BreastScreen Aotearoa Programme Monitoring Report

For Māori, Pacific and Total women screened during 1 July 2016 to 30 June 2018

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INTRODUCTION

This report summarises the performance of BreastScreen Aotearoa (BSA) based on quality indicators for women screened during the two- year period to June 2018. Treatment indicators are for women screened during the four-year period to June 2017.

Breast cancer is the most commonly diagnosed cancer among women in Aotearoa New Zealand. Screening aims to detect cancers at an early stage when tumours are more amenable to treatment. A properly organised breast screening programme can significantly reduce illness and death from breast cancer.

BSA offers free two-yearly mammographic screening to women aged 45 to 69 years. It plays a vital role, firstly by finding breast cancer tumours at a very early and treatable stage; and secondly by systematic following up women whose cancer is found by the screening programme to ensure timely pathways through the cancer care continuum. Women screened by BSA have a third lower risk of dying from breast cancer than women who are not screened[1].

BSA has eight Lead Provider (LP) regions. Each LP is responsible for providing or subcontracting mammography screening and assessment services in their region. Support to Screening Providers are contracted by the National Screening Unit (NSU) to support women from priority groups to screening and assessment. District Health Boards (DHBs) provide breast cancer treatment after diagnosis. Surgery is performed by DHB services and private providers; oncology and radiation therapy are provided by six Cancer Centres (or by private providers in some areas). Data on the treatment provided to women whose breast cancer was detected by BSA is collected by each LP and reported to the NSU.

Māori and Pacific mortality rates from breast cancer are disproportionately higher than those of other women[2] and more equitable outcomes could be achieved if more Māori and Pacific women were diagnosed at an earlier stage. For this reason, BSA prioritises screening these women and those who are unscreened or under-screened. All quality indicators are monitored and reported by ethnicity.

Tables and graphs for each quality indicator can be found in an online data tool on the NSU's website. Previous monitoring reports and details of the indicator measures are also available online.

This report summarises the results of BSA quality indicators related to coverage, screening quality and assessment, early detection, and timeliness for women screened between 1 July 2016 and 30 June 2018. Breast cancer treatment indicators are summarised for women whose breast cancer was detected by BSA during the four-year period 1 July 2014 to 30 June 2017.

The report has four sections:

- Overall programme performance
- Lead Provider variability
- Equity issues
- Is BSA making a difference?

[1] Ministry of Health. 2016. Summary of the BreastScreen Aotearoa Mortality evaluation 1999–2011. Wellington: Ministry of Health. Available on www.health.govt.nz

[2] Ministry of Health. 2016. Cancer: New registrations and deaths 2013. Wellington: Ministry of Health.

OVERALL PROGRAMME PERFORMANCE

This section examines the performance of the BSA programme at the national level. Quality indicators by Lead Provider may differ from those of the overall programme. Previous reports focused mainly on the findings for women aged 50 to 69 years since targets had only been developed for this age group. However, targets for women aged 45 to 49 are currently being developed. Indicators that are likely to have different targets for the younger age group are those related to cancer incidence (detection and assessment indicators). Other indicators related to coverage, screening quality, timeliness and treatment are likely to have the same targets for both age groups. Therefore, results for women aged 45 to 49 are discussed where relevant. The online data tool includes tables and graphs of trends over time for all indicators for both age groups by ethnicity.

Coverage – under 70% for Māori women, over 70% for Pacific and other women and inequitable

- Coverage was on target for Pacific and total women aged 50 to 69 years but not for Māori. BSA screened 65% of Māori women, 73% of Pacific women, and 72% of other women (target over 70%).
- An additional 2,916 Māori women aged 50 to 69 years needed to be screened to reach the target, while 4,307 were needed to achieve the same coverage as non-Māori.
- Among women aged 45 to 49 years, BSA screened 63% of Māori, 67% of Pacific and 73% of other women.
- To achieve 70% coverage for women aged 45 to 49 years, a further 1,526 Māori and 282 Pacific women needed to be screened. If coverage in this age group was the same as for non-Māori non-Pacific women, the additional number of Māori women would be 2,182, with 561 more Pacific women.
- To achieve 70% coverage for women aged 45 to 69 years, a further 4,442 Māori women needed to be screened. In contrast, the number of non-Māori women screened that were additional to 70% amounted to 15,059.

BSA screened 532,890 women during the two years to 30 June 2017, 8,025 more than the previous biennium to 30 June 2017.

The coverage target of more than 70% for women aged 50–69 years was met for BSA overall with 71.5% of eligible women screened between July 2016 and June 2018. The proportion of eligible women aged 45–49 years screened was similar at 71.3%. These proportions were 0.2% and 0.4% lower respectively than were achieved for the previous biennium. The total eligible population (aged 45–69 years) increased by 14,040 (or 1.9%) between the biennia to June 2017 and to June 2018. The total number of women screened increased by 8,025 (or 1.5%).

National coverage for women aged 50–69 years was highest for Pacific (72.6%) and non-Māori non-Pacific women (72.2%). Among women aged 45–49, national coverage was highest for non-Māori non-Pacific women at 72.9%.

Among Pacific women aged 50–69 years, national coverage was on target at 73% (1% higher than in 2017). The >70% target was met by one LP with a high proportion of Pacific women, but not by other LPs. To achieve >70% coverage of Pacific women aged 50–69 years in all LP regions, a further 578 needed to be screened in total.

Among Pacific women aged 45–49 years, coverage remained stable at 67%.

Māori screening participation remained below the target at 65% for women aged 50–69 and at 63% for women aged 45–49 years. These biennial rates have not changed over the past three years. The total number of Māori women screened increased by 1,913, or 3.6%, since the previous biennium, while the number of eligible Māori women increased by 1,920 or 2.3%. To achieve the 70% target for women aged 50–69 years, 2,916 additional Māori women needed to be screened. To reach 70% of women aged 45–49 years, a further 1,526 needed to be screened.

Of note, the total number of non-Māori non-Pacific women screened beyond 70% was 15,059. To achieve the same coverage as non-Māori women aged 45–69 years 6,417 more Māori women would need to have been screened.

Timely rescreening – lower after initial screens, disparities remain

- Timely rescreening after an initial screen was below the target of 75% for all women aged 50–67 years with gaps remaining between Māori (51%), Pacific (51%), and other women (67%).
- Timely rescreening after a subsequent screen remained above the 85% target for non-Māori women aged 50–67 years (86%) but below target for Māori (80%) and Pacific women (76%).
- Women aged 45–49 were more likely to be rescreened within 27 months of an initial screen than women aged 50–67 years in each population group.

Women who screen regularly have a lower risk of dying from breast cancer than those who screen less regularly[3]. If there is too long an interval between screens, new cancers have a longer time to develop beyond the early stages and screening is less effective at preventing illness and death. BSA aims to have 75% of women rescreened between 20 and 27 months of their initial screen and 85% rescreened within 20 and 27 months of any subsequent screen.

Previous reports noted a decline in the proportion of women being rescreened within 27 months of their first screen with BSA. This downward trend has stabilised for Māori, Pacific and Other women. Among women aged 50–67 years who were first screened during the two years to June 2016, the target was not met for any group and there were significant gaps between ethnic groups: 51% of Māori and Pacific women were rescreened within the desired timeframe compared to 67% of other women. Timely rescreening rates after an initial screen were more than 10 percentage points higher among women aged 45–49 years: Māori 68%, Pacific 63%, non-Māori non-Pacific 78%.

Rates of timely rescreening after subsequent screens were higher for all groups. The 85% target was exceeded for non-Māori non-Pacific women aged 50–67 years (87%) but rates remained under target for Māori women (80%) and Pacific women (76%) The results for women aged 45–49 years were slightly lower (79% for Māori, 74% for Pacific and 84% for other women).

Inequities remained. Greater numbers of Māori and Pacific women than in previous years needed to be rescreened within 20–27 months to achieve the targets. Among women aged 50–67 years, 2,273 more Māori women needed to be rescreened within 20–27 months to achieve the targets for initial and subsequent screens. For Pacific women, the additional number was 1,540. For non-Māori non-Pacific women 1,080 more were required to achieve the initial screen target but there were 5,083 women beyond the rescreening target for subsequent screens. If the rescreen targets were applied to women aged 45–67 as a whole, the deficits would be 3,207 Māori women and 2,289 Pacific women while non-Māori non-Pacific women had a surplus of 5,106.

[3] Ministry of Health. 2015. Summary of the BreastScreen Aotearoa Mortality Evaluation 1999 to 2011. Wellington: Ministry of Health.

To achieve the same rescreening rates as non-Māori non-Pacific women (or equitable rates), BSA would need to have rescreened a further 4,399 Māori women within 20–27 months and 2,767 more Pacific women.

Screening quality – technical recall rates and image quality on track. Percentage of Māori and Pacific women having no more than four images increased

- Technical recall rates in mobile and fixed units remained in the target range (≤0.5%).
- The proportions of women having no more than 4 images per screening episode were slightly lower in mobile units than in fixed sites. They were on target for non-Māori non-Pacific women and trending towards the target range for Māori and Pacific women screened in mobile units.
- The rate of rejected images (1%) remained well within the target range (<3%).

With all screening units using digital technology the low rate of women recalled for technical reasons has been maintained within the target range of less than 0.5%. This indicator is monitored to ensure the number of women having to return to a screening unit for further images to complete their screening episode is minimal.

The proportion of women having no more than four images has gradually increased among Māori and Pacific women screened in mobile units, now only 2% and 3% under the 80% target. The target was met for Māori and non-Māori non-Pacific women screened in fixed units, with Pacific women just under target at 78%.

Only 1% of images were rejected (target <3%).

Timely reporting of screening results – on target

- Most women received their screening results within 10 working days (96%).

Assessment – quality on track, timeliness declined for Pacific women

- Targets for assessment quality indicators continued to be met for all groups of women aged 50–69 years having a subsequent screen.
- Among women in this age group who had an initial screen, the target (<10%) for assessment rates was met or was within the confidence interval and similar for Māori, Pacific and other women aged 50–69 years (between 9% and 11%). Positive predictive values were well within the target range of 9% or more for all groups (17% for Māori, 10% for Pacific, 12% for other women).
- Among women having a subsequent screen, the rate of referral for assessment was between 3.3% (for non-Māori non-Pacific women aged 50–69 years) and 3.8% (for Māori women) (target <5%). Positive predictive values were around twice the target of 9% or more. Māori women referred for assessment were 40% more likely than non-Māori women to have a cancer detected.
- The proportion of women offered their first assessment appointment within 15 working days remained at 86% (target 90%), but decreased to 78% for Pacific women.
- For women aged 45–49 years positive predictive values were around half those of women aged 50–69 years. The proportion offered their first assessment (87%) in 15 working days was similar to that of women aged 50–69 years.

The proportion of women aged 50–69 years who were referred for further assessment after a subsequent screen remains steady and within the expected range of less than 5% for all groups.

All assessment quality indicators were within the target ranges for subsequent screens overall. This indicates that BSA is performing well for women who are returning for routine rescreening (the majority of women screened). Māori women had slightly higher assessment rates from subsequent screens (3.8%) than non-Maori (3.3%) but false positive rates were the same and Māori who were referred for assessment were more likely to have a cancer detected (25% compared to 18% for non-Māori).

For women having an initial screen the rates of referral to assessment, false positives, and positive predictive value were on target or the target was within the confidence interval for each population group. Specificity was slightly under the target of >93% at 90%. Around one in six Māori, one in ten Pacific, and one in eight other women referred for an assessment from an initial screen had a cancer detected.

To expedite diagnosis and minimise anxiety, BSA aims to have 90% of women offered their first assessment appointment within three weeks of their screening mammogram. This indicator remained at around 86% for Maori and non-Maori women but declined for Pacific women (due to decreasing trends in LPs with high proportions of Pacific women).

Biopsies – most diagnosed without open surgery and on time, open biopsies less timely and benign biopsy weight remained below target

- Most women (96%) had a definitive diagnosis of breast cancer without open surgery and within 5 working days of their assessment.
- Some women required open surgery to obtain a definitive diagnosis. Fewer than one per 1,000 women screened had a benign open biopsy. Of those women, most (84%) had a benign biopsy that weighed under 30g but the target of >90% was not reached.
- Under two-thirds (58%) had their open biopsy within 20 working days (target 90%).
- The proportion of women who received their final diagnostic biopsy results within 5 working days was 85% overall (target 90%).

Around 96% of women diagnosed with breast cancer had a definitive diagnosis from a needle biopsy, meeting the target value for all groups of women. Most percutaneous biopsies (96%) were received within 5 working days of assessment.

The benign open biopsy rates were within the target ranges for initial (≤3.5 per 1000) and subsequent screens (≤1.6 per 1000). Fewer than three women per 1000 having an initial screen and less than one per 1000 women having a subsequent screen underwent an open biopsy for a benign condition. Among the women who had an open biopsy that turned out to be benign, just over four out of five had a biopsy weighing less than 30 grams. This was lower than the target value of 90%. This indicator relates to minimising harms from surgery that might not have occurred without screening.

The proportion of women who received their open biopsy within 20 working days of being notified that they needed it remained at 58% (target ≥90%).

The proportion of women who received their final diagnostic biopsy results within five working days was 85% overall (target >90%). This indicator increased by 6 percentage points for Pacific women to reach 86%. This indicator aims to minimise anxiety and delays in treatment planning.

Early detection – on target for all indicators for Māori, Pacific and other women

- The programme is succeeding in its goal of early breast cancer detection with all targets met.
- Māori women aged 50–69 years were more likely to have an invasive breast cancer detected than non-Māori women.

- Pacific women had a similar rate of invasive cancer detection to non-Māori non-Pacific women from initial screens and a slightly higher rate from subsequent screens.
- The targets for detection of invasive cancers that are small (≤15mm) were met or were within the confidence interval for all population groups.
- The proportion of cancers that were DCIS (24%) was in the target range for women aged 50–69 years and higher for women aged 45–49 years (30%).
- Data on the proportion of cancers without nodal involvement were not available for this report.

The invasive cancer detection rates were in the target range for initial and subsequent screens for each group of women.

Around half of breast cancers detected by BSA from initial screens were 15mm or less in diameter, as were two-thirds of those detected from subsequent screens. Among women aged 50–69, the rate of detection of small breast cancers per 10,000 screens was over a third higher for Māori than for non-Māori women among women having a subsequent screen. There was no significant difference among women aged 45–49 years.

The proportion of breast cancers that were DCIS was 23%, within the target range of 10% to 25% for women aged 50–69 years. The proportion was lower for Maori women (18%) than for non-Maori women (24%). Among women aged 45–49 years, the overall proportion of screen-detected cancers that were DCIS was significantly higher at 30%.

Although the proportions of screen-detected cancers that are DCIS have increased since the transition to digital mammography they may now be trending down among women aged 45–49 and appear to have stabilised among women aged 50–69 years.

Treatment – most indicators met targets with no ethnic differences, time to surgery under target and not equitable

- Just over half of BSA women (54%) had their first surgical treatment within 20 days of receiving their final diagnosis (target 90%). Māori and Pacific women were less likely than other women to receive timely surgery overall.
- Among women whose invasive cancer was detected by BSA during the four years to June 2017, and whose cancer was ≤30mm, 80% had sentinel node biopsy as their first axillary procedure. There were no significant differences between ethnic groups.
- The proportion of women who had radiation therapy with breast conserving surgery for invasive cancer was 91% (target 95% or more) with a gradual declining trend continuing.
- The targets were met for other treatment indicators, with no differences between Māori, Pacific, and other women.

The proportion of women who had their first surgical treatment within 20 working days during the four years to 30 June 2017 was below target for all ethnic groups and in each LP region. Māori (46%) and Pacific women (36%) were less likely than other women (56%) to receive timely surgery.

Among women with invasive breast cancer 30mm or less, 80% had sentinel node biopsy as their first axillary procedure. There is no target for this indicator. Sentinel lymph node biopsy is useful for staging of cancers and may help avoid more extensive lymph node surgery.

The proportion of women who had radiation therapy with breast conserving surgery for invasive cancer continued a gradual decline to 91% (target 95% or more). Pacific women had the lowest rate at 80%.

Other treatment indicators met the target values.

Women aged 45–49 years

- Just over half of the invasive breast cancers detected by BSA among women aged 45–49 years were small.
- The proportion of screen-detected cancers that were DCIS was higher for this age group.
- The rate of cancers detected per 1000 screens was about half the rate for women aged 50–69 years.

BSA has provided screening to women aged 45–49 years since 2004. Quality targets are likely to be introduced before the next monitoring report.

Half of the invasive cancers detected among women aged 45–49 years were small (15mm or less in diameter). This indicates that the majority of women in this age group whose cancer was detected by BSA had a favourable prognosis. The main difference in the effectiveness of screening for younger women is that the rate of invasive cancers and small cancers detected per thousand women screened is lower – about half that for women aged 50–69 years who have a higher underlying risk of developing breast cancer. In addition, women in the younger age group who are referred for further assessment after their screening mammogram are half as likely to have a cancer detected as women in the older age group.

Other indicators that showed a significant difference between women in the two age groups remained similar to those previously reported. Compared to women aged 50–69 years, women aged 45–49 years had a:

- Slightly lower coverage among Māori and Pacific women but higher coverage among other women
- Higher rate of timely rescreening after an initial screen and slightly lower rate after a subsequent screen
- Higher technical recall rate from fixed and mobile units
- Lower rate of referrals to assessment from initial screens
- Higher rate of referrals to assessment and higher false positive rate for subsequent screens
- Specificity slightly higher for initial screens and slightly lower for subsequent screens
- Slightly higher benign open biopsy rate for subsequent screens, but not for initial screens
- Higher proportion of screen-detected cancers that were DCIS
- Higher receipt of chemotherapy among women in one diagnostic groups.

If new targets for women aged 45–49 years were applied

It is likely that targets will be applied for women aged 45–49 in the near future. Many performance indicators are not age-related (coverage, screening quality, treatment, timeliness indicators). For those indicators the targets for women aged 50–69 can be applied. Targets related to cancer detection will differ since they are based on underlying cancer incidence which is lower in younger women. Mammography screening is also less sensitive in younger women due to greater breast density, and because some cancers grow faster in younger women.

This section summarises which indicators would have met the targets for women aged 45–49 years if they had been applied during this time period.

The following indicators are those which would have the same target as for women aged 50–69 years.

The target of 70% coverage was met for non-Māori non-Pacific women (73%) but not for Māori (63%) or Pacific women (67%). Likewise, the 75% target for women rescreened within 27 months of an initial screen was met for non-Māori, non-Pacific women (78%) but not for Māori (68%) or Pacific women (63%). The target of ≥85% rescreened within 27 months of a subsequent screen

was almost met for non-Māori non-Pacific women (84%) but not for Māori (79%) or Pacific women (74%).

The target of >80% of women having 4 images or less was met for non-Māori non-Pacific women (87%) and Māori women (81%) screened in a fixed unit but not for Pacific women (77%). For women screened in a mobile unit the target was met for non-Māori non-Pacific women (86%) but not for Māori (78%) or Pacific women (76%).

The technical recall and technical reject targets were met for all groups screened in mobile and fixed units.

The preoperative diagnosis rate of >90% was met for all groups.

The benign open biopsy rate targets were met for all groups for initial and subsequent screens. The target of >90% for the proportion of benign open biopsies being <30g was met for Pacific women but not for Māori (81%) or other women (80%).

The targets for the percentage of women diagnosed with DCIS or invasive cancer having breast conserving surgery were met for all groups.

The target of ≥95% for the proportions of women with invasive cancer who had BCS and radiation therapy was within the confidence interval for Māori and non-Māori non-Pacific women but not for Pacific women (69%).

The target of ≥90% was met for all groups for the timely receipt of screening results, as was the target for timely receipt of needle biopsies. However, similar to the older age group, the timeliness targets were not met for any groups for the first offer of an assessment, the receipt of an open biopsy, the receipt of final biopsy results, or first treatment surgery.

Indicators with specific targets for women aged 45–49 years

Table 1 presents the newly developed targets for women aged 45–49 years related to detection and assessment. The rationale and methods for these targets can be found in the report by Robson et al (2018) on the NSU website.

Table 1: Proposed targets for women aged 45–49 years compared to BSA indicators in 2018 monitoring report

Indicator	Proposed targets for BSA women aged 45–49 years	
	Initial screen	**Subsequent screen**
Assessment rate	<9%	<4.5%
False positive rate	<8%	<4%
Specificity	>92%	>95%
Positive predictive value	>6%	>8%
Invasive cancer detection rate	≥3.8 per 1,000	≥2.4 per 1,000
Invasive cancers ≤15mm rate	≥19.0 per 10,000	≥12.0 per 10,000

The assessment rate target for initial screens was met for Pacific and non-Māori non-Pacific women but not for Māori women (10%). For subsequent screens it was on target for each group.

The false positive rate for initial screens was on target for Pacific and non-Māori non-Pacific women and the target was within the confidence interval for Māori women. For subsequent screens it was within the target range for all groups.

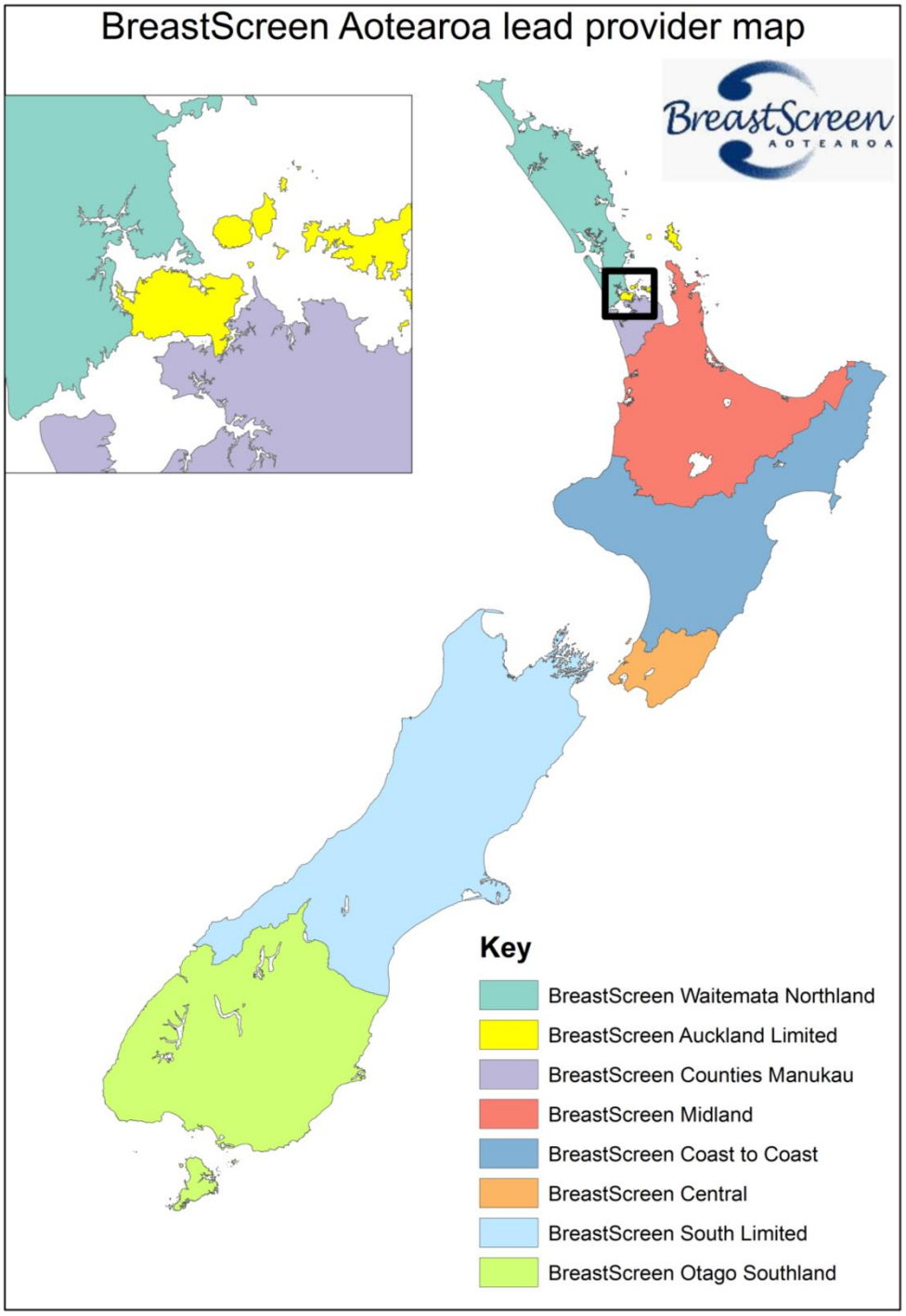
Specificity was within the target range for initial screens for Pacific women and slightly under for Māori and non-Māori non-Pacific women. The target was met for all groups having subsequent screens.

The positive predictive value targets were met for initial and subsequent screens for all groups.

The invasive breast cancer detection rate target for initial screens was met or within the confidence interval for all groups. The detection rate target for subsequent screens was also met for all groups.

The targets for invasive cancers ≤15mm were met or were within the confidence interval for all groups having initial or subsequent screens.

LEAD PROVIDER VARIATION



The eight BSA Lead Provider regions are shown in the figure above. BreastScreen Health Care was replaced with BreastScreen Otago Southland in August 2014. The treatment indicators in this report cover a four-year period when BreastScreen Health Care was still operating, as do the time trends for all indicators.

Coverage – LPs varied in coverage and equity

- For Māori women aged 50–69 years, BreastScreen South Ltd and BreastScreen Central met the 70% coverage target. BreastScreen Auckland Ltd remained at 57% and BreastScreen Midland reached 60%. Other LPs achieved coverage of 67% or 68%. BreastScreen Midland has the highest number of eligible Māori women and needed to screen a further 1,628 Māori women in this age group over the two-year period to reach the target.
- Coverage for Māori women aged 45–49 years was 73% in BreastScreen South Ltd. Coverage in other LPs ranged from 57% (BreastScreen Central) to 70% (BreastScreen Counties Manukau).
- Apart from BreastScreen Waitemata Northland, coverage was lower for Māori than for non-Māori women in both age groups.
- The 70% target was met for Pacific women aged 50–69 years in BreastScreen Counties Manukau which increased its coverage to 84%. Other high Pacific population LPs had 67% or 68% coverage with the target within the confidence interval for BreastScreen Central. In other LPs Pacific coverage ranged from 61% to 66% and was lower than for non-Māori non-Pacific women.
- For Pacific women aged 45–49 years, coverage ranged from 56% to 76% (BreastScreen Counties Manukau).
- For total women aged 50–69 years, five LPs achieved the target coverage: BreastScreen Counties Manukau, BreastScreen Coast to Coast, BreastScreen Central, BreastScreen South Ltd, BreastScreen Otago Southland. The remainder screened 65% to 69% of their eligible populations.
- For total women aged 45–49 years four LPs achieved over 70% coverage and the remainder screened 64% to 69%.

BreastScreen South Ltd and BreastScreen Central screened 70% of Māori women aged 50–69 years. BreastScreen Auckland Ltd and BreastScreen Midland had the lowest coverage in this age group at 57% and 60% respectively. To achieve 70% coverage in this age group BreastScreen Midland needed to screen an additional 68 Māori women per month, BreastScreen Auckland an additional 20 per month, BreastScreen Coast to Coast 12 per month, BreastScreen Waitemata Northland 10 per month.

For Māori women aged 45–49 years, BreastScreen South Ltd screened 73%, BreastScreen Counties Manukau screened 70% and BreastScreen Otago Southland 69%. Coverage was under 60% in BreastScreen Central (57%), BreastScreen Auckland Ltd (58%) and BreastScreen Midland (59%). If the 70% target was applied for women aged 45–49 years, the additional numbers of Māori women screened in this age group would range from 7 per month (BreastScreen Auckland) to 26 per month (BreastScreen Midland).

The 70% target was achieved for Pacific women aged 50–69 years by BreastScreen Counties Manukau which increased coverage to 84%. Pacific coverage decreased in BreastScreen Auckland Ltd to 67%, but remained higher than for non-Māori non-Pacific women. The target coverage was in the confidence interval for BreastScreen Central. Coverage was higher for Pacific than for other women in BreastScreen Counties Manukau and BreastScreen Auckland Ltd and was similar in BreastScreen Waitemata Northland, especially with the promise of a clipon module. In other LPs, Pacific participation was below the target and lower than that of non-Māori non-Pacific women. To achieve the target for Pacific women aged 50–69 these LPs needed to screen a further 1 to 7 women per month. If women aged 45–49 years were included, six LPs would have needed to screen an additional 1 to 9 women per month in this age group.

For non-Māori non-Pacific women aged 50–69 years, five of the eight LPs achieved the target coverage. Coverage was highest in BreastScreen South Ltd (77%) and BreastScreen Coast to Coast (76%) and lowest in BreastScreen Auckland Ltd (65%).

For non-Māori non-Pacific women aged 45–49 years, six LPs had over 70% coverage, highest in BreastScreen South Ltd at 84%. The other two LPs achieved 64% each (BreastScreen Auckland Ltd and BreastScreen Waitemata Northland.

Timely rescreening – lower after initial screens, Māori and Pacific lower than others in most LPs, time trends vary between LPs

- Two LPs met the target of 75% rescreened within 20–27 months of an **initial screen** among women aged 50–67 years (BreastScreen Coast to Coast at 76% and BreastScreen Central at 80%). Rates increased for women in BreastScreen Otago Southland and BreastScreen Counties Manukau.
- Timely rescreening rates after an initial screen were lower for Māori than for non-Māori women aged 50–67 years in most LPs apart from BreastScreen Waitemata Northland and BreastScreen Otago Southland. The target was within the confidence interval by BreastScreen Central (72%) and BreastScreen Otago Southland (64%).
- Timely rescreening after an initial screen was significantly lower for Pacific women in six LPs. The target was met or within the confidence interval by BreastScreen Central (70%) and BreastScreen Otago Southland (78%). Possible upward trends were shown in BreastScreen Counties Manukau (to 50%) and BreastScreen Otago Southland.
- The target of 85% for timely rescreening after a **subsequent screen** was met or was within the confidence interval for Māori, Pacific, and total women aged 50–67 years in BreastScreen Coast to Coast and BreastScreen Central. Four other LPs met the target for non-Māori non-Pacific women.
- Māori and Pacific rates of timely rescreens after a subsequent screen were lower than for other women in all LPs apart from BreastScreen Otago Southland.

The proportion of women aged 50–67 years who were rescreened within 27 months of their previous screen varied significantly between LPs but was consistently lower for women whose previous screen was their first with BSA. Two LPs (BreastScreen Coast to Coast and BreastScreen Central) achieved the target of 75% after an initial screen for total women.

Timely rescreening rates after initial and subsequent screens were lower for Māori than for non-Māori women aged 50–67 years but not significantly different in BreastScreen Waitemata Northland or BreastScreen Otago Southland (initial screens only). In BreastScreen Counties Manukau timely rescreen rates after an initial screen increased for Pacific and non-Māori non-Pacific women but not for Māori women.

To achieve the target rescreening rates for women aged 50–67 years, the number of additional women in each LP who needed to be rescreened within 20–27 months ranged from 2 to 35 per month after initial screens (1 to 11 Māori, and 1 to 4 Pacific women), and from 4 to 103 among women having a subsequent screen (2 to 37 Māori and 1 to 27 Pacific women). BreastScreen Midland had the highest numbers of additional Māori and non-Māori non-Pacific women to rescreen and BreastScreen Counties Manukau and BreastScreen Auckland Ltd the highest numbers of additional Pacific women.

If similar targets were set for women aged 45–49 years, four LPs would meet the target for Māori women rescreened after an initial screen, three LPs for Pacific women, and six LPs for non-Māori non-Pacific women. After subsequent screens the target would be met or in the confidence

interval in two LPs for Māori women, four LPs for Pacific women, and four LPs for non-Māori non-Pacific women. If the additional numbers of women aged 45–49 rescreened within 27 months were combined for initial and subsequent screens monthly, the monthly additional numbers would range from 1 to 20 for Māori women, 1 to 16 for Pacific women and 1 to 41 for non-Māori non-Pacific women.

Screening quality – few differences between LPs

- Technical recall rates and technical reject rates were within the target range for mobile and fixed units for most LPs. Technical recall rates appear to be increasing in BreastScreen Otago Southland and BreastScreen Central.
- BreastScreen Coast to Coast shows an increasing trend in the proportions of women screened in mobile and fixed units who had four images or fewer taken per screening episode. All others met the target of 80% or more.

Assessment – some variability in initial screens but not in subsequent screens

- The target values for referrals to assessment, false positives, specificity and positive predictive value for subsequent screens were met or within the confidence interval for all LPs.
- For initial screens, one LP was outside the target ranges for rates of referral to assessment, false positives and specificity, but the target positive predictive value was within the confidence interval. The target was met or was within the confidence interval for assessment rates, false positives, and positive predictive values for all other LPs. Only one LP met the >93% target for specificity, but most were within 4 percentage points.

For Māori, Pacific, and other women having subsequent screens, the target value was met or was within the confidence interval for rates of referral to assessment, false positives, specificity, and positive predictive values in each LP.

There was some variability between LPs in assessment indicators for women having their first screen with BSA.

For women having an initial screen, BreastScreen Coast to Coast was well within the target ranges for all assessment related indicators. For those having an initial screen with BreastScreen Otago Southland rates of referral to assessment, false positives and specificity were outside the target ranges but trending towards the targets. For other LPs the targets were met or within the confidence interval for assessment rates, false positives and positive predictive values, but specificity was below the target value.

It is important to note that indicators for initial screens by Lead Provider and ethnicity should be interpreted with caution since the number of women can be small and confidence intervals wide.

Biopsies – some variation in the proportion of benign open biopsies weighing less than 30g

Over 90% of women had a preoperative diagnosis of breast cancer in each LP.

The target for the benign open biopsy rate was met or was within the confidence interval for all LPs for initial and subsequent screens.

There was variation between LPs in the proportions of benign open biopsies weighing less than 30g.

Open biopsies for a benign condition are relatively rare in BreastScreen Aotearoa. Among those who did have a benign open biopsy, most weighed less than 30g. Two LPs met the target of >90%

(BreastScreen Waitemata Northland at 90%, BreastScreen Auckland Ltd at 96%). In other LPs the proportions ranged from 72% to 85% and the target was within the confidence interval for all except BreastScreen Midland.

Early detection – no significant variability between LPs

- There was little variation between LPs in rates of invasive breast cancer detection from subsequent screens and no significant variation in detection rates from initial screens.
- All LPs achieved target levels for detection of small invasive breast cancers.
- The proportions of breast cancers detected that were DCIS were within the target range for all LPs.

For all LPs the target was met or was within the 95% confidence interval for rates of detection of invasive breast cancers and tumours 15mm or smaller for initial and subsequent screens. There was little variation between LPs in these indicators. No data were available on the proportion of screen-detected cancers without nodal involvement.

The proportions of screen-detected breast cancers that were DCIS were within the target range for each LP or the target range was within the confidence interval.

Timeliness - variation evident in each indicator

- All LPs achieved the target of 90% of women receiving their screening results within 10 working days apart from BreastScreen Auckland Ltd which is trending down.
- BreastScreen Waitemata Northland maintained a high level of the proportion of women receiving their offer of a first assessment appointment within 15 working days, exceeding the 90% target at 93%). BreastScreen Auckland Ltd dropped to 56%. BreastScreen Otago Southland continued to increase significantly to 81%.
- Most LPs achieved the target value (90% or more) for the percentage of women receiving their needle biopsy within five working days of their assessment. BreastScreen Auckland Ltd remained under target at 82%.
- The 90% target for the percentage having their open biopsy within 20 working days was met by one LP BreastScreen Otago Southland (100%), and was within the confidence interval for BreastScreen South Ltd (81%), BreastScreen Auckland Ltd (80%), and BreastScreen Central (75%). Declining trends were shown by BreastScreen Counties Manukau (to 19%) and BreastScreen Coast to Coast (to 29%).
- The target or 90% or more for the percentage of women receiving their final diagnostic biopsy results within five working days was met or within the confidence interval for 4 LPs. BreastScreen Counties Manukau showed a significant increase to 87%. BSM showed a gradual decline to 79%. BreastScreen Otago Southland remained lowest at 71%.
- In each LP, most timeliness indicators for women aged 45–49 years were generally similar to those for women aged 50–69 years.

The proportions of women receiving their screening results within 10 working days were within the target range of 90% or more for most LPs. Most maintained high levels above 95%. BreastScreen Central remained in the target range. BreastScreen Auckland Ltd shows a decreasing trend to just below the target at 89%. Across most LPs, results were slightly lower for women aged 45–49 years.

The proportion of women offered their first assessment appointment within 15 working days was maintained at a high level by BreastScreen Waitemata Northland (93%). BreastScreen Otago

Southland increased significantly from 57% to 81%. BreastScreen Midland continued to increase to 90%. BreastScreen Coast to Coast continued to show a shallow downward trend to 86%. BreastScreen Auckland dropped sharply to 56%. The 90% target was within the confidence interval for most other LPs.

Nearly all LPs exceeded the 90% target for women receiving their needle biopsy within 5 working days of assessment. BreastScreen Auckland was below target at 82% (a 3% increase since the previous report). The proportions were similar for women aged 45–49 years.

The 90% target for the percentage of women having their open biopsy procedure within 20 working days was met by BreastScreen Otago Southland (100% of 4 open biopsies). Increases were shown by BreastScreen South Ltd (76% to 81%), BreastScreen Central (65% to 75%). Declining trends continued in BreastScreen Coast to Coast (37% to 29%) and BreastScreen Counties Manukau (41% to 19%). Other LPs showed no change (BreastScreen Auckland Ltd 80%, BreastScreen Midland 49%, BreastScreen Waitemata Northland 57%). This indicator may be affected by capacity issues within DHBs and prioritisation of treatment surgery over biopsies. As noted previously, further analyses could be undertaken including comparing the median times to open biopsy for women who were or were not found to have a cancer.

The 90% target for the percentage of women receiving their final diagnostic biopsy results within five working days was met by or was within the confidence interval for BreastScreen Waitemata Northland, BreastScreen Coast to Coast, BreastScreen Central and BreastScreen South Ltd. BreastScreen Counties Manukau increased from 81% to 87%, and BreastScreen Auckland from 82% to 84%. BreastScreen Midland continued a shallow decline from 82% to 79%. BreastScreen Otago Southland remained at 71%. Results for women aged 45–49 years were similar to those of the older age group in each LP.

Treatment – some variation in timeliness of surgery and in radiotherapy

- All LPs were below the 90% target for the proportion of women receiving their first treatment surgery within 20 working days, with BreastScreen Counties Manukau significantly lower than others (32%). BreastScreen Central (63%) and BreastScreen Midland (59%) were highest. Two LPs had significant disparities between Māori and non-Māori women for this indicator, with three also showing significant differences between Pacific and non-Māori non-Pacific women.
- The proportion of women with invasive cancer who had breast conserving surgery and radiotherapy was below the target of 95% or more for three LPs (remaining lowest for BreastScreen Auckland Ltd at 74%).
- All LPs met the targets for other treatment indicators with no significant differences between ethnic groups.

Treatment indicators are reported for women whose cancer was detected by BSA during the four years to June 2017.

The proportion of women with invasive cancer who had breast conserving surgery and radiotherapy varied. The target of 95% or more was met or within the confidence interval for five LPs. BreastScreen Waitemata Northland and BreastScreen Counties Manukau showed decreasing trends while BreastScreen Auckland Ltd remained lowest at 74%.

The proportion of women receiving timely surgical treatment remained significantly lower in BreastScreen Counties Manukau than in other LPs with one in three women receiving timely surgery (32%) compared to just over one in two women nationally. The previous report noted that further analyses of this indicator could include looking at the median time to first treatment surgery; stratifying by DCIS and invasive cancers; and whether neoadjuvant therapies have been used prior to surgery.

Māori women in BreastScreen Waitemata Northland and BreastScreen Central were less likely than other women to receive their first treatment surgery in 20 working days, as were Pacific women in BreastScreen Counties Manukau, BreastScreen Auckland Ltd, and BreastScreen Central. The reasons for these disparities need further investigation.

There is no target for the proportion of women having sentinel node biopsy as their first axillary treatment. There was little variation in this indicator among most LPs but women aged 50–69 whose cancer was detected by BreastScreen Auckland Ltd were more likely than others to receive this procedure (88% compared to 80% overall).

All other treatment indicators were within the target range with little variation between LPs.

There was some variation between LPs in the proportions receiving adjuvant therapies within specific diagnostic groups. As noted previously, a review of these indicators could focus specifically on groups most likely to benefit from the particular therapies and consider extending the monitoring to uptake and completion.

EQUITY ISSUES

BSA has a priority goal of providing equitable screening and achieving equitable outcomes for Māori, Pacific, and other populations in Aotearoa. Equity is a fundamental component of a high quality service, since "there is no quality without equity" (Poynter et al, 2017)[4] The recent Hauora report by the Waitangi Tribunal includes equity as a Treaty principle, along with partnership, active protection and options (for kaupapa Māori services).[5] In March 2019 the Ministry of Health adopted the following definition of equity.[6]

"In Aotearoa New Zealand, people have differences in health that are not only avoidable but unfair and unjust. Equity recognises different people with different levels of advantage require different approaches and resources to get equitable health outcomes."

The Ministry designed the definition to:

- align with Te Tiriti o Waitangi obligations to go beyond just remedying disadvantage and reducing inequities, enabling Māori to flourish and lead their aspirations for health
- be inclusive enough to incorporate all possible dimensions of equity (indigenous, socio-economic, geographically, disability, etc.)

Systematic monitoring for equity by ethnicity and geographic region is a critical element of quality assurance and quality improvement. BreastScreen Aotearoa data is available by ethnicity, two age groups, and by LP region. It is not yet routinely availably by socioeconomic position or small area deprivation, nor by disability status.

Accelerating Māori coverage and timely rescreening are the most urgent equity issues facing BSA. Increased rescreening rates for Pacific women are also needed. Achieving equitable breast screening requires reallocating resources to where they are needed most. It also requires changing the way services are structured and delivered rather than requiring "individuals to change themselves to fit in".[7]

Māori women

Māori women have higher breast cancer mortality rates than other women aged 50 and over. If more Māori women have their breast cancer detected early the disparity in breast cancer mortality can be reduced. The higher incidence also means that more cancers will be detected per 1,000 Māori women screened than will be detected among 1,000 other women (i.e. screening is more cost effective). National screening coverage of Māori women continues to remain relatively static and the gap between Māori and non-Māori rates remains the same (Figure 1).

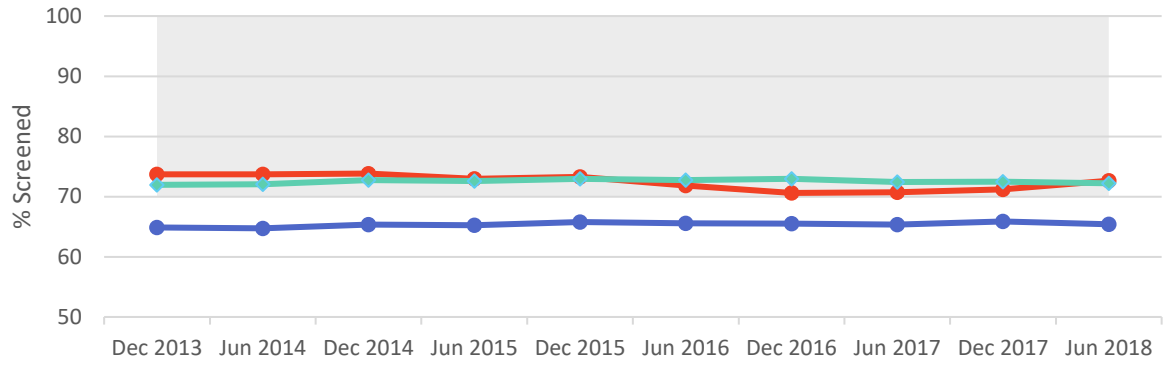
[4] Poynter M, Hamblin R, Shuker C, Cincotta J. 2017 Quality improvement: no quality without equity? Wellington: Health Quality and Safety Commission. P.12

[5] Waitangi Tribunal 2019. Hauora: Report on Stage One of the Health Services and Outcomes Kaupapa Inquiry. WAI 2575. https://forms.justice.govt.nz/search/Documents/WT/wt_DOC_150429818/Hauora%20Pre-PubW.pdf

[6] https://www.health.govt.nz/about-ministry/what-we-do/work-programme-2018/achieving-equity

[7] Smith GH, Smith LT. Doing Indigenous Work: Decolonizing and Transforming the Academy in:E.A. McKinley, L.T. Smith (eds.), 2018. Handbook of Indigenous Education, https://doi.org/10.1007/978-981-10-1839-8_69-1

Figure 1: Biennial screening coverage of Māori and non-Māori women aged 50–69 years



Key: Green Non-Māori, Blue Māori, Red Pacific

Figure 2: Number of additional Māori women needed to be screened to achieve same coverage as non-Māori or target of 70%, by LP and age group

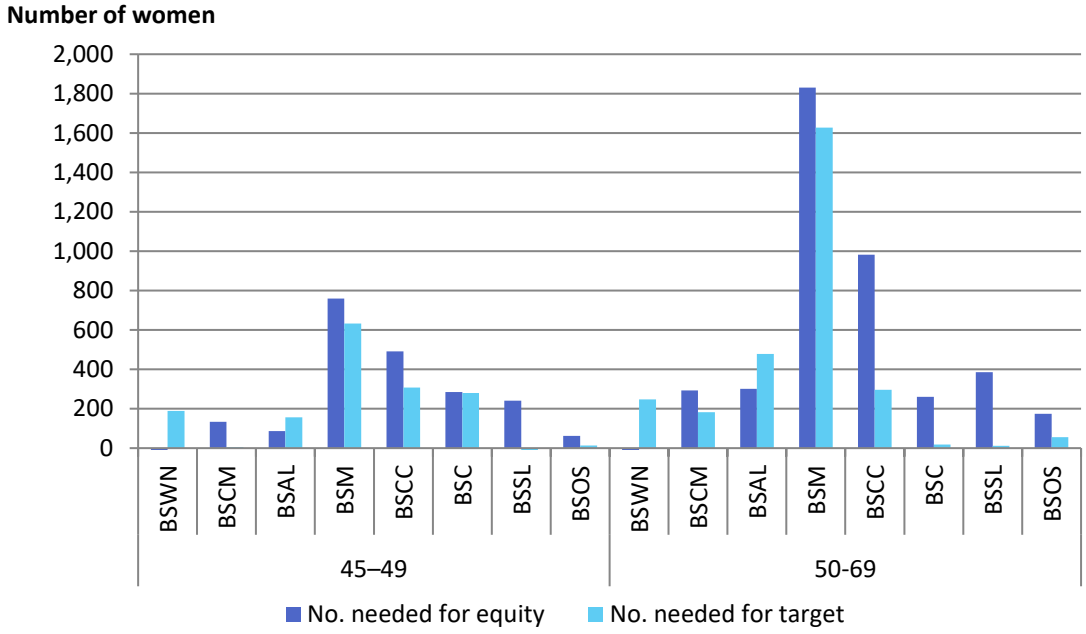


Figure 2 shows the additional numbers of Māori women needed to be screened to achieve the same coverage as non-Māori within the LP (darker bars) and the number needed to achieve the 70% target (lighter bars) by age group. This graph also illustrates the additional numbers needed to achieve geographical equity for Māori women – i.e. equitable screening rates between LPs.

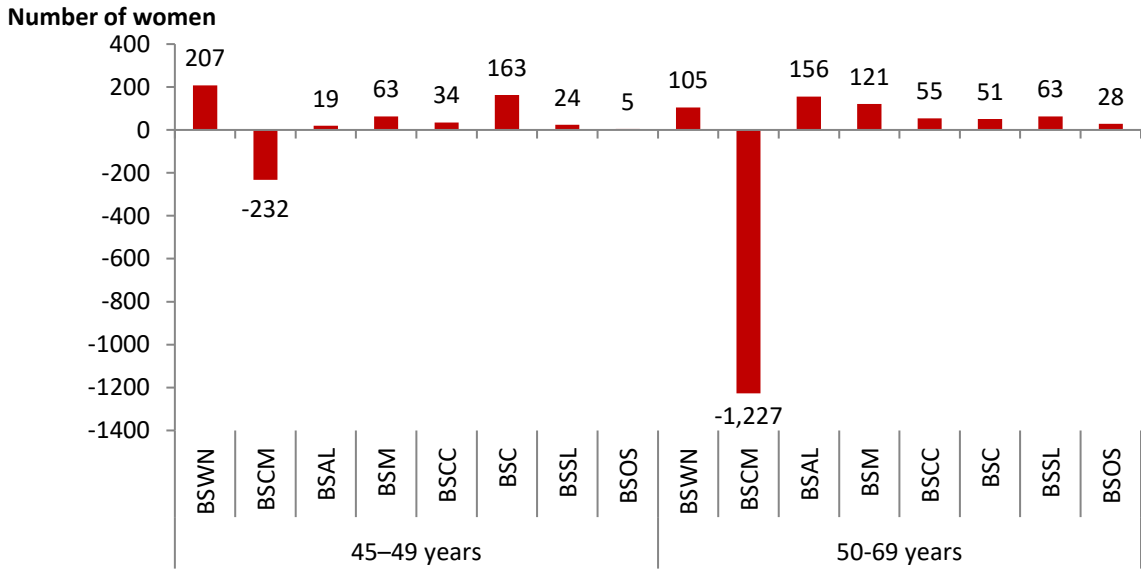
BreastScreen Midland has the largest number of additional Māori women to be screened to reach both equity and the coverage target. BreastScreen Waitemata Northland has achieved equitable rates in both age groups, but needed around 200 more Māori women in each age group to achieve the target. In contrast BreastScreen South Ltd achieved the target but needed to screen around 600 more Māori women across the two age groups to achieve equitable rates.

Pacific women

Pacific women have a higher incidence and mortality rate than non-Māori non-Pacific women. Close to three-quarters of Pacific women in the screening age group reside in three LP regions: BreastScreen Waitemata Northland, BreastScreen Auckland Ltd, and BreastScreen Counties

Manukau. The national rates are therefore strongly influenced by the performance of these LPs. BreastScreen Counties Manukau in particular is achieving outstanding coverage of Pacific women at 84% of women aged 50–69 years and 76% of women aged 45–49. This is strongly influencing the national coverage rate (73% for women aged 50–69 years). Figure 3 shows the additional numbers needed to achieve 70% coverage of Pacific women over 2 years are relatively small and should be achievable. Increasing coverage Pacific coverage across all other LPs will help reduce survival disparities for Pacific women.[7]

Figure 3: Additional Pacific women needed to be screened to achieve 70% coverage, by LP and age group



Although coverage was higher overall for Pacific women, timely rescreening rates after initial or subsequent screens were lower than for Māori or non-Māori non-Pacific women (Figures 5 and 6).

A range of tools are available to support health systems and providers to monitor for equity and implement strategies to achieve equitable outcomes[8] (noted in previous reports). Strategies that improve equity generally benefit all populations. Equity needs to be prioritised at multiple levels (system, organisation, workforce, community), with collaboration between sectors. Taranaki DHB, for example, is working on a Health Equity Assessment of breast screening with BreastScreen Coast to Coast, Māori service providers and primary care organisations in Taranaki. Primary care has an important role to play in supporting breast screening equity.[9]

The elements and strategies used to achieve the outstanding coverage of Pacific women in BreastScreen Counties Manukau could be considered by other LPs. Likewise, attention could be paid to how BreastScreen Waitemata Northland has achieved equitable coverage for Māori women, and those LPs who have achieved the coverage targets for Māori women (BreastScreen South Ltd in both age groups and BreastScreen Central in women aged 50–69 years).

There is a stated commitment to achieving equitable outcomes for all populations in Aotearoa across the health sector. The Waitangi Tribunal Inquiry into health services and outcomes (WAI 2575) is likely to focus on cancer outcomes for Māori in 2020. The Tribunal has made several

[8] E.g. Ministry of Health's framework on Equity of Healthcare for Māori, Health Equity Assessment Tool; Whanau Ora Tool.
[9] See BPAC https://bpac.org.nz/BPJ/2009/November/breastscreening.aspx

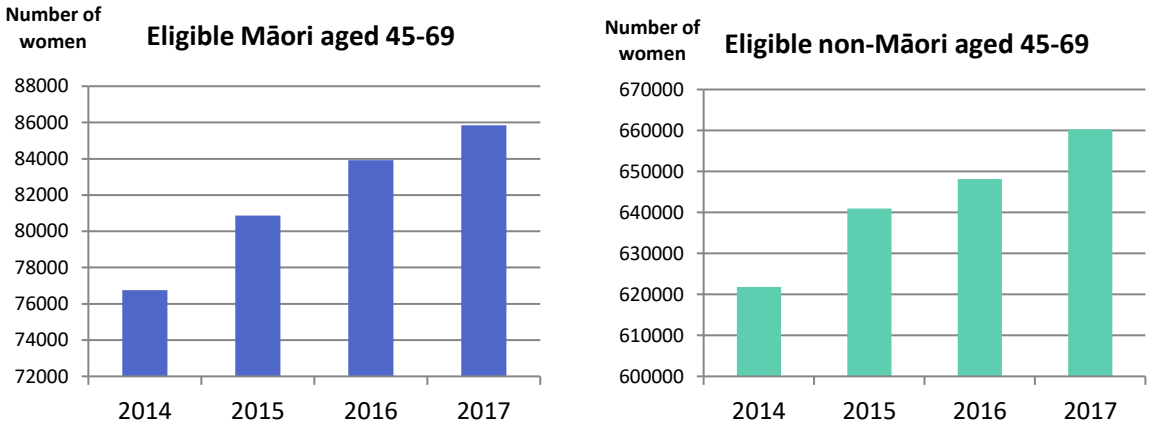
recommendations which could apply to screening, including committing to achieving equitable health outcomes for Māori, better alignment of funding to do so, and strengthening accountability mechanisms and processes which impact upon Māori. Active protection and partnership are key Treaty principles. As Lazslo Tabar says, "of all the harms associated with breast screening, the greatest harm comes from non-attendance."[10] Increasing the proportion of Māori women whose cancer is diagnosed early through breast screening is one of the most critical pathways for achieving equitable breast cancer mortality rates.

[10] British Institute of Radiology. 2019 Breast screening: insights and controversies — an interview with Dr Laszlo Tabar 19 February 2019. https://www.birpublications.org/page/podcasts/2019/breast-screening-tabar

IS BSA MAKING A DIFFERENCE?

- BSA is meeting its goals for early detection and treatment of breast cancers among screened women but not its goals for equitable screening coverage and timely rescreening.
- More than half of the invasive breast cancers detected by BSA were detected while they were still small among women aged 45–49 and 50–69 years. These cancers have a better prognosis and reduced morbidity from treatment.
- Māori women were more likely than non-Māori to have a small breast cancer detected. Increasing the coverage and timely rescreening of Māori women will help achieve its goal of equitable breast cancer mortality outcomes for Māori women in Aotearoa.
- Pacific women have similar coverage to non-Māori non-Pacific women, and similar rates of small cancers detected from subsequent screens.
- Although younger women have lower detection rates, reflecting the lower underlying incidence, the proportions of screen detected cancers that are small are close to those of older women.
- Four out of five women had breast conserving surgery, with the majority (91%) also having radiotherapy. Chemotherapy and hormone therapy rates were similar for all ethnic groups.
- The programme aims to minimise harm by keeping false positive rates and open biopsy rates as low as possible. These were generally within the target range for this period.
- Gradual increases in gaps in timely rescreening rates need to be addressed since they may affect future rates of small cancer detection and interval cancer rates.

Figure 4: Trends in the population of women eligible for screening by BSA



The number of women eligible for breast screening continues to grow substantially (Figure 4). This has the potential to put stress on BSA's programme capacity, and LPs need to plan for increasing numbers of eligible Māori and Pacific women at the same time as working towards equitable coverage. Nevertheless, BSA continues to provide a high quality service to women, meeting key goals of detecting cancers early and minimising harms from unnecessary procedures. Early detection and prompt diagnosis is key to reducing ethnic disparities in survival form breast

cancer.[11] Treatment received by women diagnosed by BSA is similar for Māori, Pacific, and other women.

Maximising benefits

Detecting breast cancers while they are small and before they have spread to the axillary lymph nodes (armpit) means that the treatment can be breast conserving and cause less long-term illness and disability since fewer lymph nodes need removing, reducing the chance of swelling in the arm. The risk of dying from breast cancer is also reduced.

Half of the cancers detected from initial screens were small (15mm or less in diameter) as were nearly two-thirds of those detected from subsequent screens (slightly lower among Pacific women). Most women were treated with breast conserving surgery and only underwent a single surgical procedure.

These indicators show BSA is making a positive difference to breast cancer mortality and morbidity in Aotearoa.

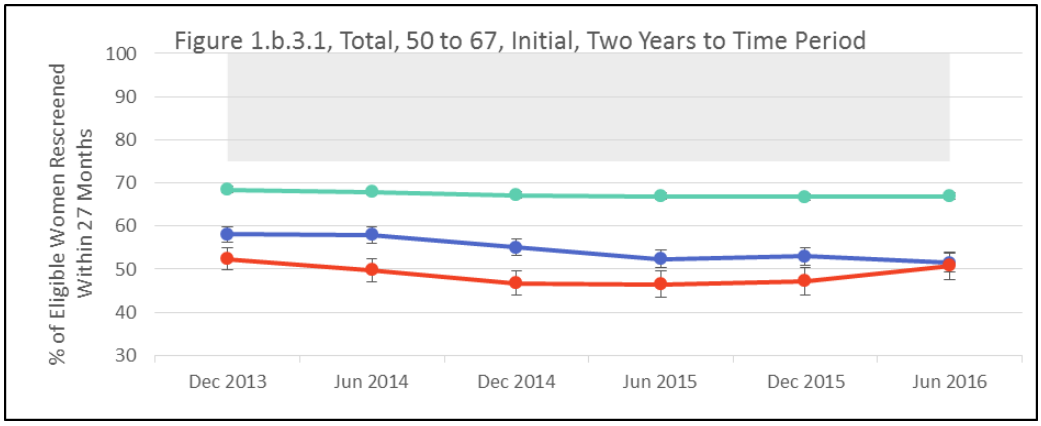
Minimising harms

High quality screening programmes aim to minimise any harms from screening, since well women are invited to participate in an intervention. Possible harms include unnecessary procedures and surgery from false positive screens, or increased anxiety while waiting for an assessment or biopsy results.

BSA is achieving most targets relevant to harm minimisation, including low numbers of women recalled for technical reasons; low false positive rates for subsequent screens; nearly all women have a definitive diagnosis without undergoing open surgery; the benign biopsy rate was on target; as was the timely receipt of needle biopsy.

Improvements in the rates of false positives from initial screens and the proportion of women waiting longer for their first assessment appointment are positive. Continuing low proportions of women receiving timely open biopsies and timely surgical treatment are of concern, since they heighten anxiety levels for some women and potentially affect outcomes.

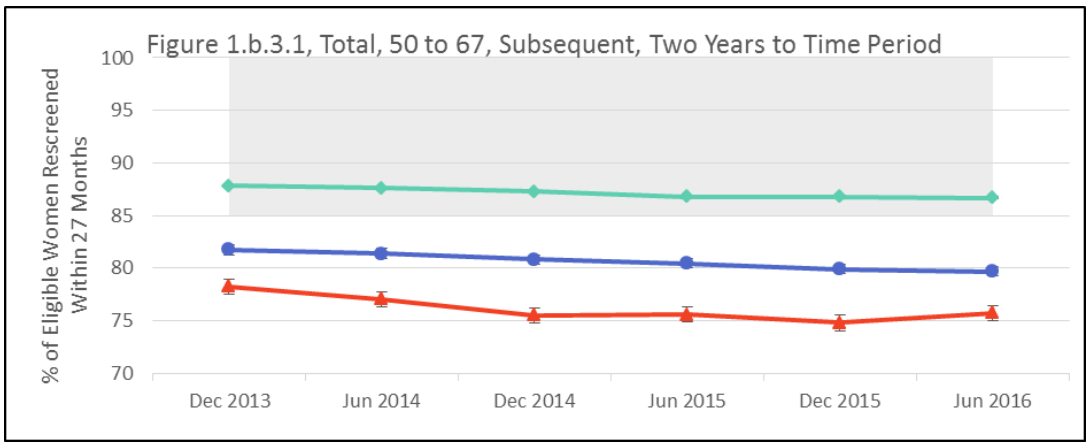
Figure 5: Trends in the proportion of women rescreened within 27 months of an initial screen



Key: Green is non-Māori non-Pacific, Blue is Māori, Red is Pacific women. Target ≥75%

[11] Tin Tin et al. Ethnic disparities in breast cancer survival in New Zealand: which factors contribute? BMC Cancer (2018) 18:58 DOI 10.1186/s12885-017-3797-0

Figure 6: Trends in the proportion of women rescreened within 27 months of a subsequent screen



Key: Green is non-Māori non-Pacific, Blue is Māori, Red is Pacific women. Target ≥85%

Gradual widening of the gaps between non-Māori non-Pacific women and Maori and Pacific women in timely rescreening after initial and subsequent screens remain a concern since the effectiveness of mammography screening depends on regular screening within the recommended screening interval.

In summary, despite the growth in the eligible population over time, BSA is providing a high quality screening service to women in Aotearoa, and is contributing to reduced illness and deaths from breast cancer. Most potential harms are being minimised. Reprioritising resources to increase coverage of Māori women nationally, increase coverage of Pacific women in five regions, and improve timely rescreening rates, are essential to enhance the programme's effectiveness and contribution to equitable outcomes from breast cancer for women in Aotearoa.