Annual Report 2011

EARLY AND LOCALLY ADVANCED BREAST CANCER DIAGNOSED IN NEW ZEALAND PATIENTS IN 2011

Prepared for Ministry of Health, New Zealand

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Prepared by:

Australian Safety and Efficacy Register of New Interventional Procedures – Surgical

of

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on behalf of:

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† notations are provided within the report

1 Acknowledgments and Funding

This report was produced by the BSANZ Quality Audit (formerly known as the National Breast Cancer Audit).

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The data analysis and development of the report was undertaken by Corey Taylor, Senior Research Officer, Royal Australasian College of Surgeons.

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2 Introduction

The National Breast Cancer Audit (NBCA) began in 1998 and collects data on the surgical care of early and locally advanced breast cancer patients in Australia and New Zealand. The audit is now funded and directed by the Breast Surgeons of Australia and New Zealand Inc. (BreastSurgANZ) and in 2013 has been renamed the BreastSurgANZ Quality Audit (BQA).

A Structured Query Language (SQL) query has been written to extract New Zealand data with a diagnosis date of 2011 (if diagnosis date was not provided, first surgery date was used) from the restored BQA online database on 25 June 2013.

There were 12,091 cases reported to the BQA in 2011; of which 2,348 cases were from New Zealand. Out of the 293 surgeons who contributed to the audit in 2011, 63 were from New Zealand.

In the report, percentage case volumes for New Zealand data have been reported by referral source under the following main headings:

1. Background information
2. Invasive tumour characteristics
3. DCIS tumour characteristics
4. Breast surgery treatment
5. Axillary surgery treatment
6. Margins of excision for breast surgery
7. Radiotherapy treatment
8. Hormonal treatment
9. Chemotherapy treatment
10. Trastuzumab treatment

In some of the treatment sections, the relevant guidelines and/or BQA Key Performance Indicators (KPIs) have been listed. The reader can clearly see the percentage of cases which follow the guidelines and BQA KPIs from this data.

The number of cases reported from Breast Screen Aotearoa (BSA) and other referral sources for each category were compared using a chi-square test via the statistical packages Stata 12 and R 2.14.1. A statistical significance level of $P<0.05$ was used. (P-value was not calculated if the number of observations per category was zero.)

Background information, tumour characteristics and breast cancer treatments that are significantly different between “BSA” and “non-BSA” referral are listed in the summary section.

Definitions of the terms provided in the report are from the National Breast Cancer Audit Data Dictionary, available from www.surgeons.org/nbca.

In this report, “Unknown”, “Not yet” and missing data are reported as “not known”.

3. Background Information

3.1 Referral source for New Zealand episodes

Referral source		Percentage
Breast Screen Aotearoa (BSA) (N=951)		40.5%
Non-BSA (N=1,393) -	Symptomatic from GP (N=1184)	50.43%
	Breast Screen Australia (N=3)	0.13%
	Other (N=206)	8.77%
Not known (N=4)		0.17%
Total (N=2,348)		**100%**

Comments:
While the majority of breast cancer cases from New Zealand were referred as symptomatic from a general practitioner, GP (50%), BSA was the second most common referral source (41%).

Audit data used:
Information is derived from the audit question “referral source” which allows the options of symptomatic from GP, Breast Screen Australia, Breast Screen Aotearoa (NZ) and Other.

Definitions:
Referral source records the source from which the person was referred to the surgeon. Symptomatic patients are referred to a breast surgeon when presenting to a GP or other physician with symptoms such as a breast lump, pain, or discharge. Patients referred from “Other” sources may include private screening programs.

3.2 Invasive and DCIS episodes by referral source †

Referral source	Invasive	DCIS
BSA (N=951)	80.13%	19.87%
Non-BSA (N=1,390)	92.16%	7.84%
P-value	< 0.001	< 0.001

†Referral source was not known for 4 records and invasive/insitu status was not known for 3 non-BSA patients.

Comments:
The majority of New Zealand breast cancer episodes were invasive (87%). There was a significantly higher proportion of ductal carcinoma in situ (DCIS) cases in the BSA referral group (20%) than in the non-BSA referral groups (8%).

Audit data used:
Information is derived from the audit question "invasive/in situ cancer".

Definitions:
- Invasive—cancer which has grown beyond its site of origin and invaded neighbouring tissue.
- DCIS—the presence of any malignant tumour which has not yet become invasive but is confined to the layer of cells from which it arose. A form of pre-invasive cancer.

3.3 Private and public status of the episodes by referral source †

Referral source	Private	Public
BSA (N=950)	26.21%	73.79%
Non-BSA (N=1,392)	35.42%	64.58%
P value	< 0.001	<0.001

†Referral source was not known for 4 records.

Comments:
The majority of New Zealand patients were public (74%). The proportions of public and private patients were significantly different between the BSA and non-BSA groups with the BSA group having a proportionately greater number of public patients.

Audit data used:
Information is derived from the audit question "public/private" which allows the options of private and public.

Definitions:
Public—a person, eligible for public healthcare who on admission to a recognised hospital or soon after:

- receives a public hospital service free of charge
- elects to be a public patient
- has their treatment is contracted to a public hospital

Private— a person who, on admission to a recognised hospital or soon after:

- elects to be a private patient treated by a medical practitioner of his or her choice
- elects to occupy a bed in a single room (where such an election is made, the patient is responsible for meeting certain hospital charges as well as the professional charges raised by treating medical practitioner)
- chooses to be admitted to a private hospital, although eligible for public healthcare.

3.4 Age of patients by referral source†

Referral source	≤40 years	41-50 years	51-60 years	61-70 years	>70 years
BSA (N=951)	0.42%	20.82%	38.70%	37.01%	3.05%
Non-BSA (N=1,393)	9.69%	24.41%	18.74%	18.02%	29.15%
P-value	<0.001	0.0425	<0.001	<0.001	<0.001

†Referral source was not known for 4 records.

Comments:
All age-groups differed significantly by referral source with BSA screening proportionately higher numbers of patients aged 51-60 when compared to non-BSA sources.

Audit data used:
Information is derived from a calculation using audit questions “diagnosis date” and “date of birth”. (If diagnosis date was not available, the first surgery date was used.)

Definitions:
Diagnosis date: The date upon which the cancer diagnosis was made Surgery date: The date upon which breast cancer surgery was done Date of birth: Patient’s date of birth

3.5 Gender of patients by referral source†

Referral source	Female	Male
BSA (N=950)	100.00%	0.00%
Non-BSA (N=1,393)	98.85%	1.15%
P value	NC	NC

†Referral source was not known for 4 records.

Comments:
Only 1% of New Zealand patients were males and none of the male patients were referred from BSA for treatment.

Audit data used:
Information is derived from the audit question “gender” which allows the options of female and male.

Definitions:
Female: female patient; Male: male patient

4 Invasive Tumour Characteristics

4.1 Type of invasive tumour by referral source†

Referral source	1	2	3	4	5	6	7	8*
BSA (N=759)	81.29%	10.67%	0.92%	2.24%	2.37%	0.13%	1.98%	0.40%
Non-BSA (N=1,254)	77.67%	11.80%	1.59%	3.83%	1.36%	0.32%	2.87%	0.56%
P value	0.0532	0.4389	0.2036	0.0508	0.091	0.4134	0.2158	0.6143

†Referral source was not known for 4 invasive records. Tumour types were not known for 191 BSA and 138 non-BSA patients.

* the numbers in the columns refer to the following Type:

1. Ductal Carcinoma Not Otherwise Specified (NOS)
2. Invasive Lobular
3. Other invasive of mixed type
4. Other Neoplasm
5. Tubular
6. Medullary
7. Mucinous
8. Basal like

Comments:
New Zealand invasive tumours were Ductal Carcinoma NOS in 68% of cases. The proportions of each invasive tumour type did not differ significantly between the BSA and non-BSA groups.

Audit data used:
Information is derived from the audit question "invasive histological type of tumour" which allows the options of ductal carcinoma NOS, invasive lobular, tubular, medullary, mucinous, other invasive of mixed type, other neoplasm and basal-like.

Definitions:
Tumour type defines the microscopic appearance of the invasive breast cancer cells in the principal tumour.

4.2 Size of invasive tumour by referral source†

Referral source	<10 mm	10-14 mm	15-19 mm	20-29 mm	30-39 mm	≥40 mm
BSA (N=760)	27.11%	29.87%	17.24%	16.71%	3.82%	5.26%
Non-BSA (N=1,236)	11.57%	13.51%	18.37%	27.59%	12.86%	16.10%
P value	<0.001	<0.001	0.5233	<0.001	<0.001	<0.001

†Referral source was not known for 4 invasive records. Invasive tumour size was not known for 190 BSA and 159 non-BSA patients.

Comments:
The percentage of patients with smaller tumours (< 15 mm) was significantly higher in the BSA group (57%) than in the non-BSA group (25%). The percentage of patients with larger tumours (>20 mm) was significantly higher in non-BSA group (57%) than in the BSA group (26%). The percentage of patients with 15 to 19 mm invasive tumours did not differ significantly between the BSA and non-BSA groups.

Audit data used:
Information is derived from the audit question “invasive tumour size in mm”.

Definitions:
Tumour size refers to the maximum diameter in millimetres of the furthest points of extension of the invasive tumour cells in the principal tumour.

4.3 Histological grade of invasive tumour by referral source†

Referral source	Grade 1	Grade 2	Grade 3
BSA (N=754)	33.82%	43.77%	22.41%
Non-BSA (N=1,234)	19.85%	43.11%	37.03%
P value	<0.001	0.775	<0.001

†Referral source was not known for 4 invasive records. Histological grade of the invasive tumours were not known for 197 BSA and 156 non-BSA patients.

Comments:
The percentage of patients with Grade 1 tumours was significantly higher in the BSA group (34%) than in the non-BSA group (20%). The percentage of patients with Grade 3 tumours was significantly higher in the non-BSA group (37%) when compared to the BSA group (22%). Proportions of Grade 2 invasive tumours did not differ significantly between the BSA and non-BSA groups.

Audit data used:
Information is derived from the audit question "invasive histological grade of tumour" which allows the options of grade 1, grade 2, and grade 3.

Definitions:
Histological grade is the degree of differentiation of the breast cancer or the degree to which it resembles normal tissue as assessed by the pathologist according to Pathology Reporting Guidelines. The histological grade is calculated by adding three scores (mitosis score, nuclear score and tubular differentiation score):

Grade 1 Total score of 3-5

Grade 2 Total score of 6-7

Grade 3 Total score of 8-9

4.4 Lymphatic vascular invasion of invasive tumour by referral source†

Referral source	Present	Absent
BSA (N= 751)	16.25%	83.75%
Non-BSA (N= 1,245)	28.03%	71.97%
P value	<0.001	<0.001

†Referral source was not known for 4 invasive records. Lymphatic vascular invasion was not known for 117 BSA and 102 non-BSA patients.

Comments:
In the majority (70%) of New Zealand patients, lymphatic vascular invasion was absent. The proportion of patients with vascular lymphatic invasion was significantly lower in the BSA group (16%) than in the non-BSA group (28%).

Audit data used:
Information is derived from the audit question "vascular/lymphatic invasion" which allows the options of present and absent.

Definitions:
Lymphatic vascular invasion present - tumour cells observed within the lumen of blood or lymphatic vessels.

4.5 Bilateral synchronous status of invasive tumour by referral source†

Referral source	Bilateral synchronous	Not bilateral synchronous
BSA (N= 762)	3.15%	96.85%
Non-BSA (N= 1,279)	3.83%	96.17%
P value	0.4226	0.4226

†Referral source was not known for 4 invasive records. Bilateral synchronous status for invasive tumours was not known for 3 non-BSA patients.

Comments:
Most (96%) of New Zealand invasive cancers were not bilateral synchronous. Proportions of patients with bilateral synchronous cancers did not differ significantly between patients from BSA and non-BSA groups.

Audit data used:
Information is derived from the audit question "bilateral synchronous" which allows the options of yes and no.

Definitions:
Bilateral synchronous cancers are cancers that occur in both breasts either simultaneously or sequentially within three months.

4.6 Menopausal status for invasive tumour by referral source†

Referral source	Pre	Post	Peri
BSA (N= 749)	15.89%	72.63%	11.48%
Non-BSA (N= 1,233)	31.95%	61.31%	6.73%
P value	<0.001	<0.001	0.0002

†Referral source was not known for 4 invasive records. Menopausal status was not known for 21 BSA females and 38 non-BSA females. There were 16 males in the non-BSA group.

Comments:
The majority (63%) of New Zealand patients were post-menopausal. The proportion of pre- menopausal women was significantly lower in the BSA group (16%) than in the non-BSA group (32%). The BSA group had significantly higher proportions of post and peri-menopausal patients.

Audit data used:
Information is derived from the audit question "menopausal status" which allows the options of pre, peri, post and male.

Definitions:
Pre: an individual who has not yet experienced the menopause

Post: an individual who has experienced the menopause and the occurrence of greater than one year of spontaneous amenorrhoea

Peri: an individual who is either in the period just prior to the menopause or the subsequent one year of amenorrhoea following the menopause

Male: male patient

4.7 Oestrogen receptor status of invasive tumour by referral source†

Referral source	Positive	Negative
BSA (N= 753)	89.11%	10.89%
Non-BSA (N= 1,265)	82.37%	17.63%
P value	<0.001	<0.001

†Referral source was not known for 4 invasive records. Oestrogen receptor status was not known for 179 BSA and 104 non-BSA patients.

Comments:
Most (74%) New Zealand patients had oestrogen positive tumours. The proportion of patients with oestrogen positive tumours was slightly higher in the BSA group (89%) than in non-BSA group (82%). This difference was statistically significant (P<0.001).

Audit data used:
Information is derived from the audit question "Oestrogen receptor status" which allows the options of positive, negative, ordered but not known and not done.

Definitions:
The presence or absence of oestrogen receptors on the tumour cells.

4.8 Progesterone receptor status of invasive tumour by referral source†

Referral source	Positive	Negative
BSA (N= 749)	75.57%	24.43%
Non-BSA (N= 1,262)	67.83%	32.17%
P value	0.0002	0.0002

†Referral source was not known for 4 invasive records. Progesterone receptor status was not known for 184 BSA and 109 non-BSA patients.

Comments:
The majority (62%) of New Zealand patients had progesterone positive tumours. The proportion of patients with progesterone positive tumours was significantly higher in the BSA group (76%) than in non-BSA group (68%).

Audit data used:
Information is derived from the audit question "progesterone receptor status" which allows the following options: positive, negative, ordered but not known and not done.

Definitions:
The presence or absence of progesterone receptors on the tumour cells.

4.9 HER2 Receptor status of invasive tumour by referral source†

Referral source	Positive	Negative
BSA (N= 739)	12.45%	87.55%
Non-BSA (N= 1,224)	16.83%	83.17%
P value	0.0088	0.0088

†Referral source was not known for 4 invasive records. HER2 status was not known for 205 BSA and 160 non-BSA patients.

Comments:
Most (84%) New Zealand patients had HER2 negative invasive tumours. The percentage of patients with HER2 negative tumours was slightly higher in the BSA group (88%) than in non- BSA group (83%). This difference was statistically significant (P=0.0088).

Audit data used:
Information is derived from the audit question "HER2 receptor status" which allows the following options: positive, negative, ordered but not known and not done.

Definitions:
HER2: Human Epidermal growth factor Receptor 2

Positive: Biopsy revealed abnormally high levels of the HER2 gene or protein

Negative: Biopsy revealed a normal level of the HER2 gene or protein

5 DCIS Tumour Characteristics

5.1 Size of DCIS tumours by referral source†

Referral source	<10 mm	10-14 mm	15-19 mm	20-29 mm	30-39 mm	>40 mm
BSA (N= 182)	36.26%	18.13%	10.44%	12.09%	9.34%	13.74%
Non-BSA (N= 102)	18.63%	17.65%	10.78%	17.65%	12.75%	22.55%
P value	0.0018	0.9187	0.9277	0.1963	0.3705	0.0573

†Referral source was not known for 3 DCIS records. DCIS tumour size was not known for 3 BSA and 5 non-BSA patients.

Comments:
The percentage of patients with smaller tumours (<20mm) was significantly higher for the BSA group (65%) than the non-BSA group (47%).

Audit data used:
Information is derived from the audit question “DCIS tumour size in mm”.

Definitions:
Tumour size refers to the maximum diameter in millimetres of the furthest points of extension of the DCIS tumour cells in the principal tumour.

5.2 Histological grade of DCIS tumour by referral source†

Referral source	Low	Intermediate	High
BSA (N= 186)	13.44%	46.24%	40.32%
Non-BSA (N= 104)	16.35%	36.54%	47.12%
P value	0.5002	0.1094	0.2621

†Referral source was not known for 3 DCIS records. DCIS Histological grade was not known for 3 BSA and 5 non-BSA patients.

Comments:
Proportions of each histological grade of DCIS tumours did not differ significantly between BSA and non-BSA groups.

Audit data used:
Information is derived from the audit question "DCIS histological grade of tumour" which allows the following options: low, medium and high.

Definitions:
The degree of differentiation of the breast cancer or the degree to which it resembles normal tissue as assessed by the pathologist.

Low: well differentiated

Intermediate: moderately differentiated

High: poorly differentiated

5.3 Necrosis of DCIS tumour by referral status†

Referral source	Absent	Present
BSA (N=173)	36.99%	63.01%
Non-BSA (N=95)	34.74%	65.26%
P value	0.713	0.713

†Referral source was not known for 3 DCIS records. Necrosis of the DCIS tumours was not known for 16 BSA and 14 non-BSA patients.

Comments:
The majority (64%) of New Zealand patients with DCIS tumours had necrosis. Proportions of DCIS tumours with necrosis did not differ significantly between BSA and non-BSA groups.

Audit data used:
Information is derived from the audit question "necrosis of tumour" which allows the options of present and absent.

Definitions:
Two categories of necrosis are recognised with DCIS: focal necrosis with no central necrosis and central necrosis in ducts:

Present: Central necrosis is identified in ducts (this has previously been described as "comedo" type necrosis).

Absent: Necrosis is not present or minimal. No central duct necrosis is present, but focal necrosis and isolated apoptotic cells may be present.

5.4 Bilateral synchronous status of DCIS tumours by referral status†

Referral source	Bilateral synchronous	Not bilateral synchronous
BSA (N= 189)	2.12%	97.88%
Non-BSA (N= 109)	5.50%	94.50%
P value	0.1177	0.1177

†Referral source was not known for 3 DCIS records.

Comments:
DCIS tumours in most (97%) New Zealand patients were not bilateral synchronous. Proportionately, the incidence of patients with bilateral synchronous DCIS tumours was lower in the BSA group (2%) than in non-BSA group (6%) but this difference was not statistically significant.

Audit data used:
Information is derived from the audit question "bilateral synchronous" which allows the option of yes and no.

Definitions:
Bilateral synchronous cancers are cancers that occur in both breasts, either simultaneously or sequentially within three months.

5.5 Menopausal status for the DCIS tumours by referral source†

Referral source	Pre	Post	Peri
BSA (N= 181)	18.78%	64.64%	16.57%
Non-BSA (N= 103)	32.04%	61.17%	6.80%
P value	0.0114	0.5588	0.0186

†Referral source was not known for 3 DCIS records. Menopausal status was not known for 7 BSA and 1 non-BSA patients. There was 1 male from non-BSA referral sources.

Comments:
The majority (63%) of the New Zealand DCIS patients were post-menopausal. Proportions of DCIS cases were significantly lower for pre-menopausal patients of BSA and peri-menopausal non-BSA patients.

Audit data used:
Information is derived from the audit question "menopausal status" where the options are: pre, peri, post and male.

Definitions:
Pre: an individual who has not yet experienced the menopause

Post: an individual who has experienced the menopause and the occurrence of greater than one year of spontaneous amenorrhoea

Peri: an individual who is either in the period just prior to the menopause or the subsequent one year of amenorrhoea following the menopause

Male: male patient

6 Breast Surgery Treatment

6.1 First breast surgery performed for invasive cancer by referral source†

Referral source	None	Open Biopsy	CLE	Mastectomy	Other
BSA (N= 762)	0.39%	1.71%	68.24%	28.61%	1.05%
Non-BSA (N= 1,281)	4.68%	2.11%	38.25%	54.25%	0.70%
P value	<0.001	0.5263	<0.001	<0.001	0.4033

†Referral source was not known for 4 invasive records. Surgery status was not known for 4 non-BSA participants.

Comments:
The majority of the BSA patients (70%) had breast conserving surgery (CLE or Open Biopsy) and the majority of non-BSA patients had mastectomy (54%) as their first breast surgery.

6.2 Further breast surgery after breast conserving surgery for invasive cancer by referral source†

Referral source	Mastectomy	Re-excision	Other	Any further surgery	No further breast surgery
BSA (N=533)	7.50%	14.82%	0.38%	22.70%	77.30%
Non-BSA (N=517)	9.67%	12.96%	0.97%	23.60%	76.40%
P value	0.2099	0.3832	0.2387	0.7307	0.7307

†Referral source was not known for 4 invasive tumours. Please note that some of the patients had more than one surgery after BCS and therefore the percentage of any further surgery after BCS does not equal to the sum of the percentages of mastectomy, re-excision and other surgery after BCS.

Comments:
The majority (77%) of New Zealand patients had no further surgery after breast conserving surgery for invasive cancer. Proportionately, patients undergoing mastectomy after BCS for invasive cancer did not differ significantly for BSA patients (8%) when compared to the non-BSA group (10%).

6.3 Reconstruction after mastectomy for invasive cancer by referral source†

Referral source	Reconstruction	No Reconstruction
BSA (N= 269)	14.87%	85.13%
Non-BSA (N= 765)	13.46%	86.54%
P value	0.5656	0.5656

†Referral source was not known for 3 invasive tumours which had mastectomy.

Comments:
The majority (86%) of New Zealand mastectomy patients had no reconstruction after mastectomy for invasive cancer. The proportion of patients with reconstruction surgery after mastectomy for invasive tumours did not differ significantly between BSA and non-BSA groups.

6.4 First breast surgery performed for DCIS by referral source†

Referral source	None	Open biopsy	CLE	Mastectomy	Other
BSA (N= 189)	0.53%	10.58%	64.02%	24.34%	0.53%
Non-BSA (N= 109)	1.83%	9.17%	47.71%	40.37%	0.92%
P value	0.2768	0.6973	0.006	0.0037	0.6925

†Referral source was not known for 3 DCIS records.

Comments:
The majority (68%) of New Zealand patients had breast conserving surgery (open biopsy or CLE) as their first surgery for DCIS. The proportion of patients who had breast conserving surgery for DCIS tumours was significantly higher in the BSA group (75%) than in the non-BSA group (57%). The percentage of patients with mastectomy as their first surgery for DCIS tumours was significantly lower in the BSA group (24%) than in the non-BSA group (40%).

6.5 Further surgery after breast conserving surgery for DCIS by referral source†

Referral source	Mastectomy	Re-excision	Other	Any further surgery	No further breast surgery
BSA (N= 141)	7.80%	19.86%	0.71%	28.37%	71.63%
Non-BSA (N= 62)	17.74%	29.03%	0.00%	46.77%	53.23%
P value	0.0359	0.1504	0.5062	0.0108	0.0108

†Referral source was not known for 3 DCIS records. Please note that some of the patients had more than one surgery after BCS and therefore the percentage of any further surgery after BCS does not equal to the sum of the percentages of mastectomy, re-excision and other surgery after BCS.

Comments:
The majority (66%) of New Zealand patients had no further surgery after breast conserving surgery for DCIS. The proportion of patients with mastectomy after breast conserving surgery for DCIS tumours was significantly lower in the BSA group (8%) than in the non-BSA group (18%).

6.6. Reconstruction performed after mastectomy for DCIS by referral source †

Referral source	Reconstruction	No Reconstruction
BSA (N=61)	34.43%	65.57%
Non-BSA (N=63)	30.16%	69.84%
P value	0.6113	0.6113

†Referral source was not known for 3 DCIS records.

Comments
The majority (68%) of New Zealand patients had no reconstruction after mastectomy for DCIS. There was no statistically significant difference between BSA and non-BSA patients.

Audit data used:
Information is derived from the audit question "surgical procedures" which allows the following options: no surgery, ABBI, open biopsy, CLE, re-excision, total mastectomy, reconstruction and other.

Definitions:

Open biopsy:	surgical procedure in which a sample of breast tissue for histological examination is obtained in a conventional surgical procedure, using an open excision
CLE:	the complete excision of an entire tumour mass
ABBI:	the process whereby an Advanced Breast Biopsy Instrumentation System (or similar) technique is used to excise non-palpable breast lesions
Total mastectomy:	the surgical removal of the breast
Re-excision:	a secondary surgical procedure conducted to obtain a rim of normal breast tissue around the periphery of the previously removed primary tumour
Reconstruction:	the use of a prosthesis or tissue from other parts of the body to re-build a breast
Other:	other surgery

7 Axillary surgery treatment

Relevant clinical practice guidelines

- Women with unifocal ≤ 3cm invasive tumours and clinically negative nodes should be offered sentinel node biopsy[1,2].
- For women with multifocal >3cm invasive tumours with clinically involved nodes, axillary dissection is normally recommended[1,2].
- Axillary dissection should not be performed in the management of DCIS unless invasion is suspected[1,3].

BQA KPIs

- KPI 3: Percent of cases undergoing axillary surgery for invasive cancer (≥90%).
- KPI 4: Percent of cases not undergoing axillary surgery for DCIS which underwent breast conserving surgery (≥90%).

7.1 Axillary procedures for invasive cancer by referral source†

Referral source	No axillary surgery	SNB only	Level 1 only	Level 2 or 3 only	SNB & Level 1	SNB & Level 2 or 3	Level 1 & 2 or 3	Level 2 & 3	>2 axillary surgeries
BSA (N=762)	2.10%	70.47%	1.31%	14.17%	0.52%	10.89%	0.00%	0.00%	0.52%
Non-BSA (N= 1,281)	7.49%	44.42%	1.72%	32.63%	0.94%	11.63%	0.55%	0.23%	0.39%
P value	<0.001	<0.001	0.4758	<0.001	0.3071	0.6106	0.0409	0.1813	0.6568

†Referral source was not known for 4 invasive tumours. Axillary procedures was not known for 6 BSA and 10 non-BSA patients.

7.2 Axillary procedures for ≤3cm invasive cancer by referral source†

Referral source	No axillary surgery	SNB only	Level 1 only	Level 2 or 3 only	SNB & Level 1	SNB & Level 2 or 3	Level 1 & 2 or 3	Level 2 & 3	>2 axillary surgeries
BSA (N= 691)	1.74%	75.83%	1.01%	10.27%	0.58%	10.42%	0.00%	0.00%	0.14%
Non-BSA (N= 878)	4.44%	56.49%	1.48%	22.55%	1.14%	12.87%	0.34%	0.23%	0.46%
P value	0.0027	<0.001	0.4124	<0.001	0.2415	0.1351	0.124	0.2093	0.2781

†For ≤ 3 cm tumours, referral source was not known for 3 patients.

7.3 Axillary procedures for >3cm invasive cancer by referral source by referral source†

Referral source	No axillary surgery	SNB only	Level 1 only	Level 2 or 3 only	SNB & Level 1	SNB & Level 2 or 3	Level 1 & 2 or 3	Level 2 & 3	>2 axillary surgeries
BSA (N=69)	2.90%	18.84%	4.35%	53.62%	0.00%	15.94%	0.00%	0.00%	4.35%
Non-BSA (N=358)	5.59%	20.39%	2.51%	59.50%	0.56%	9.78%	1.12%	0.28%	0.28%
P value	0.355	0.7687	0.3987	0.3645	0.5337	0.1304	0.3777	0.6603	0.0013

†For >3 cm tumours, referral source not known for one patient, tumour size was missing for 2 BSA and 45 non-BSA patients. Most of the patients with missing tumour size information were recorded as having no axillary surgery.

Comments:
For ≤3cm tumours, a higher proportion (76%) of BSA patients had SNB as their only axillary surgery compared with non-BSA patients (56%). This difference was not significant for >3cm tumours. As expected from the guidelines, a higher percentage of patients had Level 2 or Level 3 axillary surgery (with or without SNB) for >3cm tumours (69%) than for ≤ 3cm tumours (23%).

7.4 Axillary procedures for DCIS treated with breast conserving surgery only by referral source

Referral source	No axillary surgery	SNB only	Level 1 only	Level 2 or 3 only	SNB & Level 1	SNB & Level 2 or 3	Level 1 & 2 or 3	Level 2 & 3	>2 axillary surgeries
BSA (N=142)	83.80%	16.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Non-BSA (N=63)	71.43%	26.98%	0.00%	0.00%	0.00%	1.59%	0.00%	0.00%	0.00%
P value	0.041	0.0722				Not calculated			

Comments:
The majority (80%) of New Zealand patients with DCIS did not have axillary surgery after BCS, as expected from the guidelines. Fewer BSA patients (16%) had axillary surgery than non-BSA patients (29%) but this result did not achieve statistical significance.

7.5 Axillary procedures for DCIS treated with mastectomy by referral source

Referral source	No axillary surgery	SNB only	Level 1 only	Level 2 or 3 only	SNB & Level 1	SNB & Level 2 or 3	Level 1 & 2 or 3	Level 2 & 3	>2 axillary surgeries
BSA (N=61)	22.95%	73.77%	1.64%	1.64%	0.00%	0.00%	0.00%	0.00%	0.00%
Non-BSA (N=63)	26.98%	68.25%	1.59%	1.59%	0.00%	1.59%	0.00%	0.00%	0.00%
P value	0.6041	0.4987	0.9817	0.9817			Not calculated		

Comments:
The majority (74%) of New Zealand patients with DCIS had axillary surgery after mastectomy. The proportions of axillary surgery performed did not differ significantly between the BSA group and non-BSA group.

Audit data used:
Information on axillary procedure is from the audit question "axillary surgery" which allows the following options: sentinel node biopsy; level 1 sampling, level 2, level 3 and no axillary surgery.

Definitions:

Sentinel node biopsy:	Identification and excision of the sentinel lymph node (the first node(s) draining the primary tumour in the regional lymphatic basin).
Axillary surgery:	Surgical excision of the axillary contents (fat and lymph nodes).
Level 1:	Excision of a single, low axillary node or the excision of the axillary contents up to the inferior border of the pectoralis minor muscle, includes sampling.
Level 2:	Excision of the axillary contents up to the superior border of the pectoralis minor muscle.
Level 3:	Excision of the axillary contents up to the apex of the axilla.

8 Margins of excision for breast surgery

8.1 Margins of excision for invasive cancer by referral source†

Referral source	Margin size=0 mm	Margin size >0 mm and ≤1 mm	Margin size ≥2 mm
BSA (N=645)	1.86%	2.64%	95.50%
Non-BSA (N=934)	2.36%	4.07%	93.58%
P value	0.5053	0.1269	0.1025

†Referral source was not known for 4 invasive cases. Margin size was not known for 117 BSA and 347 non-BSA patients.

Comments:
Most (94%) New Zealand patients had ≥2 mm margins after surgery for invasive cancer. The proportions of patients of any margin size after surgery for invasive tumours did not differ significantly between BSA and non-BSA patients.

8.2 Margins of excision for DCIS cancer by referral source†

Referral source	Margin size=0 mm	Margin size >0 mm and ≤1 mm	Margin size ≥2 mm
BSA (N=155)	2.58%	8.39%	89.03%
Non-BSA (N=75)	2.67%	10.67%	86.67%
P value	0.9694	0.5737	0.6013

†Margin size was not known for 34 BSA and 34 non-BSA patients for DCIS cases.

Comments:
Most (88%) New Zealand patients had ≥2 mm margins after surgery for DCIS. The proportions of patients of any margin size after surgery for DCIS tumours did not differ significantly between BSA and non-BSA patients.

Audit data used:
Information on margin size is derived from the audit question “distance (in mm) to closest circumferential margin” and “distance (in mm) to closest vertical margin”

9 Radiotherapy treatment

BQA KPIs

- KPI 1: Percent of invasive tumours treated with breast conserving surgery (BCS) that were referred for or prescribed radiotherapy (≥85%).
- KPI 5: High risk mastectomy cases that were referred for or prescribed radiotherapy. High risk defined as: invasive tumour size ≥ 50 mm OR invasive tumours with ≥ 4 positive lymph nodes (≥85%).

9.1 Radiotherapy for invasive cancer treated with breast conserving surgery by referral source†

Referral source	Radiotherapy prescribed	Radiotherapy not prescribed
BSA (N= 479)	97.91%	2.09%
Non-BSA (N= 433)	93.76%	6.24%
P value	0.0015	0.0015

†Referral source was not known for 3 BCS invasive cases. Radiotherapy was not known for 10 BSA and 19 non-BSA patients. Please note that the patients who had mastectomy or other breast surgery after breast conserving surgery were not included in this group.

Comments:
The proportion of NZ patients prescribed radiotherapy treatment for invasive cancers was slightly higher for BSA (98%) patients when compared to non-BSA patients (94%). This difference was statistically significant (P=0.0015). Both groups exceed the BQA KPI1 threshold of ≥85% of invasive tumours treated with BCS to be referred or prescribed radiotherapy.

9.2 Radiotherapy for invasive cancer which had mastectomy by referral source†

Referral source	Radiotherapy prescribed	Radiotherapy not prescribed
BSA (N= 263)	43.35%	56.65%
Non-BSA (N= 737)	52.10%	47.90%
P value	0.0148	0.0148

†Referral source was not known for 3 invasive mastectomy cases and radiotherapy status was not known for 6 BSA and 28 non-BSA patients.

Comments:
The percentage of patients with prescribed radiotherapy treatment after mastectomy for invasive cancer was significantly lower in the BSA group (44%) than in the non-BSA group (52%).

9.3 Radiotherapy for high risk invasive cancer treated with mastectomy by referral source†

Referral source	Radiotherapy prescribed	Radiotherapy not prescribed
BSA (N=36)	88.89%	11.11%
Non-BSA (N=208)	89.42%	10.58%
P value	0.9236	0.9236

†Radiotherapy status was not known for 1 BSA and 2 non-BSA patients.

Comments:
Proportions of patients with prescribed radiotherapy treatment after mastectomy for high risk invasive cancer did not differ significantly between BSA and non-BSA groups. Proportionately, patients with high-risk invasive cancers were far more likely to receive radiotherapy treatment after mastectomy than those with lower-risk tumours. Both groups exceed the BQA KPI5 threshold of ≥85% for high-risk (≥ 50mm tumours or ≥ 4 positive lymph nodes) invasive tumours treated with mastectomy to be referred or prescribed radiotherapy

9.4 Radiotherapy for DCIS treated with breast conserving surgery by referral source†

Referral source	Radiotherapy prescribed	Radiotherapy not prescribed
BSA (N= 124)	71.77%	28.23%
Non-BSA (N= 38)	68.42%	31.58%
P value	0.6903	0.6903

†Radiotherapy status was not known for 3 BSA and 6 non-BSA patients. Please note that the DCIS patients who had mastectomy after breast conserving surgery were excluded in this group.

Comments:
The majority (67%) of New Zealand DCIS patients had radiotherapy after breast conserving surgery. Proportionately, radiotherapy treatment after breast conserving surgery for DCIS did not differ significantly between BSA and non-BSA groups.

9.5 Radiotherapy for DCIS cancer which had mastectomy by referral source†

Referral source	Radiotherapy prescribed	Radiotherapy not prescribed
BSA (N= 58)	5.17%	94.83%
Non-BSA (N= 59)	8.47%	91.53%
P value	0.4792	0.4792

†Radiotherapy status was not known for 3 BSA and 4 non-BSA patients.

Comments:
Only a small percentage (6%) of New Zealand patients had radiotherapy treatment after mastectomy for DCIS cancer. Proportions of radiotherapy treatment after mastectomy for DCIS did not differ significantly between the BSA and non-BSA groups.

Audit data used:
Information on patients undergoing radiotherapy is derived from the audit question "did you prescribe or refer for any of the following adjuvant therapies?" where one of the options is radiotherapy. The options were: yes, no, not yet, referred but not used, not known.

Definitions:
Radiotherapy is the use of radiation, usually X-rays or gamma rays, to kill tumour cells.

10 Hormonal treatment

BQA KPI 2: Percent referred or prescribed hormonal treatment for oestrogen positive invasive tumours (≥85%).

10.1 Hormonal treatment for oestrogen positive invasive tumours by referral source†

Referral source	Hormonal treatment	No hormonal treatment
BSA (N= 651)	84.18%	15.82%
Non-BSA (N= 980)	88.37%	11.63%
P value	0.0147	0.0147

†Referral source was not known for 1 record. Oestrogen receptor status was not known for 16 BSA records and 26 non-BSA records. Hormonal treatment was not known for 38 BSA and 95 non-BSA patients for oestrogen positive tumours.

Comments:
Most (87%) of the New Zealand patients with oestrogen positive tumours had hormonal treatment. The percentage of patients with prescribed hormonal treatment for oestrogen positive invasive tumours was significantly lower in the BSA group (85%) than in non-BSA group (89%). Both groups exceed the BQA KPI2 threshold of ≥85% percent patients referred or prescribed hormonal treatment for oestrogen positive invasive tumours.

10.2 Hormonal treatment type by menopausal status: oestrogen positive invasive tumours

Any Menopausal State

Referral source	Any hormone treatment	Tamoxifen only	Tamoxifen & Ovarian ablation	Tamoxifen & Aromatase inhibitors	Ovarian ablation only	Ovarian ablation & Aromatase inhibitors	Aromatase inhibitors only	All three hormone treatments	No hormone treatment
BSA (N=643)	84.33%	37.46%	0.16%	14.26%	0.16%	0.31%	31.82%	0.16%	15.67%
Non-BSA (N=971)	88.47%	49.33%	0.21%	10.22%	0.21%	0.00%	28.07%	0.41%	11.56%
P value	0.0193	<0.001	0.8215	0.014	0.8215	0.0812	0.1072	0.3672	0.0171

Pre Menopause

Referral source	Any hormone treatment	Tamoxifen only	Tamoxifen & Ovarian ablation	Tamoxifen & Aromatase inhibitors	Ovarian ablation only	Ovarian ablation & Aromatase inhibitors	Aromatase inhibitors only	All three hormone treatments	No hormone treatment
BSA (N=104)	89.42%	74.04%	0.96%	10.58%	0.96%	1.92%	0.00%	0.96%	10.58%
Non-BSA (N=299)	90.97%	78.60%	0.67%	10.03%	0.00%	0.00%	1.67%	0.00%	9.03%
P value	0.642	0.3384	0.7649	0.8745	0.0896	0.0162	NC	NC	0.642

Peri Menopause

Referral source	Any hormone treatment	Tamoxifen only	Tamoxifen & Ovarian ablation	Tamoxifen & Aromatase inhibitors	Ovarian ablation only	Ovarian ablation & Aromatase inhibitors	Aromatase inhibitors only	All three hormone treatments	No hormone treatment
BSA (N=76)	86.84%	60.00%	0.00%	16.00%	0.00%	0.00%	10.67%	0.00%	13.33%
Non-BSA (N=66)	93.94%	66.67%	0.00%	10.61%	1.52%	0.00%	15.15%	0.00%	6.06%
P value	0.1571	0.413	NC	0.3493	NC	NC	0.4259	NC	0.1496

Post Menopause

Referral source	Any hormone treatment	Tamoxifen only	Tamoxifen & Ovarian ablation	Tamoxifen & Aromatase inhibitors	Ovarian ablation only	Ovarian ablation & Aromatase inhibitors	Aromatase inhibitors only	All three hormone treatments	No hormone treatment
BSA (N=463)	82.94%	25.49%	14.81%	0.00%	0.00%	0.00%	42.48%	0.00%	17.21%
Non-BSA (N=591)	86.46%	31.75%	10.36%	0.17%	0.00%	0.00%	43.46%	0.68%	13.58%
P value	0.1124	0.0268	0.0293	NC	NC	NC	0.7506	NC	0.1042

Male

Referral source	Any hormone treatment	Tamoxifen only	Tamoxifen & Ovarian ablation	Tamoxifen & Aromatase inhibitors	Ovarian ablation only	Ovarian ablation & Aromatase inhibitors	Aromatase inhibitors only	All three hormone treatments	No hormone treatment
BSA (N= 0)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Non-BSA (N= 15)	100.00%	80.00%	6.67%	0.00%	0.00%	0.00%	6.67%	0.00%	6.67%
P value	NC	NC	NC	NC	NC	NC	NC	NC	NC

Unknown

Referral source	Any hormone treatment	Tamoxifen only	Tamoxifen & Ovarian ablation	Tamoxifen & Aromatase inhibitors	Ovarian ablation only	Ovarian ablation & Aromatase inhibitors	Aromatase inhibitors only	All three hormone treatments	No hormone treatment
BSA (N= 8)	62.50%	37.50%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	37.50%
Non-BSA (N= 9)	77.78%	33.33%	11.11%	0.00%	0.00%	0.00%	33.33%	0.00%	22.22%
P value	0.4902	0.8576	0.4534	NC	NC	NC	NC	NC	0.4902

10.3 Hormonal treatment for oestrogen negative invasive tumours by referral source†

Referral source	Hormonal treatment	No hormonal treatment
BSA (N=80)	6.25%	93.75%
Non-BSA (N=218)	6.88%	93.12%
P value	0.0193	0.0193

†Referral source was not known for 4 invasive records. Oestrogen receptor status was not known for 6 BSA and 12 non-BSA patients. Hormonal treatment was not known for 2 BSA and 5 non-BSA patients for oestrogen negative invasive tumours.

Comments:
A small percentage (7%) of New Zealand patients with oestrogen negative tumours had hormonal treatment. Proportions of patients with oestrogen negative tumours who had hormone therapy did not differ significantly different between BSA and non-BSA groups in general.

Audit data used:
Information for oestrogen receptor positive status is derived from the audit questions relating to "receptor status" where information is recorded for oestrogen and progesterone status with options of positive, negative, ordered but not known and not done.

Information for number of patients prescribed and/or referred for hormonal therapy is derived from the question "did you prescribe or refer for any of the following adjuvant therapies?" The following options apply: yes, no, not yet and referred but not used.

Definitions:
Oestrogen Receptors are prognostic indicators. They are an intracellular receptor protein that binds oestrogens and anti-oestrogens, mediating their effects by binding to DNA and altering the expression of specific genes.

Hormonal treatment includes SERMs, aromatase inhibitors and ovarian ablation.

SERMSs refers to the use of Selective Oestrogen Receptor Modulators to inhibit the growth of hormone responsive cancer cells after primary treatment, either by surgery or radiotherapy or a combination of these, to eradicate micro metastatic cancer.

Ovarian ablation refers to the use of surgery, radiation or drug treatment to cease hormone production by the ovaries, after primary treatment either by surgery or radiotherapy or a combination of these (usually within six weeks), to eradicate micro metastatic cancer.

Aromatase inhibitors refer to the class of drugs which lower the level of oestrogen in the tumour. They are primarily used in post-menopausal patients.

10.4 Hormonal treatment type by menopausal status: oestrogen negative invasive tumours

Any Menopausal State

Referral source	Any hormone treatment	Tamoxifen only	Tamoxifen & Aromatase inhibitors	Aromatase inhibitors only	No hormone treatment
BSA (N=78)	6.41%	2.56%	0.00%	3.85%	93.59%
Non-BSA (N=210)	7.14%	4.29%	1.43%	1.43%	92.86%
P value	0.8279	0.4981	NC	0.2018	0.8279

Pre Menopause

Referral source	Any hormone treatment	Tamoxifen only	Tamoxifen & Aromatase inhibitors	Aromatase inhibitors only	No hormone treatment
BSA (N=11)	0.00%	0.00%	0.00%	0.00%	100.00%
Non-BSA (N=79)	7.59%	5.06%	2.53%	0.00%	92.41%
P value	NC	NC	NC	NC	0.3441

Peri Menopause

Referral source	Any hormone treatment	Tamoxifen only	Tamoxifen & Aromatase inhibitors	Aromatase inhibitors only	No hormone treatment
BSA (N=9)	22.22%	11.11%	0.00%	11.11%	77.78%
Non-BSA (N=15)	0.00%	0.00%	0.00%	0.00%	100.00%
P value	0.28	NC	NC	NC	0.0565

Post Menopause

Referral source	Any hormone treatment	Tamoxifen only	Tamoxifen & Aromatase inhibitors	Aromatase inhibitors only	No hormone treatment
BSA (N=58)	5.17%	1.72%	0.00%	3.45%	94.83%
Non-BSA (N=116)	7.76%	4.31%	0.86%	2.59%	92.24%
P value	0.5257	0.3781	0.456	0.7483	0.5257

There were no eostrogen negative male patients.

11 Chemotherapy treatment

11.1 Chemotherapy treatment for invasive cancer for patients ≤ 70 years old by referral source†

Referral source	Chemotherapy prescribed	Chemotherapy not prescribed
BSA (N=720)	39.86%	60.14%
Non-BSA (N=868)	64.98%	35.02%
P value	< 0.001	< 0.001

Referral source	Chemotherapy prescribed			Chemotherapy not prescribed		
	Oestrogen or Progesterone			Oestrogen or Progesterone		
	Positive	Negative	Unknown	Positive	Negative	Unknown
BSA (N=719)	30.74%	9.04%	0.00%	57.72%	1.67%	0.83%
Non-BSA (N=867)	48.21%	16.26%	0.46%	32.30%	2.19%	0.58%
P value	< 0.001	< 0.001	NC	< 0.001	0.4543	0.538

†Referral source was not known for 1 record. Chemotherapy status was not known for 15 BSA and 42 non-BSA patients

Comments:
The proportion of patients ≤ 70 years old or under who were prescribed chemotherapy treatment was significantly lower in the BSA group (40%) than in the non-BSA group (65%).

11.2 Chemotherapy treatment for invasive cancer for patients > 70 years old by referral source †

Referral source	Chemotherapy prescribed	Chemotherapy not prescribed
BSA (N=26)	19.23%	80.77%
Non-BSA (N=366)	15.85%	84.15%
P value	0.6499	0.6499

Referral source	Chemotherapy prescribed			Chemotherapy not prescribed		
	Oestrogen or Progesterone			Oestrogen or Progesterone		
	Positive	Negative	Unknown	Positive	Negative	Unknown
BSA (N=26)	15.38%	3.85%	0.00%	76.92%	3.85%	0.00%
Non-BSA (N=365)	11.23%	4.66%	0.00%	74.52%	7.67%	1.92%
P value	0.5216	0.8487	NC	0.7855	0.4721	0.4761

† Referral source was not known for 1 record. Chemotherapy status was not known for 2 BSA and 7 not-BSA patients

Comments:
A small percentage (16%) of over 70 year old New Zealand patients had chemotherapy treatment. The proportions of over 70 years old patients prescribed chemotherapy treatment did not differ significantly between BSA and non-BSA groups.

Audit data used:
Information on chemotherapy was derived from the audit question “did you prescribe or refer for any of the following adjuvant therapies?” where one choice is chemotherapy. The following options apply: yes, no, not yet, referred but not used.

Definitions:
Chemotherapy is the use of cytotoxic drugs that aim to kill, prevent or slow the growth rate of cancer cells.

12 Trastuzumab treatment

Relevant Clinical Practice Guidelines
Patients with early breast cancer and HER-2 positive tumours, either node positive or node negative with tumours larger than 1cm, should be offered trastuzumab with chemotherapy following surgery[4].

12.1 Trastuzumab treatment for >1cm HER2 positive OR node positive HER2 positive invasive cancer by referral source†

Referral source	Trastuzumab prescribed			Not prescribed
	Chemo yes	Chemo no	Chemo unknown	
BSA (N=62)	77.42%	4.84%	0.00%	17.74%
Non-BSA (N=189)	77.78%	2.65%	2.12%	17.46%
P value	0.9531	0.3936	0.2482	0.9596

† Trastuzumab treatment was not known for 5 BSA patients and 1 non-BSA patients with >1cm HER2 positive or node positive HER2 positive tumours.

Comments:
The majority (82%) of New Zealand patients with HER2 positive tumours over 1 cm or with HER2 positive tumours and positive nodes received Trastuzumab treatment. Proportions of Trastuzumab treatment did not differ significantly between BSA and non-BSA groups whether they had chemotherapy or not.

Audit data used:
Information on chemotherapy and Trastuzumab was derived from the audit question "did you prescribe or refer for any of the following adjuvant therapies?" where one choice is Trastuzumab or other immunotherapy. The following options apply: yes, no, not yet, referred but not used.

Definitions:
Trastuzumab is a drug aimed at women who show HER2 gene amplification and/or protein over expression.

13 Summary

While the majority of breast cancer cases from New Zealand were referred as symptomatic from a GP (50%), BSA was the second most common referral source for New Zealand breast cancer patients (41%).
The majority (87%) of New Zealand cases were invasive breast cancer. The proportion of DCIS cancer was higher in the BSA group (20%) compared to non-BSA group (8%).

The majority of New Zealand patients were public (74%). The proportions of public and private patients were significantly different between the BSA (26% private, 74% public) and non-BSA (35% private, 65% public) groups.

All age-groups differed significantly by referral source with BSA screening proportionately higher numbers of patients aged between 51 and 60 years of age.

There were some significant differences between BSA and non-BSA patients for invasive and DCIS tumour characteristics and accordingly there were differences in some of the breast cancer treatments between BSA and non-BSA patients. These are detailed in sections 13.1 and 13.2 but can be summarised as follows; BSA patients had smaller, lower grade tumours, were less likely to present with lymphatic vascular invasion and less likely to be pre-menopausal when compared to non-BSA patients. BSA patients were more likely to have breast-conserving therapy as their first surgery, sentinel node biopsy as their only axillary surgery and, for insitu tumours, BSA patients were less likely to have further surgery.

13.1 Significant differences in invasive tumour characteristics and treatments between BSA and non-BSA patients

Significantly different invasive tumour characteristics between BSA and non- BSA patients

Higher proportion of BSA patients (57%) had smaller (<15 mm) tumours compared to non-BSA patients (25%).

Lower proportion of BSA patients (26%) had larger tumours (>20 mm) compared to non-BSA patients (57%).

Higher proportion of BSA patients (34%) had invasive Grade 1 tumours compared to non-BSA patients (20%).

Lower proportion of BSA patients (22%) had Grade 3 tumours compared to non-BSA patients (37%).

Lower proportion of BSA patients (16%) had lymphatic vascular invasion compared to non-BSA patients (28%).

Lower proportion of BSA patients (16%) were pre-menopausal compared non-BSA patients (32%)

Higher proportion of BSA patients (89%) had oestrogen positive tumours compared to non-BSA patients (83%).

Higher proportion of BSA patients (76%) had progesterone positive tumours compared to non-BSA patients (68%).

Lower proportions of BSA patients (13%) had HER2 positive tumours compared to non-BSA patients (17%).

Treatments for invasive tumours that were significantly different between BSA and non-BSA patients

Breast surgery
The majority of BSA patients (70%) had BCS as their first breast surgery. The majority of non-BSA patients had mastectomy as their first breast surgery (54%).

Axillary surgery
For ≤3cm tumours, a higher proportion of (76%) of BSA patients had SNB as their only axillary surgery compared with non- BSA patients (56%).

Radiotherapy treatment after mastectomy
A lower proportion of BSA patients (43%) were prescribed radiotherapy after mastectomy compared to non-BSA patients (52%).

Hormone treatment
A lower proportion of BSA patients (84%) were prescribed hormonal treatment compared to non-BSA patients (88%).

Chemotherapy treatment
The proportion of ≤ 70 years old patients with prescribed chemotherapy treatment was significantly lower in BSA group (40%) than in the non-BSA group (65%).

13.2 Significant differences in DCIS tumour characteristics and treatments between BSA and non-BSA patients

Significantly different DCIS tumour characteristics between BSA and non-BSA patients

Higher proportion of BSA patients (36%) had smaller (<10 mm) tumours compared to non- BSA patients (19%). Lower proportion of BSA patients (19%) were pre-menopausal compared non-BSA patients (32%)

Treatments for DCIS tumours that were significantly different between BSA and non-BSA patients

Breast Surgery

A higher proportion of BSA patients (68%) had breast conserving surgery (CLE or open biopsy) as their first breast surgery compared to non-BSA patients (57%).

The proportion of patients with mastectomy as their first surgery for DCIS tumours was significantly lower in the BSA group (24%) than in the non-BSA group (40%).

The proportion of patients who had any further surgery was lower for BSA (28%) patients than non-BSA patients (47%). Specifically, the proportion of patients whose further surgery was mastectomy was lower for BSA (8%) patients than non-BSA patients (18%).

14 References

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