScreen SA in 2001 and 2002. Approximately one-third of screening mammograms performed by BreastScreen SA in 2001 and 2002 were for women born outside Australia. Of these, approximately half were from countries where English is not the first language.

Table 4: Screening mammograms by country of birth and age – 2001 and 2002

Country of birth		Age group 40-49	50-59	60-69	70-79	80+	50-69	Total	% Country
Australia	2001	7589	21489	13872	3716	325	**35361**	46991	67.3%
	2002	7382	21824	13007	3801	336	**34831**	46350	67.6%
UK and Ireland	2001	1252	4816	4012	669	57	**8828**	10806	15.5%
	2002	1127	4769	4109	705	55	**8878**	10765	15.7%
Italy	2001	156	976	1272	190	3	**2248**	2597	3.7%
	2002	130	962	1119	172	9	**2081**	2392	3.5%
Greece	2001	100	566	704	68	1	**1270**	1439	2.1%
	2002	53	549	597	70	1	**1146**	1270	1.9%
Germany	2001	64	623	421	103	5	**1044**	1216	1.7%
	2002	66	646	384	105	9	**1030**	1210	1.8%
Netherlands	2001	75	500	270	68	6	**770**	919	1.3%
	2002	67	475	265	70	5	**740**	882	1.3%
Former Yugoslav states	2001	59	319	291	28	1	**610**	698	1.0%
	2002	58	249	236	24	0	**485**	567	0.8%
Other Europe	2001	173	803	683	132	12	**1486**	1803	2.6%
	2002	159	747	621	118	11	**1368**	1656	2.4%
South East Asia	2001	324	565	240	19	0	**805**	1148	1.6%
	2002	318	666	225	15	0	**891**	1224	1.8%
Other	2001	393	901	532	73	9	**1433**	1908	2.7%
	2002	353	1053	475	88	2	**1528**	1971	2.9%
Not stated	2001	51	111	93	18	3	**204**	276	0.4%
	2002	34	142	92	20	1	**234**	289	0.4%
Total	2001	10236	31669	22390	5084	422	**54059**	69801	100%
	2002	9747	32082	21130	5188	429	**53212**	68576	100%

7 ABS Consultancy, 2001 Census: Core Data – Broad Multicultural Topics (Birthplace, Religion, Language & Ancestry Tables for SA & States), published 12 February 2003.

Culturally and linguistically diverse (CALD) women

BreastScreen SA arranges a free interpreter service for women who require assistance with bookings, screening and assessment.

At their first screen with BreastScreen SA, women provide information on whether they speak a language other than English at home. This provides data on screening mammograms performed for CALD women.

The ABS 2001 Census data indicates that 14.4% of women aged 50 to 69 living in South Australia speak a language other than English at home.[8]

Table 5 shows that 12.2% of screening mammograms in 2001 and 11.6% of screening mammograms in 2002 were performed for women who specified a language other than English that they speak at home. The majority of these women were aged 50 to 69. Screening mammograms for women aged 50 to 69 who speak a language other than English at home represented 12.9% of screening mammograms performed in 2001 and 12.1% of screening mammograms performed in 2002.

'Not stated' represents screening mammograms for women who did not provide any information on whether they speak a language other than English, or who indicated that they speak a language other than English but did not specify the language.

Table 5: Screening mammograms for CALD women by age – 2001 and 2002

Language spoken at home	Age group 40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
English	9141	28160	18724	4532	392	**46884**	60949
	89.3%	88.9%	83.6%	89.1%	92.9%	**86.7%**	87.3%
Other than English	1030	3374	3580	537	28	**6954**	8549
	10.1%	10.7%	16.0%	10.6%	6.6%	**12.9%**	12.2%
Not stated	65	135	86	15	2	**221**	303
	0.6%	0.4%	0.4%	0.3%	0.5%	**0.4%**	0.4%
Total	10236	31669	22390	5084	422	**54059**	69801
	100%	100%	100%	100%	100%	**100%**	100%
				2002			
English	8736	28537	17966	4677	399	**46503**	60315
	89.6%	89.0%	85.0%	90.2%	93.0%	**87.4%**	88.0%
Other than English	956	3375	3070	493	29	**6445**	7923
	9.8%	10.5%	14.5%	9.5%	6.8%	**12.1%**	11.6%
Not stated	55	170	94	18	1	**264**	338
	0.6%	0.5%	0.4%	0.3%	0.2%	**0.5%**	0.5%
Total	9747	32082	21130	5188	429	**53212**	68576
	100%	100%	100%	100%	100%	**100%**	100%

8 ABS Consultancy, 2001 Census: Core Data – Broad Multicultural Topics (Birthplace, Religion, Language & Ancestry Tables for SA & States), published 12 February 2003. Proportional analysis of this data was used to determine populations for each age group.

Indigenous women

Table 6 shows that in 2001, there were 360 screening mammograms performed by BreastScreen SA for women who identified themselves as being of Aboriginal or Torres Strait Islander descent, representing 0.5% of total screening mammograms. In 2002, the number of screening mammograms performed for Indigenous women was 247, representing 0.4% of total screening mammograms. In the ABS 2001 Census, 0.7% of the female population in South Australia aged 40 years and over identified themselves as being of Indigenous descent.[9]

A significant proportion of screening mammograms for Indigenous women were performed on the mobile x-ray units that visit rural and remote locations every two years. The mobile x-ray unit visited Marla in 2001 which provided access to screening for many of the Indigenous women residing on the Anangu Pitjantjatjara Lands. This is reflected in the larger number of screening mammograms for Indigenous women performed in 2001 compared with 2002.

Table 6: Screening mammograms by Indigenous status and age – 2001 and 2002

	Age group						
Indigenous status	**40-49**	**50-59**	**60-69**	**70-79**	**80+**	**50-69**	**Total**
				2001			
Indigenous women	74	158	102	22	4	**260**	360
	0.7%	0.5%	0.5%	0.4%	0.9%	**0.5%**	0.5%
Non-Indigenous women	10109	31382	22217	5046	414	**53599**	69168
	98.8%	99.1%	99.2%	99.3%	98.1%	**99.1%**	99.1%
Not stated	53	129	71	16	4	**200**	273
	0.5%	0.4%	0.3%	0.3%	0.9%	**0.4%**	0.4%
Total	10236	31669	22390	5084	422	**54059**	69801
	100%	100%	100%	100%	100%	**100%**	100%
				2002			
Indigenous women	59	120	63	4	1	**183**	247
	0.6%	0.4%	0.3%	0.1%	0.2%	**0.3%**	0.4%
Non-Indigenous women	9652	31836	21010	5164	427	**52846**	68089
	99.0%	99.2%	99.4%	99.5%	99.5%	**99.3%**	99.3%
Not stated	36	126	57	20	1	**183**	240
	0.4%	0.4%	0.3%	0.4%	0.2%	**0.3%**	0.3%
Total	9747	32082	21130	5188	429	**53212**	68576
	100%	100%	100%	100%	100%	**100%**	100%

9 ABS Consultancy, 2001 Census: Indigenous Status by 5 year age groups by Sex for all SLAs in SA, 20 December 2002.

Women with breast symptoms

BreastScreen SA is a population-based screening program for women with no breast symptoms. Women reporting breast symptoms when making an appointment are referred to their general practitioner. Women reporting breast symptoms at the time of screening are advised to consult their general practitioner for clinical assessment of their breast symptoms, if no mammographic abnormality is detected.

Table 7 shows breast symptoms reported by women at the time of screening. 'Nipple discharge' includes any type of nipple discharge. 'Other breast symptoms' includes any breast symptoms, other than breast lumps or nipple discharge, reported by women at the time of screening. Where women reported more than one type of symptom, Table 7 records only one symptom in the following order of priority: lump, nipple discharge and other breast symptoms. Women reporting no breast symptoms represented 91.4% of screening mammograms in 2001 and 91.5% of screening mammograms in 2002.

The BreastScreen SA client database shows that of the 1,930 screening mammograms in 2001 for women who reported a breast lump, 405 women also reported nipple discharge and/or other breast symptoms. Of the 381 mammograms in 2001 for women who reported nipple discharge, 55 women also reported other breast symptoms. In 2002, of the 1,981 women who reported a breast lump, 410 women also reported nipple discharge and/or other breast symptoms, and of the 335 women who reported nipple discharge, 55 women also reported other breast symptoms.

Table 7: Screening mammograms by breast symptoms and age – 2001 and 2002

	Age group						
Breast symptoms	**40-49**	**50-59**	**60-69**	**70-79**	**80+**	**50-69**	**Total**
				2001			
Breast lump	540	907	385	87	11	**1292**	1930
	5.3%	2.9%	1.7%	1.7%	2.6%	**2.4%**	2.8%
Nipple discharge	128	172	57	20	4	**229**	381
	1.3%	0.5%	0.3%	0.4%	0.9%	**0.4%**	0.5%
Other breast symptoms	894	1533	849	355	46	**2382**	3677
	8.7%	4.8%	3.8%	7.0%	10.9%	**4.4%**	5.3%
No breast symptoms	8674	29057	21099	4622	361	**50156**	63813
	84.7%	91.8%	94.2%	90.9%	85.5%	**92.8%**	91.4%
Total	10236	31669	22390	5084	422	**54059**	69801
	100%	100%	100%	100%	100%	**100%**	100%
				2002			
Breast lump	511	976	410	77	7	**1386**	1981
	5.2%	3.0%	1.9%	1.5%	1.6%	**2.6%**	2.9%
Nipple discharge	114	152	55	12	2	**207**	335
	1.2%	0.5%	0.3%	0.2%	0.5%	**0.4%**	0.5%
Other breast symptoms	770	1483	873	337	41	**2356**	3504
	7.9%	4.6%	4.1%	6.5%	9.6%	**4.4%**	5.1%
No breast symptoms	8352	29471	19792	4762	379	**49263**	62756
	85.7%	91.9%	93.7%	91.8%	88.3%	**92.6%**	91.5%
Total	9747	32082	21130	5188	429	**53212**	68576
	100%	100%	100%	100%	100%	**100%**	100%

Family history of breast cancer

The Information and Consent Form completed by women prior to each screening mammogram provides family history details. All women from the age of 40 with a strong family history of breast cancer are eligible for annual screening. BreastScreen SA defines women as having a strong family history of breast cancer if they have one of the following:

- a first-degree relative (mother/sister/daughter, father/brother/son) with breast cancer diagnosed before the age of 50
- a first-degree relative with cancer in both breasts (diagnosed at any age)
- two or more first-degree relatives with breast cancer (diagnosed at any age).

Women who report a family history of breast cancer different to that defined above are classified as 'other family history'.

Table 8 shows that women with a strong family history of breast cancer represented 7.4% of total screening mammograms performed in 2001 and 7.5% of screening mammograms performed in 2002. During 2001 and 2002, a family history of breast cancer was reported by a larger proportion of women aged 40 to 49 and women aged 80 and over than in other age groups.

Table 8: Screening mammograms by family history of breast cancer and age – 2001 and 2002

Family history of breast cancer	Age group						
	40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
Strong family history	1150	1989	1547	419	31	**3536**	5136
	11.2%	6.3%	6.9%	8.2%	7.3%	**6.5%**	7.4%
Other family history	2476	5590	3600	885	88	**9190**	12639
	24.2%	17.7%	16.1%	17.4%	20.9%	**17.0%**	18.1%
No family history	6487	23784	17086	3748	298	**40870**	51403
	63.4%	75.1%	76.3%	73.7%	70.6%	**75.6%**	73.6%
Not stated	123	306	157	32	5	**463**	623
	1.2%	1.0%	0.7%	0.6%	1.2%	**0.9%**	0.9%
Total	10236	31669	22390	5084	422	**54059**	69801
	100%	100%	100%	100%	100%	**100%**	100%
				2002			
Strong family history	1077	2039	1550	464	42	**3589**	5172
	11.0%	6.4%	7.3%	8.9%	9.8%	**6.7%**	7.5%
Other family history	2342	5946	3525	987	93	**9471**	12893
	24.0%	18.5%	16.7%	19.0%	21.7%	**17.8%**	18.8%
No family history	6215	23810	15911	3698	294	**39721**	49928
	63.8%	74.2%	75.3%	71.3%	68.5%	**74.6%**	72.8%
Not stated	113	287	144	39	0	**431**	583
	1.2%	0.9%	0.7%	0.8%	0%	**0.8%**	0.9%
Total	9747	32082	21130	5188	429	**53212**	68576
	100%	100%	100%	100%	100%	**100%**	100%

Personal history of breast cancer

Women with a personal history of breast cancer are eligible for annual screening after 10 years since diagnosis, or if they are not under the regular care of a specialist. There were 246 screening mammograms (0.4% of total screening mammograms) performed in 2001 and 267 screening mammograms (0.4% of total screening mammograms) performed in 2002 for women with a personal history of breast cancer.

Breast implant status

Table 9 shows that during 2001, there were 456 screening mammograms (0.7% of total screening mammograms) performed for women who reported on the BreastScreen SA Information and Consent Form that they had breast implants. In 2002, there were 428 screening mammograms (0.6% of total screening mammograms) performed for women with breast implants.

Table 9: Screening mammograms by breast implant status and age – 2001 and 2002

Breast implant status	Age group						
	40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
Yes	57	285	108	6	0	**393**	456
	0.6%	0.9%	0.5%	0.1%	0%	**0.7%**	0.7%
No	10179	31382	22280	5077	422	**53662**	69340
	99.4%	99.1%	99.5%	99.9%	100%	**99.3%**	99.3%
Not stated	0	2	2	1	0	**4**	5
	0%	0%	0%	0%	0%	**0%**	0%
Total	10236	31669	22390	5084	422	**54059**	69801
	100%	100%	100%	100%	100%	**100%**	100%
				2002			
Yes	50	282	87	9	0	**369**	428
	0.5%	0.9%	0.4%	0.2%	0%	**0.7%**	0.6%
No	9697	31799	21043	5179	428	**52842**	68146
	99.5%	99.1%	99.6%	99.8%	99.8%	**99.3%**	99.4%
Not stated	0	1	0	0	1	**1**	2
	0%	0%	0%	0%	0.2%	**0%**	0%
Total	9747	32082	21130	5188	429	**53212**	68576
	100%	100%	100%	100%	100%	**100%**	100%

Hormone replacement therapy

Table 10 shows the number of screening mammograms performed for women who reported taking hormone replacement therapy (HRT) in the six months prior to their screening mammogram. HRT use for all women screened by BreastScreen SA increased from 33.2% of screening mammograms performed in 1992, when HRT information was first recorded by the program, to 37.5% of screening mammograms performed in 2001 and 37.7% in 2002. HRT use was higher for women aged 50 to 69, where HRT use increased from 36.9% of screening mammograms performed in 1992 to more than 42% in both 2001 and 2002.

Table 10: Screening mammograms by HRT use and age – 2001 and 2002

	Age group						
HRT use	40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
Yes	1916	14169	8791	1234	54	**22960**	26164
	18.7%	44.7%	39.3%	24.3%	12.8%	**42.5%**	37.5%
No	8317	17485	13588	3844	367	**31073**	43601
	81.3%	55.2%	60.7%	75.6%	87.0%	**57.5%**	62.5%
Not stated	3	15	11	6	1	**26**	36
	0%	0%	0%	0.1%	0.2%	**0%**	0.1%
Total	10236	31669	22390	5084	422	**54059**	69801
	100%	100%	100%	100%	100%	**100%**	100%
				2002			
Yes	1836	14008	8531	1428	62	**22539**	25865
	18.8%	43.7%	40.4%	27.5%	14.5%	**42.4%**	37.7%
No	7907	18058	12581	3756	366	**30639**	42668
	81.1%	56.3%	59.5%	72.4%	85.3%	**57.6%**	62.2%
Not stated	4	16	18	4	1	**34**	43
	0%	0%	0.1%	0.1%	0.2%	**0.1%**	0.1%
Total	9747	32082	21130	5188	429	**53212**	68576
	100%	100%	100%	100%	100%	**100%**	100%

Table 11, based on the most recent information available from other state/territory screening programs, shows that women aged 50 to 69 who were screened at BreastScreen SA reported a higher rate of HRT use than women screened in the other listed states and territories in Australia.

Table 11: HRT use by women aged 50 to 69, by state/territory screening programs

Program	Reporting period	HRT use for women aged 50 to 69 as a % of total screening mammograms
BreastScreen SA	2002	42.4%
BreastScreen WA	1999/2000	37.2%[10]
BreastScreen Victoria	2002	28.5%[11]
BreastScreen ACT & SE NSW	1998/1999	35.2%[12]

10 BreastScreen WA 1999-2000 Statistical Report (financial year).

11 BreastScreen Victoria 2002 Annual Statistical Report, based on HRT information available for 89.2% of women screened.

12 BreastScreen ACT & SE NSW Annual Statistical Report 1998/1999 (financial year).

Recruitment

Most of the women who attend BreastScreen SA are recruited as a result of personalised invitation letters. The following types of invitations are sent to recruit women to the program:

- 'Electoral Roll invitations' are sent to women aged 50 to 69 years whose names appear on the South Australian Electoral Roll and who have not previously attended BreastScreen SA.
- 'Electoral Roll re-invitations' are sent to women who did not respond to an Electoral Roll invitation within the last 12 months.
- 'Routine recall invitations' are sent every two years to women aged 40 to 69 years who have previously attended BreastScreen SA. They are sent annually to women with a personal history of breast cancer or a strong family history of the disease.

Where no response is received to an invitation, reminder letters are sent to women aged 50 to 69 at intervals of approximately six weeks, 12 weeks and 12 months after the initial invitation.

When women reach 70 years of age, they are no longer sent personal invitations. Instead, when they attend for screening, they are issued with a leaflet explaining why they will not be sent invitation letters every two years, but advising them that they are welcome to continue in the program. They are also issued with a reminder card indicating the due date of their next screening mammogram if they wish to continue screening.

Table 12 shows the number of responses within three months to invitations sent in 2001 and 2002. The highest response rate within three months of the invitation being sent was for routine recall invitations (74.8% of invitations sent in 2001 and 75.7% for 2002). With the program now firmly established, routine recall invitations represent the main type of personalised recruitment to the program.

All women aged 40 and over are eligible to participate in the program. In addition to responses to personal invitations, some women attend BreastScreen SA by initiating appointments of their own accord, or they make an appointment after three months of receiving an invitation or reminder letter.

Table 12: Response to invitations – 2001 and 2002

Invitations sent and responses	Electoral Roll	Electoral Roll re-invitation	Routine recall	Total invitations sent
		2001		
Invitations sent	5553	6195	67822	79570
Responses within three months	1982	1033	50762	53777
Response rate	35.7%	16.7%	74.8%	67.6%
		2002		
Invitations sent	4775	6924	65614	77313
Responses within three months	1818	1175	49654	52647
Response rate	38.1%	17.0%	75.7%	68.1%

Participation Rates

Participation rates are measured over a 24-month period by calculating the number of individual women screened by BreastScreen SA in each age group as a proportion of the population for that age group. The average of the Estimated Resident Populations (ERP) for 2000 and 2001 was used in calculating participation rates for the 24 months ended 31 December 2001.[13] Participation rates for the 24 months ended 31 December 2002 were based on the average of the ERP for 2001 and 2002.[14]

The NAS require that at least 70% of women in the target group aged 50 to 69 years participate in screening in the most recent 24-month period. BreastScreen SA implements recruitment strategies to maximise participation by women in the target group and to ensure that all eligible women have equal opportunity to participate in the program. In particular, participation rates are regularly monitored for groups such as Indigenous women, CALD women, and women in rural and remote areas.

Participation rates for all women by area of residence

Table 13 shows a participation rate of 64.6% for all women in South Australia aged 50 to 69 for the 24 months ended 31 December 2001, and a participation rate for all women aged 50 to 69 of 64.9% for the 24 months ended 31 December 2002. For women aged 50 to 69, the participation rate for the 24 months ended 31 December 2001 in metropolitan Adelaide[15] (63.2%) was lower than the rate for other areas of South Australia (68.6%). Similarly, for the 24 months ended 31 December 2002, the participation rate of 63.8% for metropolitan Adelaide was lower than the rate of 67.7% for other areas.

Table 13: Participation rates for 24 months by area of residence and age, for all women

Area of residence		Age group 40-49	Age group 50-69	Age group 70+
		1 January 2000 - 31 December 2001		
Adelaide	Population	82787	**113639**	70958
	Women screened	14221	**71797**	7020
	Participation rate	17.2%	**63.2%**	9.9%
Other	Population	29198	**41665**	22622
	Women screened	5911	**28566**	3493
	Participation rate	20.2%	**68.6%**	15.4%
Total	Population	111985	**155304**	93580
	Women screened	20132	**100363**	10513
	Participation rate	18.0%	**64.6%**	11.2%
		1 January 2001 - 31 December 2002		
Adelaide	Population	83658	**116880**	72568
	Women screened	13488	**74572**	7358
	Participation rate	16.1%	**63.8%**	10.1%
Other	Population	29605	**43239**	22931
	Women screened	5762	**29267**	3532
	Participation rate	19.5%	**67.7%**	15.4%
Total	Population	113263	**160119**	95499
	Women screened	19250	**103839**	10890
	Participation rate	17.0%	**64.9%**	11.4%

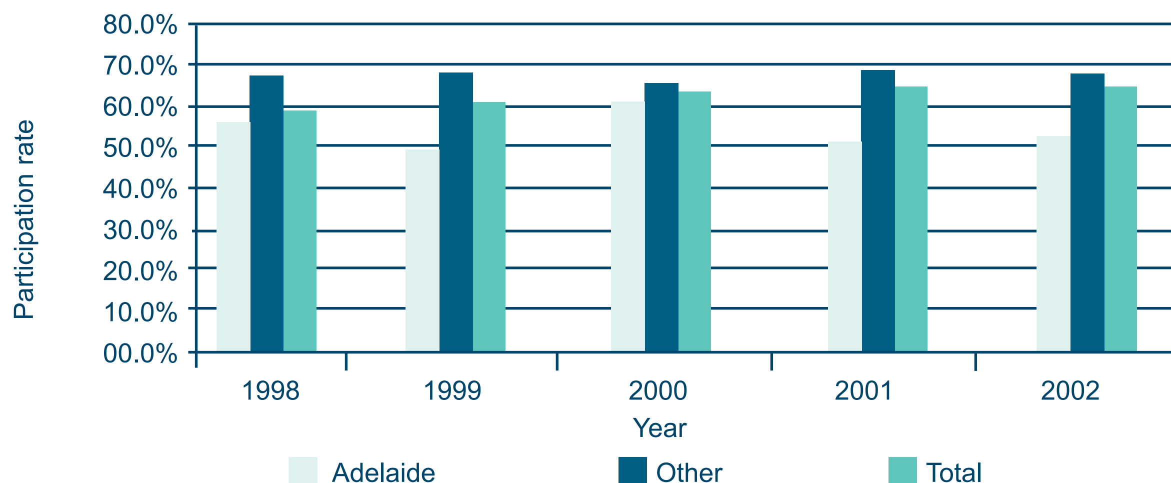
13 ABS, ERP, June 2000 and June 2001.

14 ABS, ERP, June 2001 and June 2002.

15 'Metropolitan Adelaide' refers to the Adelaide Statistical Division as defined by the ABS, Population by Age and Sex, South Australia, June 2002.

Figure 9 illustrates that participation rates for women aged 50 to 69 have been consistently higher since 1998 for women residing in areas outside metropolitan Adelaide. There has been an increase in the overall participation rate for all women aged 50 to 69 from 59.5% in 1998 to 64.9% in 2002.

Figure 9: Participation rates since 1998 for women aged 50 to 69, by area of residence



Participation rates for CALD women

In Table 14, participation rates for CALD women were calculated using the number of individual women screened who indicated that they spoke a language other than English at home, including those who did not specify the language spoken. Population data used in calculating the participation rates in Table 14 were based on the ABS 2001 Census.[16] The population of CALD women in South Australia is concentrated in metropolitan Adelaide.

Table 14 shows a participation rate of 60.5% for CALD women aged 50 to 69 for the 24 months ended 31 December 2001. For the 24 months ended 31 December 2002, the participation rate for CALD women was 61.9% which was slightly below that for all women (64.9%). Participation rates for CALD women for the 24 months ended 31 December 2002 were the same for both metropolitan Adelaide and other areas.

Table 14: Participation rates for 24 months by area of residence and age, for CALD women

	Age group		
Area of Residence	40-49	**50-69**	70+
	1 January 2000 - 31 December 2001		
Adelaide	15.3%	**60.4%**	7.8%
Other	17.8%	**62.3%**	13.6%
Total	15.5%	**60.5%**	8.3%
	1 January 2001 - 31 December 2002		
Adelaide	15.2%	**61.9%**	8.7%
Other	16.9%	**61.9%**	12.4%
Total	15.4%	**61.9%**	9.0%

16 ABS Consultancy, 2001 Census: Core Data – Broad Multicultural Topics (Birthplace, Religion, Language & Ancestry Tables for SA & States), published 12 February 2003. Proportional analysis of this data was used to determine populations for each age group.

Participation rates for Indigenous women

Population figures for Indigenous women used in calculating the participation rates in Table 15 are based on the ABS 2001 Census.[17] Table 15 shows that the participation rate for Indigenous women aged 50 to 69 was 41.5% for the 24 months ended 31 December 2002. This rate represented little change from the participation rate for the previous 24 months ended 31 December 2001 (41.6%).

The ABS 2001 Census indicates that 53.3% of Indigenous women reside in rural or remote areas. Table 15 shows that the participation rate for Indigenous women aged 50 to 69 was lower in metropolitan Adelaide (34.3%) than in other areas (47.8%) for the 24 months ended 31 December 2001. Similarly, the participation rate for the 24 months ended 31 December 2002 for Indigenous women aged 50 to 69 for metropolitan Adelaide (35.3%) was lower than the rate for other areas (46.7%).

Table 15: Participation rates for 24 months by area of residence and age, for Indigenous women

	Age group		
Area of residence	**40-49**	**50-69**	**70+**
	1 January 2000 - 31 December 2001		
Adelaide	7.1%	**34.3%**	3.2%
Other	16.0%	**47.8%**	28.2%
Total	11.7%	**41.6%**	17.7%
	1 January 2001 - 31 December 2002		
Adelaide	6.7%	**35.3%**	4.2%
Other	13.4%	**46.7%**	20.6%
Total	10.2%	**41.5%**	13.7%

17 ABS Consultancy, 2001 Census: Indigenous Status by five year age groups by Sex for all SLAs in SA, published 20 December 2002.

Rescreen rates show the percentage of women returning for screening within 27 months of a previous screening mammogram. For women aged 50 to 69, the NAS require that greater than or equal to 75% of women participating in their first screen in the program will be rescreened within 27 months, and that greater than or equal to 90% of women attending for their second or subsequent screens will be rescreened within 27 months. 'Eligible screens' refers to women screened in 1999 and 2000 who live in South Australia and who were not discharged from the program within 27 months. Age is determined at the time of the screening mammogram performed in 1999 and 2000.

Rescreen rates for all women

Table 16 shows the 2001 and 2002 rescreen rates for all screening mammograms performed in 1999 and 2000 respectively. For women aged 50 to 69, the 2001 rescreen rate was 67.8% for first screens and 82.4% for subsequent screens, and the 2002 rescreen rate was 66.2% for first screens and 82.6% for subsequent screens. Women screened at age 68 or 69 are less likely to return for screening as they are not subsequently re-invited for screening when they reach 70 years of age. The 2001 rescreen rates for women aged 50 to 67, which exclude the impact of not re-inviting women when they reach 70 years of age, were 69.9% for first screens and 86.6% for subsequent screens. The 2002 rescreen rates for women aged 50 to 67 were 67.6% for first screens and 86.5% for subsequent screens.

Table 16: Rescreen rates for all women by age – 2001 and 2002

	Age group						
Rescreen details	40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
First screens							
Eligible screens in 1999	4803	5987	1493	485	102	**7480**	12870
Rescreens within 27 months	2878	4191	879	97	10	**5070**	8055
Rescreen rate for 2001	59.9%	70.0%	58.9%	20.0%	9.8%	**67.8%**	62.6%
Subsequent screens							
Eligible screens in 1999	5112	22189	19015	3722	178	**41204**	50216
Rescreens within 27 months	4095	18989	14963	1840	73	**33952**	39960
Rescreen rate for 2001	80.1%	85.6%	78.7%	49.4%	41.0%	**82.4%**	79.6%
Total							
Eligible screens in 1999	9915	28176	20508	4207	280	48684	63086
Rescreens within 27 months	6973	23180	15842	1937	83	**39022**	48015
Rescreen rate for 2001	70.3%	82.3%	77.2%	46.0%	29.6%	**80.2%**	76.1%
				2002			
First screens							
Eligible screens in 2000	4825	6276	1151	482	78	**7427**	12812
Rescreens within 27 months	2872	4259	654	81	6	**4913**	7872
Rescreen rate for 2002	59.5%	67.9%	56.8%	16.8%	7.7%	**66.2%**	61.4%
Subsequent screens							
Eligible screens in 2000	5698	22738	18514	4251	264	**41252**	51465
Rescreens within 27 months	4550	19447	14638	2130	92	**34085**	40857
Rescreen rate for 2002	79.9%	85.5%	79.1%	50.1%	34.8%	**82.6%**	79.4%
Total							
Eligible screens in 2000	10523	29014	19665	4733	342	**48679**	64277
Rescreens within 27 months	7422	23706	15292	2211	98	**38998**	48729
Rescreen rate for 2002	70.5%	81.7%	77.8%	46.7%	28.7%	**80.1%**	75.8%

Rescreen rates by area of residence

Table 17 shows the 2001 and 2002 rescreen rates by area of residence for screening mammograms performed for all women in 1999 and 2000 respectively. For most age groups, rescreen rates for women living in metropolitan Adelaide[18] were lower than those for women living in other areas of South Australia. This is indicative of the positive client response to the mobile x-ray units that predominantly service Outer Adelaide, rural and remote areas. The presence of the mobile x-ray units every 24 months at various locations across the state provides a visible two-yearly reminder, in addition to reminder letters, resulting in women being more likely to return for screening within 27 months of their last screen.

For each age group, the rescreen rates for subsequent screens were higher than for first screens in both metropolitan Adelaide and other areas.

Table 17: Rescreen rates by area of residence, attendance history and age – 2001 and 2002

	Age group						
Area of residence	40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
First screens							
Adelaide	57.1%	67.7%	58.1%	17.9%	5.7%	**65.7%**	60.2%
Other	66.6%	76.5%	61.9%	28.0%	18.8%	**74.1%**	69.1%
Total	59.9%	70.0%	58.9%	20.0%	9.8%	**67.8%**	62.6%
Subsequent screens							
Adelaide	79.3%	84.7%	77.3%	44.9%	32.4%	**81.3%**	78.4%
Other	82.0%	87.7%	82.1%	59.7%	54.4%	**85.1%**	82.6%
Total	80.1%	85.6%	78.7%	49.4%	40.8%	**82.4%**	79.6%
				2002			
First screens							
Adelaide	57.0%	66.2%	54.8%	16.9%	9.1%	**64.4%**	59.9%
Other	64.8%	73.8%	63.6%	16.7%	4.3%	**72.2%**	65.7%
Total	59.5%	67.9%	56.8%	16.8%	7.7%	**66.2%**	61.4%
Subsequent screens							
Adelaide	78.8%	84.3%	78.0%	44.8%	32.5%	**81.5%**	78.2%
Other	82.4%	88.5%	81.6%	59.3%	41.1%	**85.4%**	82.3%
Total	79.9%	85.5%	79.1%	50.1%	34.8%	**82.6%**	79.4%

18 ‘Metropolitan Adelaide’ refers to the Adelaide Statistical Division as defined by the ABS, Population by Age and Sex, South Australia, June 2002.

Rescreen rates for CALD women

Table 18 shows the 2001 and 2002 rescreen rates for screening mammograms performed for CALD women in 1999 and 2000 respectively. Rescreen rates for CALD women were calculated using the number of screening mammograms performed for women who indicated that they speak a language other than English at home, including those who did not specify the language spoken.

The rescreen rates for CALD women aged 50 to 69 were below, but not greatly different to, the rescreen rates for all women aged 50 to 69. Similar to the trend for rescreen rates for all women aged 50 to 69 screened in 1999 and 2000, CALD women had lower rescreen rates for first screens than for subsequent screens.

Table 18: Rescreen rates for CALD women by attendance history and age – 2001 and 2002

	Age group						
Rescreen details	40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
First screens							
Eligible screens in 1999	492	742	334	67	5	**1076**	1640
Rescreens within 27 months	279	479	186	13	0	**665**	957
Rescreen rate for 2001	56.7%	64.6%	55.7%	19.4%	0%	**61.8%**	58.4%
Subsequent screens							
Eligible screens in 1999	502	2586	2914	375	12	**5500**	6389
Rescreens within 27 months	392	2195	2206	138	3	**4401**	4934
Rescreen rate for 2001	78.1%	84.9%	75.7%	36.8%	25.0%	**80.0%**	77.2%
Total							
Eligible screens in 1999	994	3328	3248	442	17	**6576**	8029
Rescreens within 27 months	671	2674	2392	151	3	**5066**	5891
Rescreen rate for 2001	67.5%	80.3%	73.6%	34.2%	17.6%	**77.0%**	73.4%
				2002			
First screens							
Eligible screens in 2000	468	777	246	53	2	**1023**	1546
Rescreens within 27 months	276	498	138	9	0	**636**	921
Rescreen rate for 2002	59.0%	64.1%	56.1%	17.0%	0%	**62.2%**	59.6%
Subsequent screens							
Eligible screens in 2000	540	2435	2791	352	16	**5226**	6134
Rescreens within 27 months	414	2042	2123	150	6	**4165**	4735
Rescreen rate for 2002	76.7%	83.9%	76.1%	42.6%	37.5%	**79.7%**	77.2%
Total							
Eligible screens in 2000	1008	3212	3037	405	18	**6249**	7680
Rescreens within 27 months	690	2540	2261	159	6	**4801**	5656
Rescreen rate for 2002	68.5%	79.1%	74.4%	39.3%	33.3%	**76.8%**	73.6%

Rescreen rates for Indigenous women

Table 19 shows the 2001 and 2002 rescreen rates for screening mammograms performed for Indigenous women in 1999 and 2000 respectively. The rescreen rates for Indigenous women aged 50 to 69 were below the rescreen rates for all women aged 50 to 69. Similar to the pattern for rescreen rates for all women aged 50 to 69, Indigenous women screened in 1999 and 2000 had lower rescreen rates for first screens than for subsequent screens.

The larger number of eligible screens in 1999 compared with 2000 reflects the mobile x-ray unit visit to Marla in 1999 which provided access to screening for many of the Indigenous women living on the Anangu Pitjantjatjara Lands. For women aged 50 to 69, eligible first screens in 1999 included 39 Indigenous women screened at Marla, and eligible subsequent screens in 1999 included 32 women at Marla. For first screens, 28 of the 39 eligible Indigenous women screened during the Marla visit (71.8%) returned for screening within 27 months. For subsequent screens, 20 of the 32 eligible Indigenous women screened during the Marla visit (62.5%) returned for screening within 27 months.

The small number of eligible first screens in 2000 for Indigenous women aged 50 to 69 limits the ability to perform a meaningful interpretation of the 2002 rescreen rate for first screens.

Table 19: Rescreen rates for Indigenous women by attendance history and age – 2001 and 2002

	Age group						
Rescreen details	40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
First screens							
Eligible screens in 1999	53	57	26	5	0	**83**	141
Rescreens within 27 months	18	35	19	4	0	**54**	76
Rescreen rate for 2001	34.0%	61.4%	73.1%	80.0%	0%	**65.1%**	53.9%
Subsequent screens							
Eligible screens in 1999	33	86	61	13	0	**147**	193
Rescreens within 27 months	18	61	40	7	0	**101**	126
Rescreen rate for 2001	54.5%	70.9%	65.6%	53.8%	0%	**68.7%**	65.3%
Total							
Eligible screens in 1999	86	143	87	18	0	**230**	334
Rescreens within 27 months	36	96	59	11	0	**155**	202
Rescreen rate for 2001	41.9%	67.1%	67.8%	61.1%	0%	**67.4%**	60.5%
				2002			
First screens							
Eligible screens in 2000	60	37	7	1	1	**44**	106
Rescreens within 27 months	23	15	4	0	0	**19**	42
Rescreen rate for 2002	38.3%	40.5%	57.1%	0%	0%	**43.2%**	39.6%
Subsequent screens							
Eligible screens in 2000	18	77	55	10	1	**132**	161
Rescreens within 27 months	12	56	33	0	1	**89**	102
Rescreen rate for 2002	66.7%	72.7%	60.0%	0%	100%	**67.4%**	63.4%
Total							
Eligible screens in 2000	78	114	62	11	2	**176**	267
Rescreens within 27 months	35	71	37	0	1	**108**	144
Rescreen rate for 2002	44.9%	62.3%	59.7%	0%	50.0%	**61.4%**	53.9%

Number of films

Most women screened require four films, comprising two views of each breast. Additional films may be required for women with larger breasts, for some women with prostheses, and for some women who report a breast symptom at the time of screening.

Table 20 shows that up to four films were used for 71.6% of screening mammograms performed in 2001 and for 71.1% of screening mammograms in 2002. Five to eight films were required for 24.8% of screening mammograms in 2001 and for 25.5% of screening mammograms in 2002.

Table 20: Screening mammograms by number of films taken and age – 2001 and 2002

	Age group						
Number of films taken	**40-49**	**50-59**	**60-69**	**70-79**	**80+**	**50-69**	**Total**
				2001			
Up to four films	7527	22818	15734	3583	299	**38552**	49961
	73.5%	72.1%	70.3%	70.5%	70.9%	**71.3%**	71.6%
Five to eight films	2378	7679	5788	1342	114	**13467**	17301
	23.2%	24.2%	25.9%	26.4%	27.0%	**24.9%**	24.8%
More than eight films	331	1172	868	159	9	**2040**	2539
	3.2%	3.7%	3.9%	3.1%	2.1%	**3.8%**	3.6%
Total screening mammograms	10236	31669	22390	5084	422	**54059**	69801
	100%	100%	100%	100%	100%	**100%**	100%
Total films taken (excluding technical repeats)	46563	146365	104523	23417	1907	**250888**	322775
Average number of films per screening mammogram	4.5	4.6	4.7	4.6	4.5	**4.6**	4.6
				2002			
Up to four films	7115	22881	14748	3703	305	**37629**	48752
	73.0%	71.3%	69.8%	71.4%	71.1%	**70.7%**	71.1%
Five to eight films	2359	8049	5597	1348	109	**13646**	17462
	24.2%	25.1%	26.5%	26.0%	25.4%	**25.6%**	25.5%
More than eight films	273	1152	785	137	15	**1937**	2362
	2.8%	3.6%	3.7%	2.6%	3.5%	**3.6%**	3.4%
Total screening mammograms	9747	32082	21130	5188	429	**53212**	68576
	100%	100%	100%	100%	100%	**100%**	100%
Total films taken (excluding technical repeats)	44285	148656	98859	23682	1956	**247515**	317438
Average number of films per screening mammogram	4.5	4.6	4.7	4.6	4.6	**4.7**	4.6

Occasionally films need to be repeated due to incorrect positioning, over-exposure or under-exposure of films, client movement or film processing faults. Table 21 shows that the proportion of technical repeat films taken was 1.5% of total films for 2001 and 1.4% of total films for 2002. The NAS require that technical repeat films should represent less than 3% of films taken.

Table 21: Technical repeat films by age – 2001 and 2002

	Age group						
Films taken	**40-49**	**50-59**	**60-69**	**70-79**	**80+**	**50-69**	**Total**
				2001			
Total films	47266	148660	106081	23750	1932	**254741**	327689
Technical repeat films	703	2295	1558	333	25	**3853**	4914
% Technical repeat films	1.5%	1.5%	1.5%	1.4%	1.3%	**1.5%**	1.5%
				2002			
Total films	44933	150763	100178	24016	1988	**250941**	321878
Technical repeat films	648	2107	1319	334	32	**3426**	4440
% Technical repeat films	1.4%	1.4%	1.3%	1.4%	1.6%	**1.4%**	1.4%

Outcome of screening

Table 22 shows that for women aged 50 to 69, 4.9% of first screens and 2.3% of subsequent screens in 2001 resulted in women being recalled for assessment of screen-detected breast abnormalities. In 2002, the recall rates for women aged 50 to 69 were 6.3% for first screens and 2.5% for subsequent screens. The NAS require recall rates of less than 10% for first screens and less than 5% for subsequent screens, for women aged 50 to 69. The overall recall rate for women aged 50 to 69 was 2.6% in 2001 and 2.9% in 2002.

Table 22: Screening outcomes by attendance history and age – 2001 and 2002

Screening outcome	Age group 40-49	50-59	60-69	70-79	80+	50-69	Total
2001							
First screens							
Routine rescreen recommended	4220 95.4%	4888 95.3%	698 94.1%	322 95.0%	82 98.8%	**5586** **95.1%**	10210 95.2%
Recalled for assessment	205 4.6%	243 4.7%	44 5.9%	17 5.0%	1 1.2%	**287** **4.9%**	510 4.8%
Total first screens	4425 100%	5131 100%	742 100%	339 100%	83 100%	**5873** **100%**	10720 100%
Subsequent screens							
Routine rescreen recommended	5662 97.4%	25957 97.8%	21109 97.5%	4600 96.9%	326 96.2%	**47066** **97.7%**	57654 97.6%
Recalled for assessment	149 2.6%	581 2.2%	539 2.5%	145 3.1%	13 3.8%	**1120** **2.3%**	1427 2.4%
Total subsequent screens	5811 100%	26538 100%	21648 100%	4745 100%	339 100%	**48186** **100%**	59081 100%
Total screening mammograms	10236	31669	22390	5084	422	**54059**	69801
Total recalled for assessment	354 3.5%	824 2.6%	583 2.6%	162 3.2%	14 3.3%	**1407** **2.6%**	1937 2.8%
2002							
First screens							
Routine rescreen recommended	3794 95.3%	4514 93.8%	567 93.1%	210 92.5%	65 90.3%	**5081** **93.7%**	9150 94.3%
Recalled for assessment	188 4.7%	298 6.2%	42 6.9%	17 7.5%	7 9.7%	**340** **6.3%**	552 5.7%
Total first screens	3982 100%	4812 100%	609 100%	227 100%	72 100%	**5421** **100%**	9702 100%
Subsequent screens							
Routine rescreen recommended	5619 97.5%	26632 97.7%	19952 97.2%	4816 97.1%	342 95.8%	**46584** **97.5%**	57361 97.4%
Recalled for assessment	146 2.5%	638 2.3%	569 2.8%	145 2.9%	15 4.2%	**1207** **2.5%**	1513 2.6%
Total subsequent screens	5765 100%	27270 100%	20521 100%	4961 100%	357 100%	**47791** **100%**	58874 100%
Total screening mammograms	9747	32082	21130	5188	429	**53212**	68576
Total recalled for assessment	334 3.4%	936 2.9%	611 2.9%	162 3.1%	22 5.1%	**1547** **2.9%**	2065 3.0%

Women recalled for assessment attend the BreastScreen SA Assessment Clinic where medical imaging, as well as clinical examination, FNAB and/or core biopsy are performed as required. Cytology results of FNAB are provided on site the same day and core biopsy results are available the next day. Most women have more than one procedure performed in the Assessment Clinic.

Assessment Clinic procedures are performed at two levels. All women recalled for assessment attend Level 1 assessment in the morning. Level 2 assessment is performed in the afternoon for women who do not have a benign or normal finding after assessment at Level 1. The outcomes of an assessment visit include a benign diagnosis, referral for definitive treatment, referral for diagnostic open biopsy or early recall for further assessment, usually within six to twelve months.

The details of assessment procedures shown in Tables 23 and 24 relate only to procedures performed by BreastScreen SA and exclude women assessed outside the program. The total number of women assessed outside the program is shown in these tables.

Level 1 assessment procedures

Level 1 procedures include further mammography (x-rays) and/or ultrasound, and a clinical examination by a medical officer. Women cleared of breast cancer after Level 1 assessment are re-invited when their next screening mammogram is due. Table 23 shows procedures performed for women assessed at Level 1 from screening mammograms performed in 2001 and 2002.

For screening mammograms performed in 2001, there were 1,937 women recalled for assessment. Of these, 1,900 women attended Level 1 assessment following screening at BreastScreen SA. Another 14 women had no breast abnormalities detected from the screening mammogram but were referred for assessment outside the program due to the detection of abnormal lymph nodes during screening.[19] A further 22 women were assessed outside the program by choice or for other reasons. Of the 1,937 women recalled for assessment, one death occurred prior to assessment. Of the 1,900 women who attended Level 1 assessment in 2001, there were 802 women (42.2%) recommended for Level 2 assessment.

For screening mammograms performed in 2002, there were 2,065 women recalled for assessment. Of these, 2,019 women attended Level 1 assessment following screening at BreastScreen SA. In addition, one woman attended Level 1 assessment at BreastScreen SA after having a screening mammogram at an interstate program. Therefore, a total of 2,020 women were assessed at Level 1 by BreastScreen SA in 2002. Of the 2,065 women recalled for assessment, there were 27 women who had no breast abnormalities detected, but were referred for assessment outside the program due to the detection of abnormal lymph nodes during screening. A further 18 women were assessed outside the program by choice or for other reasons. Another woman was not required to attend Level 1 assessment because a comparison of the BreastScreen SA screening results with details of the previous assessment by another state/territory program resulted in a routine recall recommendation. Of the 2,020 women who attended Level 1 assessment in 2002, there were 834 women (41.3%) recommended for Level 2 assessment.

19 It is BreastScreen SA policy that where a screening mammogram shows abnormal lymph nodes but no breast abnormalities are detected, the woman is not assessed at BreastScreen SA but is referred to her general practitioner for further investigation.

At Level 1 assessment, both further x-rays and ultrasound procedures were performed for 75.6% of women assessed from screening mammograms performed in 2001, and for 74.2% of women assessed from screening mammograms performed in 2002. For both 2001 and 2002, information was sought regarding the assessment outcome for all women assessed outside the program.

Table 23: Level 1 assessment procedures for individual women by age – 2001 and 2002

	Age group						
Level 1 assessment procedures	40-49	50-59	60-69	70-79	80+	**50-69**	Total
2001							
Further x-rays only	37	65	56	11	0	**121**	169
	10.5%	8.1%	9.9%	6.8%	0%	**8.8%**	8.9%
Ultrasound only	54	119	87	32	3	**206**	295
	15.3%	14.7%	15.4%	19.9%	21.4%	**15.0%**	15.5%
X-rays and ultrasound	261	623	423	118	11	**1046**	1436
	74.1%	77.2%	74.7%	73.3%	78.6%	**76.2%**	75.6%
Total Level 1	352	807	566	161	14	**1373**	1900
	100%	100%	100%	100%	100%	**100%**	100%
Total recommended for Level 2	123	336	257	79	7	**593**	802
	34.9%	41.6%	45.4%	49.1%	50.0%	**43.2%**	42.2%
Assessed outside the program:							
Abnormal lymph nodes detected	1	3	10	0	0	**13**	14
Other reasons	1	13	7	1	0	**20**	22
2002							
Further x-rays only	31	71	47	12	0	**118**	161
	9.5%	7.7%	7.8%	7.7%	0.0%	**7.8%**	8.0%
Ultrasound only	47	157	125	27	5	**282**	361
	14.4%	17.1%	20.9%	17.4%	25.0%	**18.6%**	17.9%
X-rays and ultrasound	248	692	427	116	15	**1119**	1498
	76.1%	75.2%	71.3%	74.8%	75.0%	**73.7%**	74.2%
Total Level 1	326	920	599	155	20	**1519**	2020
	100%	100%	100%	100%	100%	**100%**	100%
Total recommended for Level 2	97	372	274	74	17	**646**	834
	29.8%	40.4%	45.7%	47.7%	85.0%	**42.5%**	41.3%
Assessed outside the program:							
Abnormal lymph nodes detected	3	12	6	4	2	**18**	27
Other reasons	5	4	6	3	0	**10**	18

Level 2 assessment procedures

Most women attending Level 2 assessment undergo a clinical examination by a surgeon. In addition, FNAB and/or core biopsy procedures may be required. Table 24 shows procedures performed for women assessed at Level 2 from screening mammograms performed in 2001 and 2002.

In 2001, there were 802 women recommended for Level 2 assessment. Of these, one woman chose to continue assessment outside the program. In addition, a woman who had previously chosen to be assessed outside the program instead of attending at Level 1 assessment, subsequently attended Level 2 assessment at BreastScreen SA. For 2001, a total of 802 women attended Level 2 assessment.

In 2002, there were 834 women recommended for Level 2 assessment. In addition, a woman who had previously been assessed outside the program for Level 1 procedures subsequently attended Level 2 assessment at BreastScreen SA. In 2002, a total of 835 women attended Level 2 assessment.

After clinical examination by a surgeon, most women attending Level 2 assessment have a FNAB and then proceed to a core biopsy if needed. In 2001, a total of 104 women proceeded directly to a core biopsy without having FNAB procedures. In 2002, there were 151 women who proceeded directly to a core biopsy. The increasing trend in the use of core biopsy procedures without first performing a FNAB is largely attributable to the introduction of the vacuum assisted core biopsy (Mammotome) in 2000. Biopsy procedures were not performed for six women in 2001 and for nine women in 2002.

Table 24: Level 2 assessment procedures for individual women by age – 2001 and 2002

Level 2 assessment procedures	Age group						
	40-49	50-59	60-69	70-79	80+	**50-69**	Total
2001							
Surgical assessment only	1 0.8%	2 0.6%	3 1.2%	0 0%	0 0%	**5** **0.8%**	6 0.7%
FNAB only	88 71.5%	217 64.6%	159 61.9%	48 60.8%	7 100%	**376** **63.4%**	519 64.7%
Core biopsy only	10 8.1%	47 14.0%	37 14.4%	10 12.7%	0 0%	**84** **14.2%**	104 13.0%
FNAB and core biopsy	24 19.5%	70 20.8%	58 22.6%	21 26.6%	0 0%	**128** **21.6%**	173 21.6%
Total	123 100%	336 100%	257 100%	79 100%	7 100%	**593** **100%**	802 100%
2002							
Surgical assessment only	0 0%	5 1.3%	2 0.7%	1 1.4%	1 5.9%	**7** **1.1%**	9 1.1%
FNAB only	62 63.3%	211 56.7%	166 60.6%	52 70.3%	11 64.7%	**377** **58.4%**	502 60.1%
Core biopsy only	19 19.4%	78 21.0%	42 15.3%	10 13.5%	2 11.8%	**120** **18.6%**	151 18.1%
FNAB and core biopsy	17 17.3%	78 21.0%	64 23.4%	11 14.9%	3 17.6%	**142** **22.0%**	173 20.7%
Total	98 100%	372 100%	274 100%	74 100%	17 100%	**646** **100%**	835 100%

Trends in assessment procedures performed

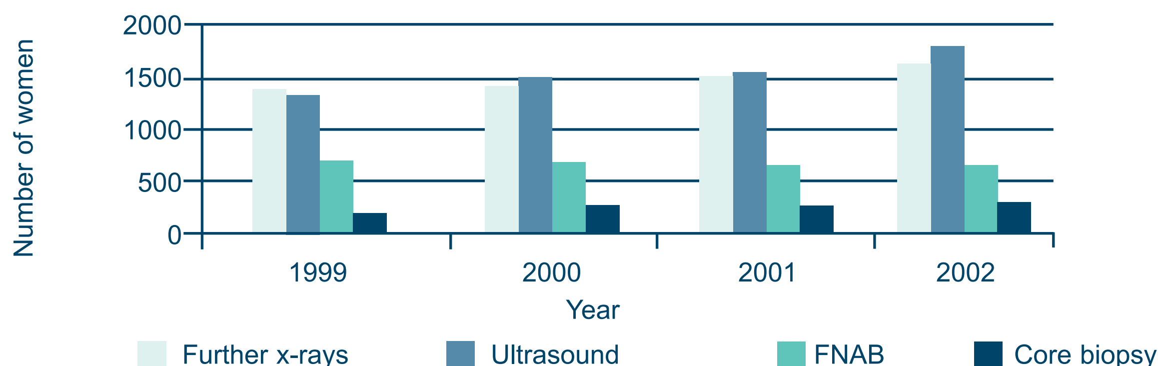
Table 25 shows the number and percentage of individual women assessed by BreastScreen SA, by type of procedure, for the years 1999 to 2002.[20] The most common assessment procedures performed were further x-rays and ultrasound. The use of ultrasound in breast assessment has continued to increase. As a result, in May 2001 a second ultrasound machine was introduced in the Assessment Clinic. By 2002, ultrasound procedures were performed for 92.0% of all women assessed by the program. The use of core biopsy procedures increased to 16.1% of all women assessed in 2002. This was largely due to the introduction of the vacuum assisted core biopsy (Mammotome) in 2000 which was used for 8.9% of all women assessed by the program in 2002.

Table 25: Percentage of individual women assessed by BreastScreen SA, by type of procedure – 1999 to 2002

Type of procedure	1999	2000	2001	2002
Further x-rays	1448 89.7%	1460 85.2%	1605 84.5%	1659 82.1%
Ultrasound	1407 87.1%	1523 88.9%	1731 91.1%	1859 92.0%
FNAB	709 43.9%	706 41.2%	692 36.4%	675 33.4%
Core biopsy - Mammotome	3 0.2%	112 6.5%	143 7.5%	179 8.9%
Core biopsy - non vacuum assisted	143 8.9%	90 5.3%	134 7.1%	145 7.2%
Women assessed by BreastScreen SA	1615	1714	1900	2020

Figure 10 shows the number of individual women assessed by BreastScreen SA who underwent each assessment procedure within the program, for the years 1999 to 2002. There has been an increase in the number of women undergoing core biopsy procedures and a decrease in the number of women undergoing FNAB. This reflects an overall worldwide trend in breast assessment to use core biopsy rather than FNAB.

Figure 10: Number of individual women undergoing assessment procedures, by type of procedure – 1999 to 2002



20 BreastScreen SA, 2003. *1999 and 2000 Statistical Report*, Wayville, South Australia, June 2003. The corresponding table in the BreastScreen SA *1999 and 2000 Statistical Report* included women assessed outside the BreastScreen SA program in the denominator.

Fine needle aspiration biopsy procedures

Table 26 shows the number of FNAB procedures performed for screening mammograms in 2001 and 2002.

For screening mammograms performed in 2001, there were 757 FNAB procedures performed. As shown in Table 24, these FNAB procedures related to 692 women, comprising 519 women who had FNAB only and 173 women who also had core biopsy procedures.

For screening mammograms performed in 2002, there were 730 FNAB procedures performed. Table 24 shows that these FNAB procedures related to 675 women, comprising 502 women who had FNAB only and 173 women who also had core biopsy procedures.

A small proportion of FNAB procedures were performed by direct palpation, but the majority of FNAB procedures were guided by ultrasound or stereotaxis. The preferred guiding technique was ultrasound. The proportion of FNAB procedures guided by ultrasound was 78.2% for screening mammograms performed in 2001 and 82.6% for screening mammograms performed in 2002. The proportion of FNAB procedures guided by stereotaxis was 11.8% for screening mammograms performed in 2001 and 8.4% for screening mammograms performed in 2002.

The decrease since 2000 in the use of stereotactic guidance for FNAB and the decrease in the total number of FNAB procedures reflects the increase in the number of women proceeding directly to a core biopsy without first having FNAB procedures, particularly since the introduction of the vacuum assisted core biopsy (Mammotome).

Table 26: FNAB procedures performed, by method and age – 2001 and 2002

	Age group						
FNAB method	40-49	50-59	60-69	70-79	80+	**50-69**	Total
2001							
Palpation	11 8.9%	28 8.9%	23 9.8%	11 14.5%	3 37.5%	**51** **9.3%**	76 10.0%
Guided by ultrasound	93 75.6%	245 77.5%	191 81.6%	60 78.9%	3 37.5%	**436** **79.3%**	592 78.2%
Guided by stereotaxis	19 15.4%	43 13.6%	20 8.5%	5 6.6%	2 25.0%	**63** **11.5%**	89 11.8%
Total FNAB	123 100%	316 100%	234 100%	76 100%	8 100%	**550** **100%**	757 100%
2002							
Palpation	6 7.1%	30 9.5%	25 10.1%	4 6.1%	1 6.3%	**55** **9.8%**	66 9.0%
Guided by ultrasound	73 85.9%	255 80.7%	205 83.0%	56 84.8%	14 87.5%	**460** **81.7%**	603 82.6%
Guided by stereotaxis	6 7.1%	31 9.8%	17 6.9%	6 9.1%	1 6.3%	**48** **8.5%**	61 8.4%
Total FNAB	85 100%	316 100%	247 100%	66 100%	16 100%	**563** **100%**	730 100%

Core biopsy procedures

Since the introduction of the use of the vacuum assisted core biopsy (Mammotome) in 2000, the number of core biopsy procedures has increased. Table 27 shows the number of core biopsy procedures performed for screening mammograms in 2001 and 2002.

For screening mammograms performed in 2001, there were 288 core biopsies. As shown in Table 24, these core biopsy procedures related to 277 women, comprising 104 women who had core biopsy only and 173 women who also had FNAB procedures.

For screening mammograms performed in 2002, there were 333 core biopsies. Table 24 shows that these core biopsy procedures related to 324 women, comprising 151 women who had core biopsy only and 173 women who also had FNAB procedures.

The largest proportion of core biopsy procedures performed for women screened in 2001 and 2002 were guided by stereotaxis, with guidance by ultrasound being used to a lesser degree. Guidance by palpation is rarely used for core biopsy procedures and was not used for women who were assessed at Level 2 following screening mammograms performed in 2001. In 2002, guidance by palpation was used for two women who required core biopsy.

Table 27: Core biopsy procedures performed, by method and age – 2001 and 2002

	Age group						
Core biopsy method	**40-49**	**50-59**	**60-69**	**70-79**	**80+**	**50-69**	**Total**
				2001			
Guided by ultrasound	16	58	46	18	0	**104**	138
	47.1%	47.5%	45.5%	58.1%	0%	**46.6%**	47.9%
Guided by stereotaxis	18	64	55	13	0	**119**	150
	52.9%	52.5%	54.5%	41.9%	0%	**53.4%**	52.1%
Total core biopsies	34	122	101	31	0	**223**	288
	100%	100%	100%	100%	0%	**100%**	100%
				2002			
Guided by palpation	0	2	0	0	0	**2**	2
	0%	1.2%	0%	0%	0%	**0.7%**	0.6%
Guided by ultrasound	17	64	55	8	3	**119**	147
	45.9%	39.8%	50.5%	38.1%	60.0%	**44.1%**	44.1%
Guided by stereotaxis	20	95	54	13	2	**149**	184
	54.1%	59.0%	49.5%	61.9%	40.0%	**55.2%**	55.3%
Total core biopsies	37	161	109	21	5	**270**	333
	100%	100%	100%	100%	100%	**100%**	100%

Fine needle aspiration biopsy results

Table 28 shows the outcome results of FNAB procedures for women who attended Level 2 assessment following screening mammograms performed during 2001 and 2002. If a woman had more than one FNAB procedure, only the most significant result, with respect to the severity of the diagnosis, was counted in Table 28.

The FNAB results in Table 28 need to be interpreted in the context of the results of other assessment procedures undertaken, as FNAB results alone do not necessarily reflect the final assessment outcome. FNAB results assist the clinical team in determining whether further procedures or follow-up are required.

All malignant cytology results are reviewed the following day. In 2001, there was a malignant result for 37% of the 692 women who had FNAB procedures. In 2002, there was a malignant result for 39% of the 675 women who had FNAB procedures.

Table 28: FNAB results for individual women by age – 2001 and 2002

	Age group						
FNAB result	40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
Inadequate specimen	8	11	14	3	0	**25**	36
	7.1%	3.8%	6.5%	4.3%	0%	**5.0%**	5.2%
Benign	57	117	72	14	1	**189**	261
	50.9%	40.8%	33.2%	20.3%	14.3%	**37.5%**	37.7%
Atypical/equivocal	21	34	7	5	1	**41**	68
	18.8%	11.8%	3.2%	7.2%	14.3%	**8.1%**	9.8%
Suspicious	3	24	31	13	0	**55**	71
	2.7%	8.4%	14.3%	18.8%	0%	**10.9%**	10.3%
Malignant	23	101	93	34	5	**194**	256
	20.5%	35.2%	42.9%	49.3%	71.4%	**38.5%**	37.0%
Total	112	287	217	69	7	**504**	692
	100%	100%	100%	100%	100%	**100%**	100%
				2002			
Inadequate specimen	7	19	16	7	1	**35**	50
	8.9%	6.6%	7.0%	11.1%	7.1%	**6.7%**	7.4%
Benign	46	106	65	14	5	**171**	236
	58.2%	36.7%	28.3%	22.2%	35.7%	**32.9%**	35.0%
Atypical/equivocal	6	25	15	5	2	**40**	53
	7.6%	8.7%	6.5%	7.9%	14.3%	**7.7%**	7.9%
Suspicious	7	29	32	5	0	**61**	73
	8.9%	10.0%	13.9%	7.9%	0%	**11.8%**	10.8%
Malignant	13	110	102	32	6	**212**	263
	16.5%	38.1%	44.3%	50.8%	42.9%	**40.8%**	39.0%
Total	79	289	230	63	14	**519**	675
	100%	100%	100%	100%	100%	**100%**	100%

Core biopsy results

Table 29 shows the outcome results of core biopsy procedures for women who attended Level 2 assessment following screening mammograms performed during 2001 and 2002. If a woman had more than one core biopsy procedure, only the most significant result, with respect to the severity of the diagnosis, was counted in Table 29.

The core biopsy results in Table 29 need to be interpreted in the context of the results of other assessment procedures undertaken, as core biopsy results alone do not necessarily reflect the final assessment outcome. Core biopsy results assist the clinical team in determining whether further procedures or follow-up are required.

Core biopsy results are available on the next day after the specimen is collected. In 2001, there was a malignant result for 48.7% of the 277 women who had core biopsy procedures. In 2002, there was a malignant result for 46.3% of the 324 women who had core biopsy procedures.

Table 29: Core biopsy results for individual women by age – 2001 and 2002

	Age group						
Core biopsy results	40-49	50-59	60-69	70-79	80+	**50-69**	Total
				2001			
Inadequate specimen	1 2.9%	5 4.3%	3 3.2%	0 0%	0 0%	**8 3.8%**	9 3.2%
Benign	16 47.1%	49 41.9%	34 35.8%	8 25.8%	0 0%	**83 39.2%**	107 38.6%
Atypical/equivocal	4 11.8%	5 4.3%	3 3.2%	2 6.5%	0 0%	**8 3.8%**	14 5.1%
Suspicious	3 8.8%	3 2.6%	4 4.2%	2 6.5%	0 0%	**7 3.3%**	12 4.3%
Malignant	10 29.4%	55 47.0%	51 53.7%	19 61.3%	0 0%	**106 50.0%**	135 48.7%
Total	34 100%	117 100%	95 100%	31 100%	0 0%	**212 100%**	277 100%
				2002			
Inadequate specimen	0 0%	10 6.4%	1 0.9%	0 0%	0 0%	**11 4.2%**	11 3.4%
Benign	13 36.1%	67 42.9%	34 32.1%	5 23.8%	1 20.0%	**101 38.5%**	120 37.0%
Atypical/equivocal	3 8.3%	11 7.1%	5 4.7%	1 4.8%	0 0%	**16 6.1%**	20 6.2%
Suspicious	3 8.3%	9 5.8%	9 8.5%	1 4.8%	1 20.0%	**18 6.9%**	23 7.1%
Malignant	17 47.2%	59 37.8%	57 53.8%	14 66.7%	3 60.0%	**116 44.3%**	150 46.3%
Total	36 100%	156 100%	106 100%	21 100%	5 100%	**262 100%**	324 100%

Outcome of assessment

Table 30 shows the outcome of assessment for screening mammograms performed in 2001 and 2002. For screening mammograms performed in 2001, there were 1,936 women who attended assessment at BreastScreen SA or elsewhere. Of these, a malignancy was detected for 376 women (19.4% of all women assessed) and 129 women (6.7%) were referred for diagnostic open biopsy. For screening mammograms performed in 2002, there were 2,065 women who attended assessment at BreastScreen SA or elsewhere. Of these, a malignancy was detected for 402 women (19.5% of all women assessed) and 121 women (5.9%) were referred for diagnostic open biopsy. Diagnostic open biopsies are not performed within the BreastScreen SA program.

A small number of women were recommended to return to the Assessment Clinic for early review within six or 12 months after their initial assessment visit. The NAS requires that less than 0.2% of women who attend for screening are recommended for early review for further assessment. In 2001, there were 12 women recalled for early review, comprising 0.02% of total women screened. Similarly in 2002, there were 11 women recalled for early review, comprising 0.02% of total women screened. Table 30 includes the outcome of assessment for these women after their early review visit.

Table 30: Outcome of assessment by age – 2001 and 2002

	Age group						
Outcome	**40-49**	**50-59**	**60-69**	**70-79**	**80+**	**50-69**	**Total**
				2001			
Malignant	31	150	139	51	5	**289**	376
	8.8%	18.2%	23.8%	31.5%	35.7%	**20.6%**	19.4%
Referred for diagnostic open biopsy	28	60	29	11	1	**89**	129
	7.9%	7.3%	5.0%	6.8%	7.1%	**6.3%**	6.7%
Benign – routine rescreen	295	613	415	100	8	**1028**	1431
	83.3%	74.5%	71.2%	61.7%	57.1%	**73.1%**	73.9%
Total assessed	354	823	583	162	14	**1406**	1936
	100%	100%	100%	100%	100%	**100%**	100%
				2002			
Malignant	29	162	155	47	9	**317**	402
	8.7%	17.3%	25.4%	29.0%	40.9%	**20.5%**	19.5%
Referred for diagnostic open biopsy	15	56	39	9	2	**95**	121
	4.5%	6.0%	6.4%	5.6%	9.1%	**6.1%**	5.9%
Benign – routine rescreen	290	717	417	106	11	**1134**	1541
	86.8%	76.6%	68.2%	65.4%	50.0%	**73.3%**	74.6%
Other [21]	0	1	0	0	0	**1**	1
	0%	0.1%	0%	0%	0%	**0.1%**	0%
Total assessed	334	936	611	162	22	**1547**	2065
	100%	100%	100%	100%	100%	**100%**	100%

21 One woman chose not to complete her assessment.

Table 31 shows, for screening mammograms performed in 2001 and 2002, the final outcome after completion of all diagnostic procedures for women who attended assessment at BreastScreen SA or elsewhere.

For screening mammograms performed in 2001, there were 417 of the 1,936 women who attended assessment (21.5%) diagnosed with breast cancer.

For screening mammograms performed in 2002, there were 435 of the 2,065 women who attended assessment (21.1%) diagnosed with breast cancer. Of the 435 women diagnosed with breast cancer, one woman was screened by an interstate program, and is therefore excluded in the following tables relating to breast cancer detection and breast cancer characteristics and treatment.

Table 31: Final outcome of assessment after all diagnostic procedures, by age – 2001 and 2002

	Age group						
Final outcome	**40-49**	**50-59**	**60-69**	**70-79**	**80+**	**50-69**	**Total**
				2001			
Malignant (discharged)	40 11.3%	162 19.7%	153 26.2%	57 35.2%	5 35.7%	**315** **22.4%**	417 21.5%
Premalignant (discharged)	3 0.8%	9 1.1%	2 0.3%	1 0.6%	0 0%	**11** **0.8%**	15 0.8%
Benign – routine rescreen	311 87.9%	652 79.2%	428 73.4%	103 63.6%	9 64.3%	**1080** **76.8%**	1503 77.6%
Other[22]	0 0%	0 0%	0 0%	1 0.6%	0 0%	**0** **0%**	1 0.1%
Total assessed	354 100%	823 100%	583 100%	162 100%	14 100%	**1406** **100%**	1936 100%
				2002			
Malignant (discharged)[23]	30 9.0%	177 18.9%	168 27.5%	50 30.9%	10 45.5%	**345** **22.3%**	435 21.1%
Premalignant (discharged)	4 1.2%	7 0.7%	5 0.8%	0 0%	0 0%	**12** **0.8%**	16 0.8%
Benign – routine rescreen	300 89.8%	751 80.2%	438 71.7%	112 69.1%	12 54.5%	**1189** **76.9%**	1613 78.1%
Other [24]	0 0%	1 0.1%	0 0%	0 0%	0 0%	**1** **0.1%**	1 0%
Total assessed	334 100%	936 100%	611 100%	162 100%	22 100%	**1547** **100%**	2065 100%

22 Surgery was not performed for one woman, as recommended by the treating surgeon.

23 Includes one woman whose screening mammogram was performed by an interstate program but who was assessed by BreastScreen SA.

24 One woman chose not to complete her assessment.

Breast cancer detection rate

The NAS require that for women aged 50 to 69, the detection rate for invasive breast cancer should be greater than or equal to 50 per 10,000 women screened for first screens, and greater than or equal to 35 per 10,000 women screened for subsequent screens. The NAS require a detection rate for DCIS of greater than or equal to 12 per 10,000 women screened for first screens, and greater than or equal to 7 per 10,000 women screened for subsequent screens.

Figure 11 shows the breast cancer detection rates per 10,000 women screened for the period from 1 January 2001 to 31 December 2002. There is a trend for the detection rates for invasive breast cancer to increase with age, for both first and subsequent screens. Age patterns of DCIS detection rates were less evident due to the small number of DCIS cases.

Figure 11: Breast cancer detection rate by attendance history and age, for the two-year period 1 January 2001 to 31 December 2002

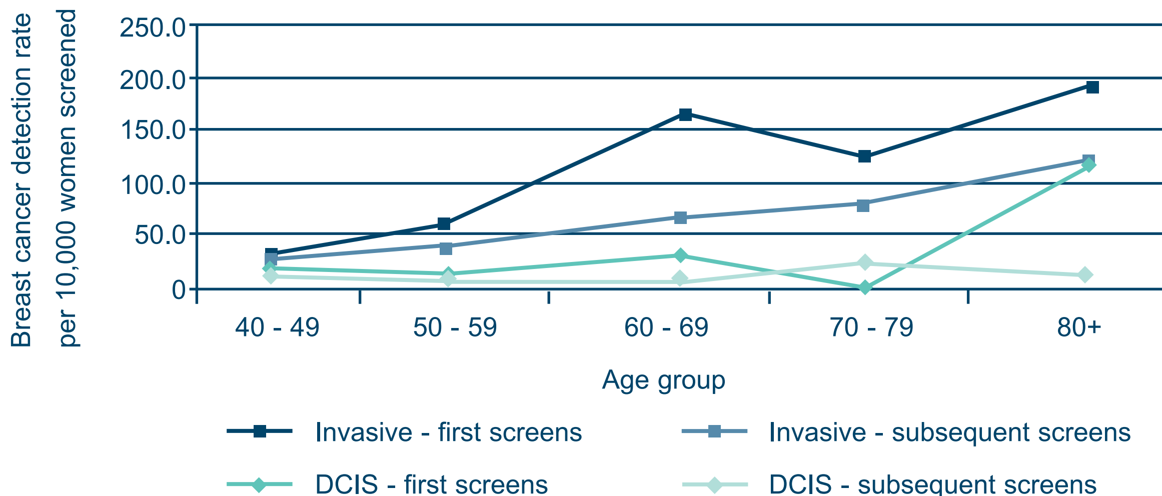


Table 32 shows that for women aged 50 to 69 who were screened in 2001, the invasive breast cancer detection rate was 54.5 per 10,000 women screened for first screens, and 46.7 per 10,000 women screened for subsequent screens. The 2001 DCIS detection rate for women aged 50 to 69 was 8.5 per 10,000 women screened for first screens, and 11.0 per 10,000 women screened for subsequent screens. Whilst the DCIS detection rate for women aged 50 to 69 for first screens does not meet the NAS, it lies within the bounds of the confidence intervals.

Table 33 shows that for women aged 50 to 69 screened in 2002, the invasive breast cancer detection rate was 83 per 10,000 women screened for first screens, and 50.6 per 10,000 women screened for subsequent screens. The 2002 DCIS detection rate for women aged 50 to 69 was 27.7 per 10,000 women screened for first screens, and 8.8 per 10,000 women screened for subsequent screens.

Tables 32 and 33 include upper and lower 95% confidence intervals (CI) for breast cancer detection rates for women screened aged 50 to 69 and for all women screened. That is, there is a 95% chance that the true breast cancer detection rate lies within the range shown.

Table 32: Breast cancer detection rate by attendance history, cancer type and age – 2001

Screens and cancers	40-49	50-59	60-69	70-79	80+	50-69 (95% CI)	Total (95% CI)
	Age group						
	2001						
First screens							
Invasive cancers	13	23	9	3	1	**32**	49
Rate per 10,000 women screened	29.4	44.8	121.3	88.5	120.5	**54.5**	45.7
						(35.7-73.3)	(32.9-58.5)
DCIS cancers	9	4	1	0	0	**5**	14
Rate per 10,000 women screened[25]	20.3	7.8	13.5	0	0	**8.5**	13.1
						(1.1-16.0)	(6.2-19.9)
Total cancers	22	27	10	3	1	**37**	63
Total women screened	4425	5130	742	339	83	**5872**	10719
Rate per 10,000 women screened	49.7	52.6	134.8	88.5	120.5	**63.0**	58.8
						(42.8-83.2)	(44.3-73.2)
Subsequent screens							
Invasive cancers	13	106	119	46	4	**225**	288
Rate per 10,000 women screened	22.4	40.0	55.0	96.9	118.0	**46.7**	48.8
						(40.6-52.8)	(43.1-54.4)
DCIS cancers	5	29	24	8	0	**53**	66
Rate per 10,000 women screened	8.6	10.9	11.1	16.9	0	**11.0**	11.2
						(8.0-14.0)	(8.5-13.9)
Total cancers	18	135	143	54	4	**278**	354
Total women screened	5805	26528	21638	4745	339	**48166**	59055
Rate per 10,000 women screened	31.0	50.9	66.1	113.8	118.0	**57.7**	59.9
						(50.9-64.5)	(53.7-66.2)
Total							
Invasive cancers	26	129	128	49	5	**257**	337
Rate per 10,000 women screened	25.4	40.7	57.2	96.4	118.5	**47.6**	48.3
						(41.7-53.4)	(43.1-53.4)
DCIS cancers	14	33	25	8	0	**58**	80
Rate per 10,000 women screened	13.7	10.4	11.2	15.7	0	**10.7**	11.5
						(8.0-13.5)	(9.0-14.0)
Total cancers	40	162	153	57	5	**315**	417
Total women screened	10230	31658	22380	5084	422	**54038**	69774
Rate per 10,000 women screened	39.1	51.2	68.4	112.1	118.5	**58.3**	59.8
						(51.9-64.7)	(54.0-65.5)

25 Whilst the DCIS cancer detection rate for women aged 50 to 69 for first screens does not meet the NAS, it lies within the bounds of the confidence intervals.

Table 33: Breast cancer detection rate by attendance history, cancer type and age – 2002

Screens and cancers	Age group 40-49	50-59	60-69	70-79	80+	**50-69 (95% CI)**	Total (95% CI)
				2002			
First screens							
Invasive cancers	10	32	13	5	2	**45**	62
Rate per 10,000 women screened	25.1	66.5	213.5	220.3	277.8	**83.0**	63.9
						(58.9-107.2)	(48.1-79.8)
DCIS cancers	4	12	3	0	2	**15**	21
Rate per 10,000 women screened	10.0	24.9	49.3	0	277.8	**27.7**	21.6
						(13.7-41.7)	(12.4-30.9)
Total cancers	14	44	16	5	4	**60**	83
Total women screened	3981	4812	609	227	72	**5421**	9701
Rate per 10,000 women screened	35.2	91.4	262.7	220.3	555.6	**110.7**	85.6
						(82.8-138.5)	(67.2-103.9)
Subsequent screens							
Invasive cancers	13	103	139	30	5	**242**	290
Rate per 10,000 women screened	22.6	37.8	67.7	60.5	140.1	**50.6**	49.3
						(44.3-57.0)	(43.6-54.9)
DCIS cancers	3	29	13	15	1	**42**	61
Rate per 10,000 women screened	5.2	10.6	6.3	30.2	28.0	**8.8**	10.4
						(6.1-11.4)	(7.8-13.0)
Total cancers	16	132	152	45	6	**284**	351
Total women screened	5763	27269	20520	4961	357	**47789**	58870
Rate per 10,000 women screened	27.8	48.4	74.1	90.7	168.1	**59.4**	59.6
						(52.5-66.3)	(53.4-65.8)
Total							
Invasive cancers	23	135	152	35	7	**287**	352
Rate per 10,000 women screened	23.6	42.1	71.9	67.5	163.2	**53.9**	51.3
						(47.7-60.2)	(46.0-56.7)
DCIS cancers	7	41	16	15	3	**57**	82
Rate per 10,000 women screened	7.2	12.8	7.6	28.9	69.9	**10.7**	12.0
						(7.9-13.5)	(9.4-14.5)
Total cancers	30	176	168	50	10	**344**	434
Total women screened	9744	32081	21129	5188	429	**53210**	68571
Rate per 10,000 women screened	30.8	54.9	79.5	96.4	233.1	**64.6**	63.3
						(57.8-71.5)	(57.4-69.2)

Method of pathological diagnosis of breast cancer

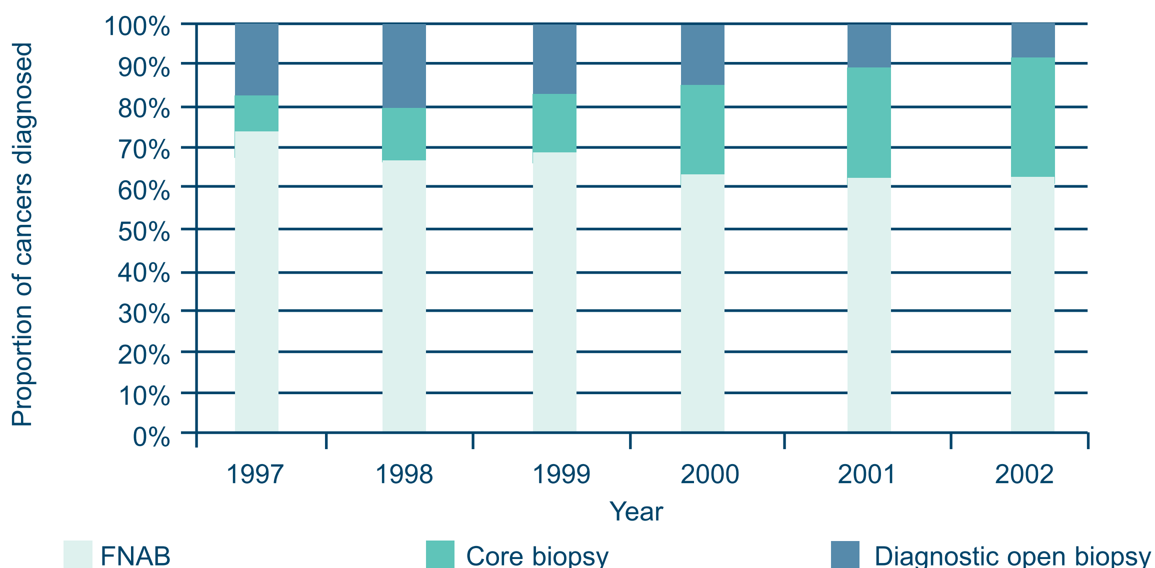
Table 34 shows the procedures undertaken for a pathological diagnosis of breast cancer. The majority of cancers were diagnosed by FNAB. Cancers diagnosed by FNAB represented 61.9% of cancers detected for screening mammograms performed in 2001 and 61.7% of cancers detected for screening mammograms performed in 2002. The percentage of diagnoses by core biopsy was 27.6% for screening mammograms performed in 2001 and 29.5% for screening mammograms performed in 2002.

Figure 12 shows the trends in methods of diagnosis since 1997.[26] While FNAB is still the main method of diagnosis, there has been an increase in the percentage of diagnoses by core biopsy and a corresponding decrease in the percentage of diagnoses by diagnostic open breast biopsy, particularly after the introduction of the vacuum assisted core biopsy (Mammotome) in 2000.

Table 34: Method of pathological diagnosis by attendance history – 2001 and 2002

	First screens		Subsequent screens		Total	
Method of diagnosis	**Cancers**	**%**	**Cancers**	**%**	**Cancers**	**%**
			2001			
FNAB	37	58.7%	221	62.4%	258	61.9%
Core biopsy	17	27.0%	98	27.7%	115	27.6%
Diagnostic open biopsy	9	14.3%	35	9.9%	44	10.6%
Total	63	100%	354	100%	417	100%
			2002			
FNAB	50	60.2%	218	62.1%	268	61.7%
Core biopsy	24	28.9%	104	29.6%	128	29.5%
Diagnostic open biopsy	9	10.8%	29	8.3%	38	8.8%
Total	83	100%	351	100%	434	100%

Figure 12: Method of pathological diagnosis of breast cancer – 1997 to 2002



26 BreastScreen SA, *1997 Statistical Report*, *1998 Statistical Report*, *1999 and 2000 Statistical Report*, Wayville, South Australia.

Histological type of breast cancer

Table 35 shows the types of breast cancer detected for screening mammograms performed in 2001 and 2002. In both years, the most common histological type of breast cancer for both first screens and subsequent screens was infiltrating ductal carcinoma of no special type. This type of breast cancer accounted for 59.7% of breast cancers detected for women screened in 2001 and 60.4% of breast cancers detected for women screened in 2002.

Non-invasive DCIS was the second most common histological type of breast cancer detected for 2001 and 2002. DCIS represented 19.2% of breast cancers detected for women screened in 2001 and 18.9% of breast cancers detected for women screened in 2002. Lobular carcinoma and its variants represented 9.6% of breast cancers detected for women screened in 2001 and 8.5% for women screened in 2002.

Table 35: Histological type of breast cancer by attendance history – 2001 and 2002

	First screens		Subsequent screens		Total	
Type of breast cancer	Cancers	%	Cancers	%	Cancers	%
			2001			
Invasive						
Infiltrating ductal – no special type	37	58.7%	212	59.9%	249	59.7%
Lobular classical	5	7.9%	20	5.6%	25	6.0%
Lobular variant	3	4.8%	12	3.4%	15	3.6%
Medullary	0	0%	1	0.3%	1	0.2%
Mixed ductal/lobular	2	3.2%	9	2.5%	11	2.6%
Mucinous	0	0%	6	1.7%	6	1.4%
Tubular	2	3.2%	24	6.8%	26	6.2%
Cribriform	0	0%	0	0%	0	0%
Other primary	0	0%	4	1.1%	4	1.0%
Non-Invasive DCIS	14	22.2%	66	18.6%	80	19.2%
Total	63	100%	354	100%	417	100%
			2002			
Invasive						
Infiltrating ductal – no special type	42	50.6%	220	62.7%	262	60.4%
Lobular classical	6	7.2%	18	5.1%	24	5.5%
Lobular variant	4	4.8%	9	2.6%	13	3.0%
Medullary	0	0%	0	0%	0	0%
Mixed ductal/lobular	4	4.8%	14	4.0%	18	4.1%
Mucinous	1	1.2%	3	0.8%	4	0.9%
Tubular	5	6.0%	21	6.0%	26	6.0%
Cribriform	0	0%	2	0.6%	2	0.5%
Other primary	0	0%	3	0.8%	3	0.7%
Non-Invasive DCIS	21	25.3%	61	17.4%	82	18.9%
Total	83	100%	351	100%	434	100%

Size of invasive breast cancers detected

Tables 36 and 37 show the detection rate for invasive breast cancers, by attendance history and tumour size, for women screened in 2001 and 2002.

The NAS require a detection rate greater than or equal to 25 per 10,000 women screened for small invasive breast cancers (cancers less than or equal to 15mm in size) for women aged 50 to 69.

The detection rate for small invasive breast cancer for women aged 50 to 69 was 30.7 per 10,000 women screened in 2001 and 35.1 per 10,000 women screened in 2002. The small invasive breast cancer detection rate for women aged 50 to 69 exceeded 25 per 10,000 women screened for women attending for their first screen or subsequent screen in 2001 and 2002.

Histopathology details were not available for three women screened in 2001 and for seven women screened in 2002, in whom invasive breast cancer was detected. Therefore, the size of the invasive breast cancers is unknown for these women.

Tables 36 and 37 include 95% CI for breast cancer detection rates for women screened aged 50 to 69 and for all women screened in 2001 and 2002.

Table 36: Invasive breast cancer detection rate by attendance history, tumour size and age – 2001

Cancer size and detection rate	Age group 40-49	50-59	60-69	70-79	80+	**50-69 (95% CI)**	Total (95% CI)
				2001			
First screens							
15mm or less	9	11	4	2	0	**15**	26
Rate per 10,000 women screened	20.3	21.4	53.9	59.0	0	**25.5**	24.3
						(12.6-38.5)	(14.9-33.6)
Greater than 15mm	4	11	5	1	1	**16**	22
Rate per 10,000 women screened	9.0	21.4	67.4	29.5	120.5	**27.2**	20.5
						(13.9-40.6)	(12.0-29.1)
Unknown size[27]	0	1	0	0	0	**1**	1
Total invasive cancers	13	23	9	3	1	**32**	49
Total women screened	4425	5130	742	339	83	**5872**	10719
Rate per 10,000 women screened	29.4	44.8	121.3	88.5	120.5	**54.5**	45.7
						(35.7-73.3)	(32.9-58.5)
Subsequent screens							
15mm or less	3	71	80	32	4	**151**	190
Rate per 10,000 women screened	5.2	26.8	37.0	67.4	118.0	**31.3**	32.2
						(26.4-36.3)	(27.6-36.7)
Greater than 15mm	10	35	37	14	0	**72**	96
Rate per 10,000 women screened	17.2	13.2	17.1	29.5	0	**14.9**	16.3
						(11.5-18.4)	(13.0-19.5)
Unknown size[27]	0	0	2	0	0	**2**	2
Total invasive cancers	13	106	119	46	4	**225**	288
Total women screened	5805	26528	21638	4745	339	**48166**	59055
Rate per 10,000 women screened	22.4	40.0	55.0	96.9	118.0	**46.7**	48.8
						(40.6-52.8)	(43.1-54.4)
Total							
15mm or less	12	82	84	34	4	**166**	216
Rate per 10,000 women screened	11.7	25.9	37.5	66.9	94.8	**30.7**	31.0
						(26.1-35.4)	(26.8-35.1)
Greater than 15mm	14	46	42	15	1	**88**	118
Rate per 10,000 women screened	13.7	14.5	18.8	29.5	23.7	**16.3**	16.9
						(12.9-19.7)	(13.9-20.0)
Unknown size[27]	0	1	2	0	0	**3**	3
Total invasive cancers	26	129	128	49	5	**257**	337
Total women screened	10230	31658	22380	5084	422	**54038**	69774
Rate per 10,000 women screened	25.4	40.7	57.2	96.4	118.5	**47.6**	48.3
						(41.8-53.4)	(43.2-53.4)

27 Histopathology details were not available therefore the size of the invasive breast cancer is unknown.

Table 37: Invasive breast cancer detection rate by attendance history, tumour size and age – 2002

Cancer size and detection rate	40-49	50-59	60-69	70-79	80+	50-69 (95% CI)	Total (95% CI)
				2002			
First screens							
15mm or less	4	15	11	3	2	**26**	35
Rate per 10,000 women screened	10.0	31.2	180.6	132.2	277.8	**48.0**	36.1
						(29.6-66.4)	(24.1-48.0)
Greater than 15mm	6	15	2	1	0	**17**	24
Rate per 10,000 women screened	15.1	31.2	32.8	44.1	0	**31.4**	24.7
						(16.5-46.2)	(14.9-34.6)
Unknown size[28]	0	2	0	1	0	**2**	3
Total invasive cancers	10	32	13	4	2	**45**	61
Total women screened	3981	4812	609	227	72	**5421**	9701
Rate per 10,000 women screened	25.1	66.5	213.5	176.2	277.8	**83.0**	62.9
						(58.9-107.2)	(47.1-78.6)
Subsequent screens							
15mm or less	8	65	96	23	3	**161**	195
Rate per 10,000 women screened	13.9	23.8	46.8	46.4	84.0	**33.7**	33.1
						(28.5-38.9)	(28.5-37.8)
Greater than 15mm	5	37	43	5	1	**80**	91
Rate per 10,000 women screened	8.7	13.6	21.0	10.1	28.0	**16.7**	15.5
						(13.1-20.4)	(12.3-18.6)
Unknown size[28]	0	1	0	2	1	**1**	4
Total invasive cancers	13	103	139	30	5	**242**	290
Total women screened	5763	27269	20520	4961	357	**47789**	58870
Rate per 10,000 women screened	22.6	37.8	67.7	60.5	140.1	**50.6**	49.3
						(44.3-57.0)	(43.6-54.9)
Total							
15mm or less	12	80	107	26	5	**187**	230
Rate per 10,000 women screened	12.3	24.9	50.6	50.1	116.6	**35.1**	33.5
						(30.1-40.2)	(29.2-37.9)
Greater than 15mm	11	52	45	6	1	**97**	115
Rate per 10,000 women screened	11.3	16.2	21.3	11.6	23.3	**18.2**	16.8
						(14.6-21.9)	(13.7-19.8)
Unknown size[28]	0	3	0	3	1	**3**	7
Total invasive cancers	23	135	152	35	7	**287**	352
Total women screened	9744	32081	21129	5188	429	**53210**	68571
Rate per 10,000 women screened	23.6	42.1	71.9	67.5	163.2	**53.9**	51.3
						(47.7-60.2)	(46.0-56.7)

Age group applies to columns 40-49 through Total.

28 Histopathology details were not available therefore the size of the invasive breast cancer is unknown.

Nodal status

Table 38 shows nodal status for invasive breast cancer and DCIS detected for women screened in 2001 and 2002.

For women screened in 2001, the proportion of axillary lymph node dissections performed for women diagnosed with invasive breast cancer was 93.2% (314 out of 337 cases). For women screened in 2002, the proportion was 93.8% (330 out of 352 cases).

For women screened in 2001, the axillary dissections performed for invasive breast cancers resulted in positive nodes being found in 14.2% of invasive breast cancers less than or equal to 15mm in size, and in 47.4% of invasive breast cancers greater than 15mm. For women screened in 2002, positive nodes were found in 15.9% of invasive breast cancers less than or equal to 15mm in size, and in 37.7% of invasive breast cancers greater than 15mm.

Most women diagnosed with DCIS did not undergo axillary lymph node dissection. In 2001 and 2002, for those women diagnosed with DCIS and who underwent axillary dissection (15 and 13 women respectively), there were no positive nodes found.

Table 38: Nodal status for invasive breast cancer (by size) and for DCIS – 2001 and 2002

	Invasive size			Total		
Nodal status of cancers	**0-15mm**	**>15mm**	**Unknown**	**invasive**	**DCIS**	**Total**
				2001		
Nodes negative	169	61	0	230	15	245
	85.8%	52.6%	0%	73.2%	100%	74.5%
Nodes positive	28	55	1	84	0	84
	14.2%	47.4%	100%	26.8%	0%	25.5%
Total axillary dissections	197	116	1	314	15	329
	100%	100%	100%	100%	100%	100%
No axillary dissection	19	2	2	23	65	88
Total cancers	216	118	3	337	80	417
				2002		
Nodes negative	180	71	1	252	13	265
	84.1%	62.3%	50.0%	76.4%	100%	77.3%
Nodes positive	34	43	1	78	0	78
	15.9%	37.7%	50.0%	23.6%	0%	22.7%
Total axillary dissections	214	114	2	330	13	343
	100%	100%	100%	100%	100%	100%
No axillary dissection	16	1	5	22	69	91
Total cancers	230	115	7	352	82	434

Tumour grade

Table 39 shows the histological grade of invasive breast cancers detected for women screened in 2001 and 2002, by tumour size.

Most invasive breast cancers detected for women screened in 2001 and 2002 were classified as grade 1 or grade 2 tumours. Grade 1 and grade 2 tumours represented 84.2% of invasive breast cancers for women screened in 2001 and 84.1% of invasive breast cancers in 2002. For women screened in 2001, 12.5% of invasive breast cancers detected were classified as grade 3 tumours. For women screened in 2002, grade 3 tumours represented 12.8% of invasive breast cancers detected.

For women screened in 2001 and 2002, grade 1 tumours represented the largest proportion of small invasive breast cancers (those less than or equal to 15mm). Grade 1 tumours represented 49.5% of small invasive breast cancers detected for women screened in 2001 and 50.9% of small invasive breast cancers detected for women screened in 2002.

Table 39: Histological grade of invasive breast cancers by tumour size – 2001 and 2002

Tumour grade	Invasive size			Total
	0-15mm	>15mm	Unknown	
2001				
Grade 1	107	39	0	146
	49.5%	33.1%	0.0%	43.3%
Grade 2	84	54	0	138
	38.9%	45.8%	0.0%	40.9%
Grade 3	18	24	0	42
	8.3%	20.3%	0.0%	12.5%
Not assessable or not known	7	1	3	11
	3.2%	0.8%	100.0%	3.3%
Total	216	118	3	337
	100%	100%	100%	100%
2002				
Grade 1	117	33	0	150
	50.9%	28.7%	0.0%	42.6%
Grade 2	91	55	0	146
	39.6%	47.8%	0.0%	41.5%
Grade 3	19	26	0	45
	8.3%	22.6%	0.0%	12.8%
Not assessable or not known	3	1	7	11
	1.3%	0.9%	100.0%	3.1%
Total	230	115	7	352
	100%	100%	100%	100%

Treatment type

Table 40 shows the type of treatment performed for invasive breast cancers and DCIS detected for women screened in 2001 and 2002. Results are shown for women residing in the metropolitan Adelaide area[29] and for women residing in other areas of South Australia.

Table 40 shows that for all areas of residence, breast conserving surgery comprising a complete local excision was performed for 76.6% of invasive breast cancers detected for women screened in 2001 and for 74.7% of invasive cancers detected for 2002. For invasive cancers detected for women screened in 2001 and 2002, a small percentage of women were treated without surgery. For all areas of residence, mastectomies were performed for 22.8% of invasive breast cancers detected for women screened in 2001 and for 23.9% of invasive breast cancers detected for 2002. The type of treatment performed for invasive breast cancers detected for women screened in 2001 was similar for both women residing in metropolitan Adelaide and in other areas. The proportion of mastectomies performed for invasive breast cancers detected for women screened in 2002 was higher for women living in metropolitan Adelaide.

For all areas of residence, a complete local excision was performed for 71.3% of DCIS detected for women screened in 2001 and for 76.8% of DCIS detected for 2002. Mastectomies were performed for 28.8% of DCIS detected for women screened in 2001 and 23.2% of DCIS detected for 2002. The small number of DCIS cancers detected for women screened in 2001 and 2002 limits the ability to perform meaningful comparisons for types of treatment of DCIS between women residing in metropolitan Adelaide and women residing in other areas.

Table 40: Treatment of breast cancer by area of residence and cancer type – 2001 and 2002

	Adelaide		Other		All areas of residence		
Treatment type	**Invasive**	**DCIS**	**Invasive**	**DCIS**	**Invasive**	**DCIS**	**Total cancers**
2001							
No surgery	1 0.4%	0 0%	1 1.2%	0 0%	2 0.6%	0 0%	2 0.5%
Complete local excision	195 77.4%	40 67.8%	63 74.1%	17 81.0%	258 76.6%	57 71.3%	315 75.5%
Mastectomy	56 22.2%	19 32.2%	21 24.7%	4 19.0%	77 22.8%	23 28.8%	100 24.0%
Total	252 100%	59 100%	85 100%	21 100%	337 100%	80 100%	417 100%
2002							
No surgery	4 1.6%	0 0%	1 0.9%	0 0%	5 1.4%	0 0%	5 1.2%
Complete local excision	177 72.0%	44 77.2%	86 81.1%	19 76.0%	263 74.7%	63 76.8%	326 75.1%
Mastectomy	65 26.4%	13 22.8%	19 17.9%	6 24.0%	84 23.9%	19 23.2%	103 23.7%
Total	246 100%	57 100%	106 100%	25 100%	352 100%	82 100%	434 100%

29 'Metropolitan Adelaide' refers to the Adelaide Statistical Division as defined by the ABS, Population by Age and Sex, South Australia, June 2002.

Interval cancers

Interval cancers are invasive breast cancers diagnosed during the interval between two screening episodes. While regular screening mammograms are currently the most effective tool for early detection in women aged 50 to 69, they do not prevent breast cancer from developing in the future. Nor are they 100% accurate. This means that in a very small number of women, the screening mammogram will not find all breast cancers. In addition, there are a small proportion of aggressive breast cancers that can develop between screening episodes.

The interval cancer rates presented in this section are for individual women living in South Australia who were screened by BreastScreen SA in the calendar years 1999 (Table 41) and 2000 (Table 42). The interval cancer rates are calculated using the formula and criteria recommended by the National Breast Cancer Centre (NBCC).[30]

Symptomatic women who have a normal screening mammogram are not recalled to BreastScreen SA for assessment. It is BreastScreen SA policy that any woman with a normal screening mammogram who has reported a breast symptom at the time of screening will be advised to visit her general practitioner for clinical investigation of the symptom. If, following this investigation, the woman is diagnosed with breast cancer, the breast cancer will nevertheless still be reported as an interval cancer for BreastScreen SA. The interval cancer rates in Tables 41 and 42 and the program sensitivity rates in Tables 43 and 44 relate only to women who were asymptomatic at the time of their screening mammogram in 1999 or 2000. The interval cancer rates and program sensitivity rates for symptomatic women are not presented in this report, as the numbers are too low for meaningful interpretation.

The interval cancer rates in Tables 41 and 42 are shown for invasive breast cancers diagnosed up until 12 months from the last screening mammogram (Year 1), and for those diagnosed between 12 and less than 24 months following the last screening mammogram (Year 2). The interval cancer rates are shown separately for first screens and subsequent screens.

The interval cancer rates in Tables 41 and 42 are calculated using the definition of 'women years at risk' of an interval cancer or screen-detected cancer, as provided by the NBCC guidelines. These guidelines define women 'at risk' as the number of individual women screened aged 40 years and older who live in South Australia and who have not reported a personal history of breast cancer. Women who have a strong family history of breast cancer are recommended for annual screening, and are therefore only included in 'women years at risk' for the period up until 12 months after the last screening mammogram. That is, women with a strong family history aged 40 to 69 years are excluded from 'women years at risk' in Year 2 calculations. The NBCC guidelines define women who are recommended for routine rescreening as being 'at risk' of an interval cancer up until 24 months after the last screening mammogram. These women are included in 'women years at risk' in both Year 1 and Year 2 calculations.

As per the NBCC guidelines, the interval cancers shown in Tables 41 and 42 include invasive breast cancers only. DCIS, lobular carcinoma in situ and Paget's disease of the nipple are not included in interval cancers shown in Tables 41 and 42, unless there is underlying evidence of invasive breast cancer.

30 Kavanagh AM, Amos AF and Marr GM (1999). *The Ascertainment and Reporting of Interval Cancers within the BreastScreen Australia Program*, NHMRC NBCC, New South Wales. For the purposes of this report, this NBCC document will be referred to as the 'NBCC guidelines'.

Table 41 shows the number of individual asymptomatic women who were screened in 1999 and who then developed an invasive breast cancer during the first or second year after that screening mammogram. The interval cancer rate for asymptomatic women aged 50 to 69 screened in 1999 was 7.9 per 10,000 women years for Year 1 and 12.6 per 10,000 women years for Year 2.

Table 41: Interval cancer rates during Year 1 and Year 2 for asymptomatic women screened in 1999, by attendance history and age

	Age group					
Attendance history	40-49	50-59	60-69	70+	**50-69 (95% CI)**	Total Av. Rate (95% CI)
Year 1 - Asymptomatic women						
First screens						
Number of women years at risk	4541	5805	1479	589	**7284**	12414
Number of interval cancers	1	5	1	0	**6**	7
Rate per 10,000 women years[31]	2.2	8.6	6.8	0.0	**8.2**	5.6
					(1.6-14.8)	(1.5-9.8)
Subsequent screens						
Number of women years at risk	4881	21819	18952	3885	**40771**	49537
Number of interval cancers	7	27	5	1	**32**	40
Rate per 10,000 women years	14.3	12.4	2.6	2.6	**7.8**	8.1
					(5.1-10.6)	(5.6-10.6)
Total						
Number of women years at risk	9422	27624	20431	4474	**48055**	61951
Number of interval cancers	8	32	6	1	**38**	47
Rate per 10,000 women years	8.5	11.6	2.9	2.2	**7.9**	7.6
					(5.4-10.4)	(5.4-9.8)
Year 2 - Asymptomatic women						
First screens						
Number of women years at risk	4259	5616	1420	589	**7036**	11884
Number of interval cancers	6	9	2	0	**11**	17
Rate per 10,000 women years	14.1	16.0	14.1	0.0	**15.6**	14.3
					(6.4-24.9)	(7.5-21.1)
Subsequent screens						
Number of women years at risk	4180	20494	17861	3885	**38355**	46420
Number of interval cancers	8	32	14	4	**46**	58
Rate per 10,000 women years	19.1	15.6	7.8	10.3	**12.0**	12.5
					(8.5-15.5)	(9.3-15.7)
Total						
Number of women years at risk	8439	26110	19281	4474	**45391**	58304
Number of interval cancers	14	41	16	4	**57**	75
Rate per 10,000 women years	16.6	15.7	8.3	8.9	**12.6**	12.9
					(9.3-15.8)	(10.0-15.8)

31 Using the NBCC guidelines, the rate of 10,000 women years is calculated as the number of interval cancers shown as a proportion of 'women years at risk' multiplied by 10,000.

Table 42 shows the number of individual asymptomatic women who were screened in 2000 and who then developed an invasive breast cancer during the first or second year after that screening mammogram. The interval cancer rate for asymptomatic women aged 50 to 69 screened in 2000 was 6.5 per 10,000 women years for Year 1 and 15.3 per 10,000 women years for Year 2.

Table 42: Interval cancer rates during Year 1 and Year 2 for asymptomatic women screened in 2000, by attendance history and age

Attendance history	Age group 40-49	50-59	60-69	70+	50-69 (95% CI)	Total Av. Rate (95% CI)
Year 1 - Asymptomatic women						
First screens						
Number of women years at risk	4525	6095	1143	541	**7238**	12304
Number of interval cancers	3	2	1	0	**3**	6
Rate per 10,000 women years	6.6	3.3	8.7	0.0	**4.1**	4.9
					(0-8.8)	(1.0-8.8)
Subsequent screens						
Number of women years at risk	5457	22374	18438	4504	**40812**	50773
Number of interval cancers	1	15	13	4	**28**	33
Rate per 10,000 women years	1.8	6.7	7.1	8.9	**6.9**	6.5
					(4.3-9.4)	(4.3-8.7)
Total						
Number of women years at risk	9982	28469	19581	5045	**48050**	63077
Number of interval cancers	4	17	14	4	**31**	39
Rate per 10,000 women years[32]	4.0	6.0	7.1	7.9	**6.5**	6.2
					(4.2-8.7)	(4.2-8.1)
Year 2 - Asymptomatic women						
First screens						
Number of women years at risk	4259	5958	1085	541	**7043**	11843
Number of interval cancers	6	8	0	0	**8**	14
Rate per 10,000 women years	14.1	13.4	0.0	0.0	**11.4**	11.8
					(3.5-19.2)	(5.6-18.0)
Subsequent screens						
Number of women years at risk	4735	20852	17148	4504	**38000**	47239
Number of interval cancers	3	28	33	3	**61**	67
Rate per 10,000 women years	6.3	13.4	19.2	6.7	**16.1**	14.2
					(12.0-20.1)	(10.8-17.6)
Total						
Number of women years at risk	8994	26810	18233	5045	**45043**	59082
Number of interval cancers	9	36	33	3	**69**	81
Rate per 10,000 women years	10.0	13.4	18.1	5.9	**15.3**	13.7
					(11.7-18.9)	(10.7-16.7)

32 Using the NBCC guidelines, the rate of 10,000 women years is calculated as the number of interval cancers shown as a proportion of 'women years at risk' multiplied by 10,000.

Program sensitivity

Program sensitivity measures how effective the BreastScreen Australia program is at detecting the presence of breast cancer in women who do not report breast symptoms at the time of screening. It is an indicator recommended for use by the NBCC guidelines. Program sensitivity measures the proportion of invasive breast cancers reported within a period that were screen-detected. Program sensitivity is calculated as:

$$\frac{\text{Number of screen-detected invasive breast cancers}}{\text{Number of screen-detected invasive breast cancers} + \text{Number of interval invasive cancers}}$$

Program sensitivity is calculated for asymptomatic women and is shown by attendance history and by age group. The follow-up period is for the first year, and for the first and second year combined. The definition of interval cancer and the inclusion criteria are the same as those detailed for interval cancers.

The program sensitivity rates in Tables 43 and 44 relate only to women who were asymptomatic at the time of their screening mammogram in 1999 or 2000.

Tables 43 and 44 show that the measure for program sensitivity in the first year was 84.2% for women screened in 1999 and 88.8% for women screened in 2000. Over the combined two-year period, the measure for program sensitivity was 67.2% for women screened in 1999 and 72.0% for women screened in 2000.

For women screened both in 1999 and in 2000, the measure for program sensitivity was higher for women attending for their first screen than for those attending for subsequent screens.

Table 43: Program sensitivity during Year 1, and during Years 1 and 2 combined, for asymptomatic women screened in 1999, by attendance history and age

Attendance history	Age group 40-49	50-59	60-69	70+	**50-69**	Total
	Year 1 - Asymptomatic women					
First screens						
Number of screen-detected invasive cancers	6	29	21	8	**50**	64
Number of interval invasive cancers	1	5	1	0	**6**	7
Program sensitivity	85.7%	85.3%	95.5%	100.0%	**89.3%**	90.1%
Subsequent screens						
Number of screen-detected invasive cancers	10	70	88	18	**158**	186
Number of interval invasive cancers	7	27	5	1	**32**	40
Program sensitivity	58.8%	72.2%	94.6%	94.7%	**83.2%**	82.3%
Total						
Number of screen-detected invasive cancers	16	99	109	26	**208**	250
Number of interval invasive cancers	8	32	6	1	**38**	47
Program sensitivity	66.7%	75.6%	94.8%	96.3%	**84.6%**	84.2%
	Combined Year 1 and Year 2 – Asymptomatic women					
First screens						
Number of screen-detected invasive cancers	6	29	21	8	**50**	64
Number of interval invasive cancers	7	14	3	0	**17**	24
Program sensitivity	46.2%	67.4%	87.5%	100.0%	**74.6%**	72.7%
Subsequent screens						
Number of screen-detected invasive cancers	10	70	88	18	**158**	186
Number of interval invasive cancers	15	59	19	5	**78**	98
Program sensitivity	40.0%	54.3%	82.2%	78.3%	**66.9%**	65.5%
Total						
Number of screen-detected invasive cancers	16	99	109	26	**208**	250
Number of interval invasive cancers	22	73	22	5	**95**	122
Program sensitivity	42.1%	57.6%	83.2%	83.9%	**68.6%**	67.2%

Table 44: Program sensitivity during Year 1, and during Years 1 and 2 combined, for asymptomatic women screened in 2000, by attendance history and age

Attendance history	Age group 40-49	50-59	60-69	70+	**50-69**	Total
	Year 1 - Asymptomatic women					
First screens						
Number of screen-detected invasive cancers	8	43	16	6	**59**	73
Number of interval invasive cancers	3	2	1	0	**3**	6
Program sensitivity	72.7%	95.6%	94.1%	100.0%	**95.2%**	92.4%
Subsequent screens						
Number of screen-detected invasive cancers	16	96	93	31	**189**	236
Number of interval invasive cancers	1	15	13	4	**28**	33
Program sensitivity	94.1%	86.5%	87.7%	88.6%	**87.1%**	87.7%
Total						
Number of screen-detected invasive cancers	24	139	109	37	**248**	309
Number of interval invasive cancers	4	17	14	4	**31**	39
Program sensitivity	85.7%	89.1%	88.6%	90.2%	**88.9%**	88.8%
	Combined Year 1 and Year 2 - Asymptomatic women					
First screens						
Number of screen-detected invasive cancers	8	43	16	6	**59**	73
Number of interval invasive cancers	9	10	1	0	**11**	20
Program sensitivity	47.1%	81.1%	94.1%	100.0%	**84.3%**	78.5%
Subsequent screens						
Number of screen-detected invasive cancers	16	96	93	31	**189**	236
Number of interval invasive cancers	4	43	46	7	**89**	100
Program sensitivity	80.0%	69.1%	66.9%	81.6%	**68.0%**	70.2%
Total						
Number of screen-detected invasive cancers	24	139	109	37	**248**	309
Number of interval invasive cancers	13	53	47	7	**100**	120
Program sensitivity	64.9%	72.4%	69.9%	84.1%	**71.3%**	72.0%

ABS
Australian Bureau of Statistics.

asymptomatic
There were no symptoms of breast cancer (ie clear or blood-stained nipple discharge, or breast lumps) reported by the woman at the time of screening. This term relates to the calculation of interval cancers and program sensitivity.

attendance
Denotes women who presented for and completed a screening mammogram. The number of women attending for screening does not necessarily equate to the number of individual women screened, as some women may attend for more than one screening mammogram in the two-year screening cycle. For example, all women aged 40 and over who meet BreastScreen SA's criteria for a strong family history of breast cancer are eligible for annual screening.

attendance history
Denotes whether a screening mammogram relates to attendance at BreastScreen SA for the first time (first screens) or whether the women had previously attended BreastScreen SA (subsequent screens).

axillary lymph nodes
Lymph nodes that are located deep in the armpit.

biopsy
Removal of a sample of cells or breast tissue to assist in diagnosis.

benign
Not cancerous.

breast cancer
Malignancy of the breast, including invasive cancer and/or DCIS.

breast conserving surgery
Surgery performed where the breast cancer is excised together with a margin of normal breast tissue, but the whole breast is not removed.

BreastScreen Australia National Accreditation Requirements (NAR)
A set of minimum requirements introduced in 1994 for BreastScreen programs, including requirements applying to recruitment, screening and assessment services, follow-up of women diagnosed with breast cancer, technical quality assurance, education and counselling, consumer satisfaction, data management, service management and training.

BreastScreen Australia National Accreditation Standards (NAS)
A set of minimum standards for BreastScreen programs, endorsed by the BreastScreen Australia National Advisory Committee in July 2001 and implemented in July 2002.

CALD women
Women from culturally and linguistically diverse backgrounds.

confidence interval (CI)
A range determined by variability in data, within which there is a specified chance (usually 95%) that the true value of a calculated parameter (for example, relative risk) lies.

core biopsy
Removal of a cylindrical sample of breast tissue through a needle, usually performed under a local anaesthetic, for microscopic examination.

DCIS
See *ductal carcinoma in situ*.

diagnostic mammogram
A diagnostic mammogram is an x-ray for women who have breast symptoms and includes views that target the symptomatic area. Breast symptoms may include a breast lump or thickening, nipple discharge, any unusual pain or discomfort, puckering or dimpling on the surface of the skin, change in nipple shape, or a change in breast size, shape or appearance.

ductal carcinoma in situ (DCIS)
Ductal carcinoma in situ (DCIS) is a form of early breast cancer involving the development of abnormal (cancer) cells inside some ducts in the breast. In this condition, the abnormal cells are only in the ducts and have not started to spread into the surrounding tissues. Another name for DCIS is non-invasive breast cancer.

early detection
The detection of breast cancer early enough in its natural history for treatment to have a good chance of making a favourable impact on recovery and long term survival from the disease.

early review
The recall of a woman to a second assessment visit within 12 months of the screening date and following an equivocal assessment visit. Early review within six months of the screening date is considered part of the screening episode, but early review at six months or more occurs after the screening episode is complete.

ERP
Estimated Resident Population, as provided by the ABS.

fine needle aspiration biopsy (FNAB)
The sampling of cells from breast tissue for examination by a pathologist.

first screens
Denotes attendance at BreastScreen SA for the first time.

FNAB
See *fine needle aspiration biopsy*.

grade (of tumour)
The degree of similarity of the cancer cells to normal cells. A grade 1 carcinoma is well differentiated and is associated with a good prognosis. A grade 2 carcinoma is moderately differentiated and is associated with an intermediate prognosis. A grade 3 carcinoma is poorly differentiated and is associated with a poor prognosis. A histopathologist assigns tumour grade by assessing the microscopic features of the tumour.

hormone replacement therapy (HRT)
The use of hormone treatment as a substitute for natural hormones in women.

HRT
See *hormone replacement therapy*.

Indigenous
A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander person and is accepted as such by the community with which he or she is associated.

Lesion

Any abnormality in tissues of the body caused by disease or injury.

Level 1 assessment

Diagnostic procedures performed in the morning session of a BreastScreen SA Assessment Clinic, for all women recalled for assessment of screen-detected abnormalities. The procedures include further mammography and/or ultrasound, and a clinical examination by a medical officer.

Level 2 assessment
Diagnostic procedures performed in the afternoon session of a BreastScreen SA Assessment Clinic, for women who do not have a benign or normal finding after Level 1 assessment. The procedures include surgical assessment, FNAB and/or core biopsy procedures.

localisation
Denotes the use of a carbon or hook-wire marking method prior to breast surgery to identify the location of the lesion. This assists the treating surgeon to find non-palpable lesions when performing an open biopsy or wide local excision of a breast cancer.

lymph node
A mass of lymphatic tissue, often bean-shaped, that produces lymphocytes and through which lymph filters. These are located throughout the body.

metropolitan Adelaide
The areas of Adelaide city and suburbs defined as the Adelaide Statistical Division by the ABS.

NAR
See *BreastScreen Australia National Accreditation Requirements*.

NAS
See *BreastScreen Australia National Accreditation Standards*.

NBCC
National Breast Cancer Centre.

nodal status
Indication of whether a breast cancer has spread (node positive) or has not spread (node negative) to axillary lymph nodes. The number and site of positive nodes can help predict a prognosis.

non-palpable
Denotes that the lesion cannot be felt during a clinical examination.

open biopsy
Surgical removal of the lesion (or abnormality) identified by mammography. This is done under general anaesthetic, and pre-operative localisation of the lesion and specimen x-ray to confirm removal of the lesion are required. The diagnosis is made by pathological examination. Open biopsies are not performed within the BreastScreen SA program.

palpable
Denotes that the lesion can be felt during a clinical examination.

QA
See *quality assurance*.

quality assurance
A series of intensive checking, testing, audit and control processes and procedures, together with communication and reporting processes to ensure that the breast cancer screening program complies with the stringent quality standards of the NAS.

screening mammogram
A radiographic depiction of the breast, using a set of standard x-ray views, performed as a test on women with no apparent breast symptoms in order to detect breast cancer at an earlier stage than would otherwise be the case. A screening test is not intended to be diagnostic. Possible abnormalities found on the screening test require further investigation.

SCU
State Coordination Unit of BreastScreen SA, located in Adelaide.

size of tumour
The greatest dimension of the tumour in millimetres. This is ideally determined from the fresh specimen or, if appropriate, from histopathologic slides.

SLA
Statistical local area as defined by the ABS.

stereotaxis
The use of mammographic equipment to assist in guiding FNAB and core biopsies.

strong family history
BreastScreen SA defines a woman as having a strong family history of breast cancer if she has a first-degree relative (mother/sister/daughter, father/brother/son) with breast cancer diagnosed before the age of 50, or if she has a first-degree relative with cancer in both breasts diagnosed at any age, or if she has two or more first-degree relatives with breast cancer diagnosed at any age.

subsequent screens
Denotes attendance at BreastScreen SA by women who have previously attended BreastScreen SA.

symptom
In this report, symptoms refer to breast lumps, nipple discharge and/or other breast problems reported by women at the time of screening.

ultrasound
A 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.

vacuum assisted core biopsy
Removal of a sample of breast tissue, usually guided by stereotaxis, using a vacuum assisted needle device (for example, Mammotome). The sample of breast tissue is subsequently analysed by a pathologist, to assist with diagnosis. Vacuum assisted core biopsy equipment is especially useful where calcification is evident.

Some definitions in this glossary were compiled with reference to the definitions included in the BreastScreen Australia Monitoring Report 2000-2001[33] *and the BreastScreen Victoria 1992-2002 Report.*[34]

33 Australian Institute of Health and Welfare (AIHW), 2003. *BreastScreen Australia Monitoring Report 2000-2001*, AIHW, Cancer Series no. 25, Canberra.

34 BreastScreen Victoria, 2003. *A Decade of Achievement, BreastScreen Victoria 1992-2002*, BreastScreen Victoria, Carlton South, Victoria.

Further Information

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