TE AHO O TE KAHU CANCER CONTROL AGENCY

Te Rēhita Mate Ūtaetae Breast Cancer Foundation National Register

Te Kāwanatanga o Aotearoa New Zealand Government

BREAST CANCER QUALITY IMPROVEMENT MONITORING REPORT

2025

Citation: Te Aho o Te Kahu – Cancer Control Agency. 2025. *Breast Cancer Quality Improvement Monitoring Report.* Wellington: Te Aho o Te Kahu – Cancer Control Agency.

Published in June 2025 by Te Aho o Te Kahu – Cancer Control Agency
PO Box 5013, Wellington 6140, New Zealand

ISBN 978-1-7385872-2-3 (online)
TP 0016

TE AHO O TE KAHU CANCER CONTROL AGENCY

This document is available at teaho.govt.nz

Acknowledgements

This report publishes quality performance indicator (QPI) results for the 8,390 people diagnosed with a new primary diagnosis of breast cancer from 1 January 2020 to 31 December 2021, using data from Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register (Te Rēhita).

Te Aho o Te Kahu – Cancer Control Agency (the Agency), would like to acknowledge the Breast Cancer New Zealand National Register Trust for providing the source data and working with the Agency to develop technical specifications and undertake calculations for the breast cancer QPIs. The agency also thanks the Breast Cancer Foundation New Zealand, as the funder of Te Rēhita, for supporting this work.

The Agency is releasing this report in collaboration with the National Breast Cancer (QPI) Working Group. Appendix F provides the membership of that working group.

We acknowledge that each data point that appears in or has contributed to this report represents a person or cluster of people who have been diagnosed with breast cancer. We extend our support to those people and their whānau whose lives will have been significantly affected by breast cancer. We are committed to sharing this data with the wider health sector to improve breast cancer screening, diagnosis and treatment across the country for all people in New Zealand.

Data disclaimer

The Breast Cancer New Zealand National Register Trust has supplied data from Te Rēhita for the analysis this report uses. While we have used all care and diligence in processing, analysing and extracting data, we cannot guarantee that the data is error free. The trust will not be liable for any loss or damage suffered by the use, directly or indirectly, of the information in this publication. If you identify errors or have concerns about the data, please email admin@breastcancerregister.co.nz.

The data presented in this report may vary from that in other reports, due to differences in technical definitions, patient eligibility and other rules (eg, diagnosis type). The Breast Cancer New Zealand National Register Trust conducts regular data audits to enhance data accuracy, completeness and quality; therefore, data may change over time. This report is based on data extracted on 30 May 2024. Data from the pharmaceuticals collection was received on 9 January 2024.

Note regarding use of the term ‘district health board’

At the time of publishing this report, district health boards (DHBs) had been disestablished (as part of the 1 July 2022 health and disability sector reforms). This report uses the term ‘DHB’ in data tables, graphs and some commentary, as they were in existence during the period the report covers (1 January 2020 to 31 December 2021). The report also refers to ‘districts’ (the term that has replaced ‘DHB’) and hospitals.

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1. OVERVIEW

About Te Aho o Te Kahu – Cancer Control Agency

Te Aho o Te Kahu – Cancer Control Agency (the Agency) is a standalone departmental government agency. Its chief executive reports directly to the Minister of Health. The Agency was created in December 2019 in recognition of increasing cancer incidence, increasing complexities of treatment and the impact cancer has on the lives of New Zealanders.

The Agency's purpose and functions were defined in a 2020 Cabinet paper, which states:

> **The Agency will develop initiatives to monitor and improve cancer system performance and practice improvements. Robust monitoring and evaluation will support stronger governance and drive the actions forward.**

As part of this, the Agency's cancer quality performance indicator (QPI) programme provides information to support the improvement of cancer detection, diagnosis, treatment and post-treatment services, to deliver better health outcomes for all people across New Zealand.

About the quality performance indicator programme

The release of this breast cancer QPI report represents a continuation of the Agency's QPI programme.

The QPI programme reports highlight unwarranted variation in cancer diagnosis, treatment and outcomes, and identifies where quality improvement action(s) could or should be prioritised. To date, we have reported on cancer-specific QPIs for bowel (originally in 2019 and an update in 2022), lung (originally in 2021 and an update in 2025), prostate and pancreatic cancers, which are available on our website **here**.

In March 2024, Te Aho o Te Kahu also published a QPI report that provided analysis about people diagnosed with cancer within 30 days of an emergency or acute (unplanned) hospital admission for 22 cancer types. The results of this analysis can be found **here**.

The QPI programme develops, calculates and reports on QPIs using national data collections, registries and other data sources. Wherever the data allows, each indicator is reported by demographic variables (eg, ethnicity, age, sex and deprivation) and by

geography (ie, by district health board (DHB), now referred to as districts), enabling comparison between groups and between cancer care providers.

About this report

This breast cancer quality improvement monitoring report publishes results for 10 of the 26 QPIs initially developed, in 2022, using data from Te Rēhita Mate Ūtaetate – Breast Cancer Foundation National Register (Te Rēhita) for the 8,390 people diagnosed with a new primary diagnosis of breast cancer in New Zealand from 1 January 2020 to 31 December 2021.

These 10 indicators were selected based on their potential to inform clinical quality improvement, needs based health gain, and because of data completeness and quality within Te Rēhita.

The 10 QPIs are:

- QPI 1: Route to detection
- QPI 2: Histological grading
- QPI 5: Breast-conserving surgery
- QPI 6: Immediate reconstruction at the time of mastectomy
- QPI 11: Chemotherapy with or without trastuzumab
- QPI 13: Neoadjuvant chemotherapy
- QPI 14: Adjuvant endocrine therapy adherence
- QPI 23: Timely diagnosis
- QPI 24: Time to surgery
- QPI 26: Access to radiation therapy.

Some key findings

This section focuses on the findings for three of the 10 QPIs contained in this report. We believe that these findings warrant prioritised follow-up and quality improvement activity, which would immediately benefit breast cancer patients and their whānau. The relevant QPIs are:

- QPI 1: Route to detection
- QPI 14: Adjuvant endocrine therapy adherence
- QPI 23: Timely diagnosis.

Many breast cancers are detected outside of the screening programme, often when symptoms arise

For details including definitions, inclusion criteria and more detailed commentary, see **QPI 1: Route to detection.**

The three most common breast cancer detection routes are:

1. the national screening programme, BreastScreen Aotearoa (BSA)
2. non-BSA image detection among non-symptomatic females (including privately funded screening)
3. the symptomatic route, where a person notices breast cancer symptoms.

During the timeframe of this analysis, breast screening was offered biennially for females aged 45–69 years. Breast screening is associated with the detection of breast cancer at an earlier stage and reduced breast cancer mortality (Duffy et al 2020).

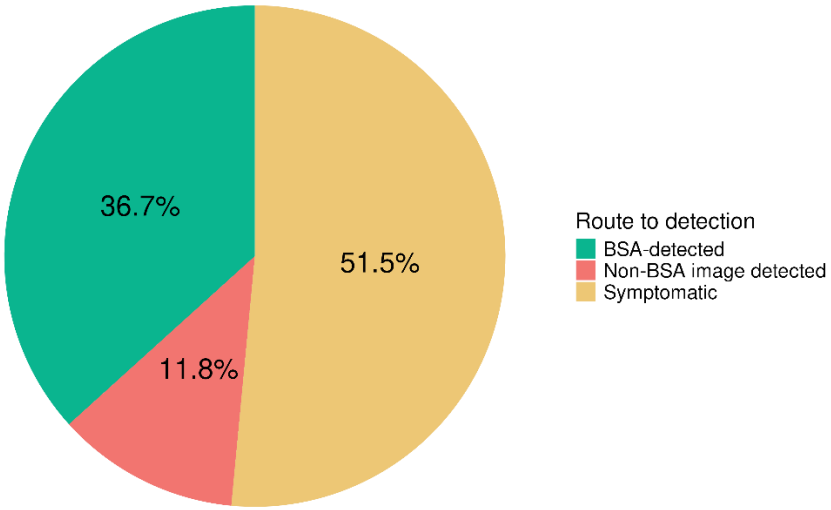
The goal is that there should not be significant differences between geographic, socioeconomic and ethnic groupings within New Zealand for any breast cancer detection route, and that most eligible females should have their breast cancer detected through the BSA programme.[1]

Our findings, however, show that in 2020 and 2021, approximately 35% of females of screening age had their breast cancer detected through a symptomatic presentation, while approximately 56% had their breast cancer detected via the BSA programme.

When analysing the data on routes to detection not just for eligible females but for people (including males) of all ages, we found that 51.5% had their breast cancer detected through symptomatic presentation, 36.7% through BSA screening and 11.8% through imaging not provided by BSA. Figure 1 illustrates this.

[1] Eligibility criteria for screening through BSA exclude males, those outside the specified age range and those with symptoms.

Figure 1: Proportion of people[2] of all ages who received a diagnosis of breast cancer, by route to detection, 2020–2021 (non-age standardised)



To maximise the benefits of a national screening programme, it is important to get high screening coverage. Over most of the time period covered by this report, the BSA programme was still working to achieve the 70% coverage target across every ethnic group (Health New Zealand - Te Whatu Ora 2025). Over time, improvements in participation across the eligible population will reduce the number of breast cancers detected through the symptomatic route in this age group. The extension of the eligibility age to include women aged 70-74 should contribute to improving the BSA-detected numbers.

Some women are less likely than others to complete endocrine therapy

For details including definitions, inclusion criteria and more detailed commentary, see **QPI 14: Adjuvant endocrine therapy adherence**.

For this indicator, we looked at adherence[3] to adjuvant endocrine therapy at six, 12 and 24 months[4] after a patient's first script was dispensed. The term 'adjuvant' refers to additional treatment given after completion of the primary treatment, such as surgery.

Adjuvant endocrine therapy is typically prescribed for a period of five years. Long-term adherence to adjuvant endocrine therapy is a key part of treatment success. It

[2] Where sex is specified (eg, 'females diagnosed with breast cancer'), biologically born males have been excluded. Where the term 'people' is used, biologically born females and males have both been included.

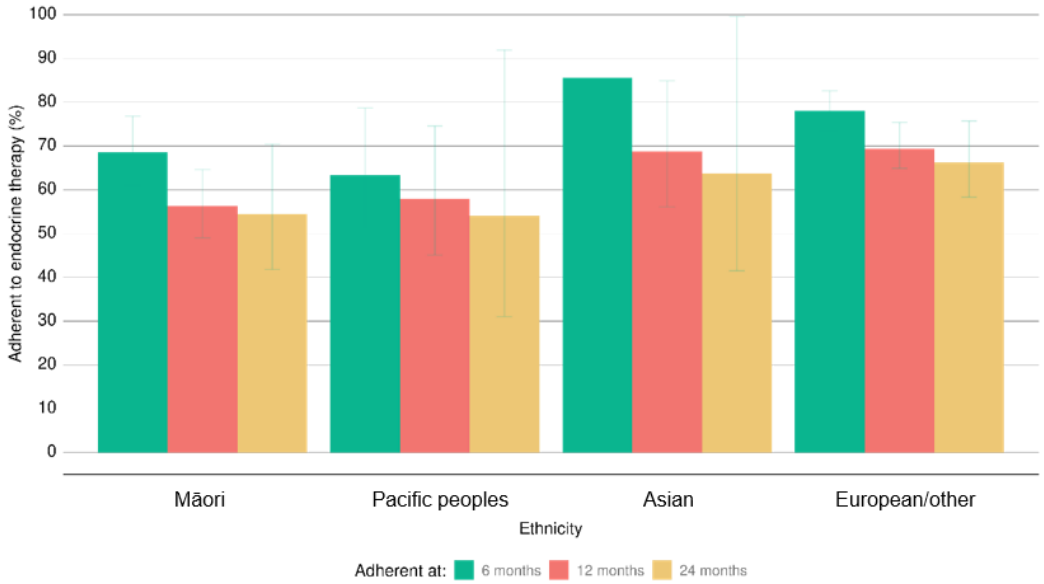
[3] Due to data limitations, adherence was measured using prescription dispensed date as a proxy measure.

[4] As Te Rēhita became a national register in 2020, there was not enough follow up time to measure adherence up to five years.

significantly decreases the risk of breast cancer recurring and increases the likelihood of the long-term survival for people with endocrine-sensitive early (stage I–III) breast cancer (EBCTCG 1998; EBCTCG 2005). For this benefit to be realised, patients should persist with taking the therapy (which is orally administered) for the entire required duration. A lack of adherence (or drop-off) in taking the therapy could limit its benefits. Our findings show that overall adherence to adjuvant endocrine therapy decreased considerably over time. Of females initially dispensed endocrine therapy, 76% were still being dispensed endocrine therapy at six months, compared to 67% at 12 months and 64% at 24 months.

Our findings show that adjuvant endocrine therapy adherence varies among differing ethnicities. At six months, 12 months and 24 months after first being dispensed endocrine therapy, Māori and Pacific peoples were much less likely than those of Asian or European/other ethnicity to still be receiving it, as Figure 2 illustrates.

Figure 2: Proportion of females with endocrine-sensitive stage I–III breast cancer who completed up to two years of adjuvant endocrine therapy, 2020–2021 (non-age-standardised)



At six months after first being dispensed endocrine therapy, Pacific peoples and Māori were much less likely (63% and 69% respectively) than females of European/other or Asian ethnicity to still be receiving it (78% and 86% respectively).

At 12 months, 56% of Māori and 58% of Pacific peoples continued to receive adjuvant endocrine therapy. These are lower proportions than those for European/other or Asian ethnicity (both at 69%).

The pattern continued at 24 months. Pacific peoples and Māori were less likely to be receiving endocrine therapy at 24 months (both at 54%) than those of Asian and European/other ethnicity (64% and 66% respectively).

As long-term adherence to adjuvant endocrine therapy is a key part of treatment success, further investigations need to occur into why adherence to endocrine therapy decreases significantly with the length of time a person is on the therapy. Our results suggest that the groups with the lowest adherence are Māori, Pacific peoples and young females. As these groups already experience worse breast cancer outcomes, particular

attention should be given to strategies targeting improvements in adherence to endocrine therapy for these groups.

Patients with symptoms wait longer for diagnosis than patients who are screened

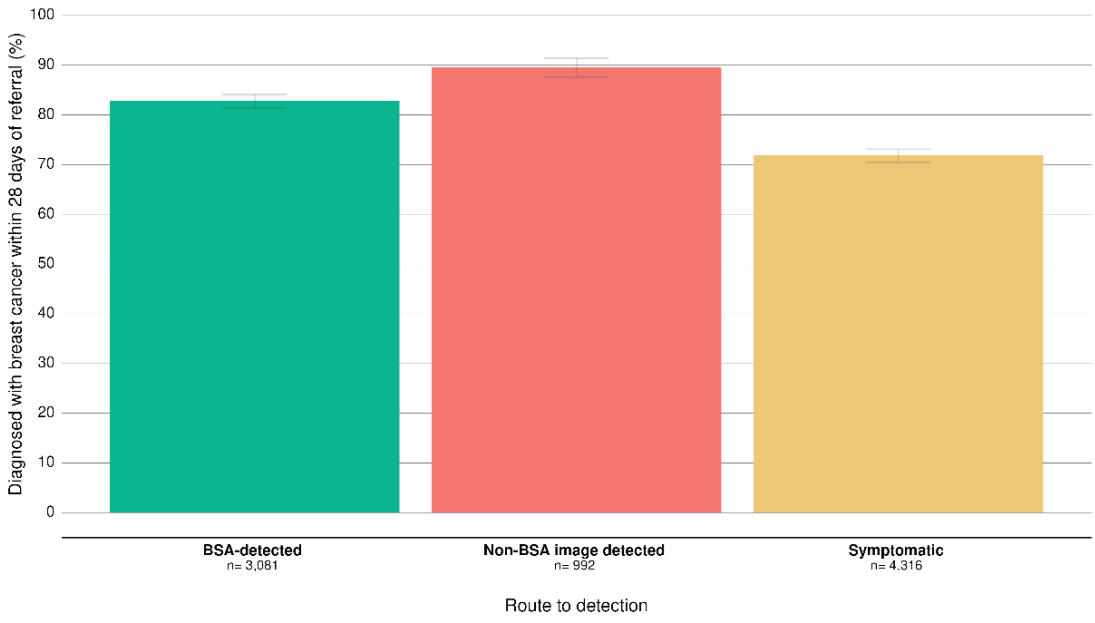
For detail, including definitions, inclusion criteria and more detailed commentary, see **QPI 23: Timely diagnosis**.

Timely detection and diagnosis of breast cancer allows cancer treatment to start more promptly, increasing the likelihood of the treatment's success and positive health outcomes (Seely 2023). Conversely, slower time to diagnosis means slower time to cancer treatment, which negatively affects breast cancer outcomes such as survival time (An et al 2022).

For this indicator, we investigated the proportion of patients for whom time from referral to diagnosis of breast cancer was within 28 days. International research indicates that the optimal timeframe from referral to diagnosis for cancer is within 28 days (Miles and Asbridge 2019).

We found that 89.6% (992 people) received a timely diagnosis when their breast cancer was detected through non-BSA imaging, compared to 82.8% (3,081 females) through the BSA programme and 71.8% (4,316 people) through symptomatic presentation (Figure 3).

Figure 3: Proportion of people diagnosed with breast cancer within 28 days of referral, 2020–2021, by route to diagnosis (non-age-standardised)



Further investigation is essential to determine why those diagnosed with breast cancer via a symptomatic route are less likely to receive their diagnosis within 28 days compared to those diagnosed through the BSA programme. Quality improvement activity regarding this issue should be a priority, as those diagnosed symptomatically generally have a higher stage at diagnosis, which correlates with a poorer prognosis.

In addition, for two routes (through the BSA programme and through non-BSA image detection), Māori and those living in deprived areas were less likely to receive a diagnosis of breast cancer within 28 days compared to all other ethnicities and deprivation quintiles. Prompt interventions are needed to reduce ethnic and socio-economic disparities in the timely diagnosis of breast cancer.

2. INTRODUCTION

Breast cancer in New Zealand

Types of cancer included in this report

This report includes all new primary cases of breast cancer during the time period, with the exclusion of breast neuroendocrine tumours and primary breast lymphomas.

The most common breast cancer is breast adenocarcinoma, which accounts for around 90% of cases.

Breast neuroendocrine tumours account for about 2–5% of breast cancers and primary breast lymphomas account for about 0.5% of breast cancers.

Breast neuroendocrine tumours and primary breast lymphomas have different biologies, treatments and outcomes compared to breast adenocarcinomas and are therefore best grouped with other neuroendocrine tumours or lymphomas for the purposes of quality improvement.

This report terms the remaining cases in our cohort 'breast cancer', noting that the majority will be adenocarcinomas of the breast.

Table 1 sets out the New Zealand Cancer Society's definitions of the stages of breast cancer (New Zealand Cancer Society 2022).

Table 1: Definitions of the stages of breast cancer

Stage	Description
Stage 0 (DCIS)	This is a non-invasive and pre-cancerous change, limited to the lining of the duct.
Stage I	The cancer is only found in your breast with no or only microscopic involvement of lymph nodes in your armpit.
Stage II	The cancer is larger than in stage I and/or is found in just a few nearby lymph nodes.
Stage III	The cancer is larger than in stage II or involves the skin of the breast or the chest wall or is a type of breast cancer called inflammatory breast cancer, and/or has spread from the breast to more than just a few lymph nodes close to the breast.
Stage IV	The cancer has advanced and has spread to other parts of your body.

DCIS = ductal carcinoma in situ

Rates of breast cancer have increased slightly over the past 20 years for both Māori and non-Māori females.

Breast cancer survival rates are among the highest of all cancers, due largely to earlier detection and diagnosis, treatment advances, and ever-improving standards of care. The Breast Cancer Foundation New Zealand estimates that breast cancer survival rates in Aotearoa New Zealand are 91% for five years and 86% for 10 years (Breast Cancer Foundation New Zealand 2022).[5]

The risk of developing breast cancer increases with certain risk factors. For example, in 2020, alcohol caused 7% of breast cancers in New Zealand (Te Aho o Te Kahu 2022b). Smoking, poor diet and obesity also increase the risk of breast cancer while physical activity and a healthy diet can reduce the risk of developing breast cancer (Cohen et al 2023). While people have some degree of control over their choices, the environments they live in heavily shape their actions and decisions, such as their ability to access and afford healthy food. Other risk factors include certain genetic mutations and a family history of breast cancer (Antoniou et al 2008).

This report provides important insight into unwarranted variation and areas for potential activity aimed at improving breast cancer detection, diagnosis, treatment approaches and outcomes.

Development of the breast cancer quality performance indicators

In early 2022, Te Aho o Te Kahu – Cancer Control Agency (the Agency) established the National Breast Cancer Quality Performance Indicator (QPI) Working Group (the working group) via a public call for nominations. Appendix F sets out membership of this group.

The Agency and the working group developed 26 potential breast cancer-specific QPIs. Drafts of these were publicly consulted on in August and September 2022.

In 2023, following feedback received during the consultation, the Agency undertook an analysis of the appropriateness of Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register (Te Rēhita) for use as the data source to calculate the breast cancer QPIs. This analysis looked at the completeness, quality and equity of the data Te Rēhita captured. It found Te Rēhita to be exemplary in all three areas. Additionally, the audit and governance processes for data in Te Rēhita were of high quality. Appendix E gives more information on Te Rēhita.

In late 2023, the Agency contracted the Breast Cancer Foundation New Zealand, as the funders of Te Rēhita, to work with the Breast Cancer New Zealand National Register Trust, which manages Te Rēhita, to calculate the breast cancer QPIs.

In 2024, the Agency, the Breast Cancer New Zealand National Register Trust and the working group developed this report. We have jointly agreed that these 10 indicators

[5] These are estimates because Te Rēhita only became national in 2020.

should be reported on because of their potential to inform clinical quality improvement, needs based health gain, and because of data completeness and quality within Te Rēhita.

Documents to accompany the monitoring report

We intend that this monitoring report is read in conjunction with the breast cancer QPI descriptions and breast cancer QPI technical specifications documents (Te Aho o Te Kahu 2025a; Te Aho o Te Kahu 2025b).

The breast cancer QPI descriptions report provides the rationale, evidence and other information for each of the 26 potential indicators (which are made up of measurable and aspirational indicators), including the 10 reported on in this report.

The breast cancer QPI technical specifications report outlines the method we used for calculating each of the 10 QPIs reported on in this monitoring report. It provides information on data sources, numerator criteria, denominator criteria, relevant data codes, descriptions and data-flow diagrams. Appendix B of this document explains the sources of data for the indicators and the methods of analysis this monitoring report includes.

Disruptive events

The Agency acknowledges that Aotearoa New Zealand and the health sector experienced considerable challenges during the time covered by this report.

COVID-19

In particular, the COVID-19 pandemic may have affected some of the results and variations we have identified and should be considered when interpreting the results in this report. National and regional alert level changes occurred between 2020 and 2022 (Department of the Prime Minister and Cabinet 2023).

Throughout the COVID-19 pandemic, the Agency produced reports which collated evidence on the impact the pandemic had on cancer diagnosis and treatment to support policy development and response planning (Te Aho o Te Kahu 2021). They may provide useful context for results presented later in this report.

Whakaari/White Island

On 9 December 2019, Whakaari/White Island erupted. Caring for the survivors had a significant impact on nearby district health boards (DHBs) and hospitals, especially Whakatāne Hospital and Bay of Plenty DHB, which undertook the immediate triage of survivors.

After the immediate triage of survivors, there was a coordinated response across many DHBs to provide treatment. Specifically, the National Burn Centre at Middlemore

Hospital and all the regional burns units (Waikato, Lower Hutt and Christchurch) took on patients over and above their normal workload. As a result, many elective surgical lists were cancelled to fulfil this demand for acute operating theatre time and theatre staff (Hayes et al 2022). It is possible that other elective diagnostic and treatment decisions were delayed or cancelled due to the Whakaari/White Island eruption.

Waikato District Health Board cyber-attack

On 25 May 2021, Waikato DHB experienced a cyber-attack that affected all phone lines and hospital computer systems. As a result, surgeries were postponed, and seriously ill patients were transferred to other hospitals.

People in the Waikato district who were undergoing radiation therapy had their treatment moved to other capable sites across Aotearoa New Zealand. It took several months to restore compromised systems and address the backlog of surgeries, treatments and appointments (Waikato District Health Board 2022).

Cohort characteristics

The cohort used for the analysis in this report comprises 8,390 people with a new primary diagnosis of breast cancer between 1 January 2020 and 31 December 2021, as recorded in Te Rēhita.

Table 2 outlines the demographic characteristics of the cohort.

Table 2: Demographic characteristics of people diagnosed with breast cancer between 2020 and 2021 in Aotearoa New Zealand

	People with breast cancer	
	n*	%
All breast cancer diagnoses (invasive and in situ)		
Total	8,390	100.0
Diagnosis type		
Ductal carcinoma in situ†	1,023	12.2
Invasive	7,351	86.9
Other/lobular carcinoma in situ/unknown	16	0.1
Year of diagnosis		
2020	4,131	49.2
2021	4,259	50.8
Sex		
Female	8,319	99.2
Male	71	0.8
Age group		
Less than 45 years	870	10.4
45–54 years	1,986	23.7
55–69 years	3,346	39.9
70–79 years	1,365	16.3
80 years and above	823	9.8
Ethnicity		
Māori	1,163	13.9
Pacific peoples	486	5.8
Asian	718	8.6
European/other	6,023	71.8

	People with breast cancer	
	n*	%
Deprivation quintile (NZDep2018)‡		
Quintile 1 – least deprived	1,775	21.2
Quintile 2	1,691	20.2
Quintile 3	1,708	20.4
Quintile 4	1,666	19.9
Quintile 5 – most deprived	1,545	18.4
Rural–urban status		
Rural	1,744	20.8
Urban	6,642	79.2
Stage		
Stage 0 (DCIS)	1,081	12.9
Stage I	3,402	40.5
Stage II	2,785	33.2
Stage III	756	9.0
Stage IV	366	4.4
Region of diagnosis (in alphabetical order)		
Central	1,927	23.0
Midland	1,497	17.8
Northern	2,884	34.4
Southern	2,082	24.8

	People with breast cancer	
	n*	%
District health board of diagnosis (in alphabetical order)		
Auckland	718	8.6
Bay of Plenty	503	6.0
Canterbury	1,019	12.1
Capital & Coast	546	6.5
Counties Manukau	802	9.6
Hawke's Bay	342	4.1
Hutt Valley	271	3.2
Lakes	204	2.4
MidCentral	294	3.5
Nelson Marlborough	317	3.8
Northland	406	4.8
South Canterbury	125	1.5
Southern	561	6.7
Tairāwhiti	87	1.0
Taranaki	240	2.9
Waikato	703	8.4
Wairarapa	87	1.0
Waitematā	958	11.4
West Coast	60	0.7
Whanganui	147	1.8

Source: Te Rēhita.

DCIS = ductal carcinoma in situ.

Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

* Excludes people registered with breast cancer from death certificates only.

† See Table 1 for an outline of the stages of breast cancer.

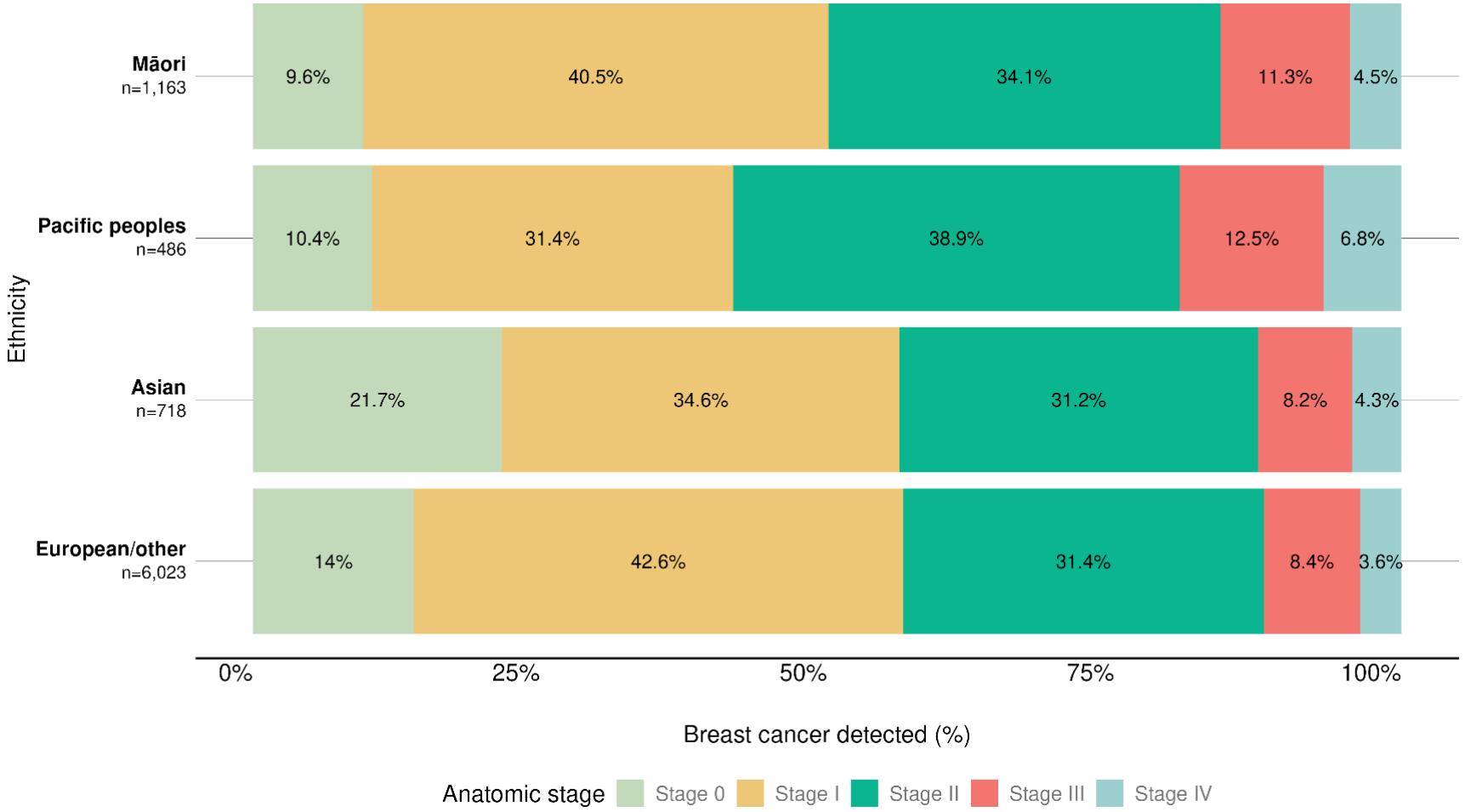
‡ The NZDep is an area-based measure, which measures the level of deprivation for people in each small area and is based on nine Census 2018 variables.

Stage at diagnosis

Stage at diagnosis is an important determinant of breast cancer survival. Late-stage diagnosis results in higher mortality. Lawrenson et al (2019) and Seneviratne et al (2016) concluded that later stage at diagnosis is the single most important (and amenable to change) contributor to worse outcomes for Māori and Pacific peoples presenting with symptomatic breast cancers.

Figure 4 shows how breast cancer stage at diagnosis differs by ethnicity.

Figure 4: People with breast cancer detected through any route, by stage at diagnosis and ethnicity, 2020–2021 (age-standardised)



Māori and Pacific peoples are more often diagnosed with higher stage (stage III and IV) breast cancer than people of other ethnicities. Figure 4 shows that Pacific peoples had the highest proportion of people diagnosed with stage IV breast cancer (6.8%) between 2020 and 2021, compared with 4.5%, 4.3% and 3.6% among Māori, Asian and European/other ethnicities respectively. A substantially higher proportion of Pacific peoples and Māori were diagnosed with stage III breast cancer. Early diagnosis is vital to reducing the risk of recurrence and development of advanced disease.

Equity

In writing this report, we have chosen to apply an equity lens, which means that we are recognising that different people with different levels of advantage require different approaches and resources to experience equitable health outcomes. The definition of those who experience inequity is wide. It incorporates many different socio-economic groupings and possible dimensions of equity (for example, those associated with ethnic differences and those associated with deprivation) (Ministry of Health 2023).

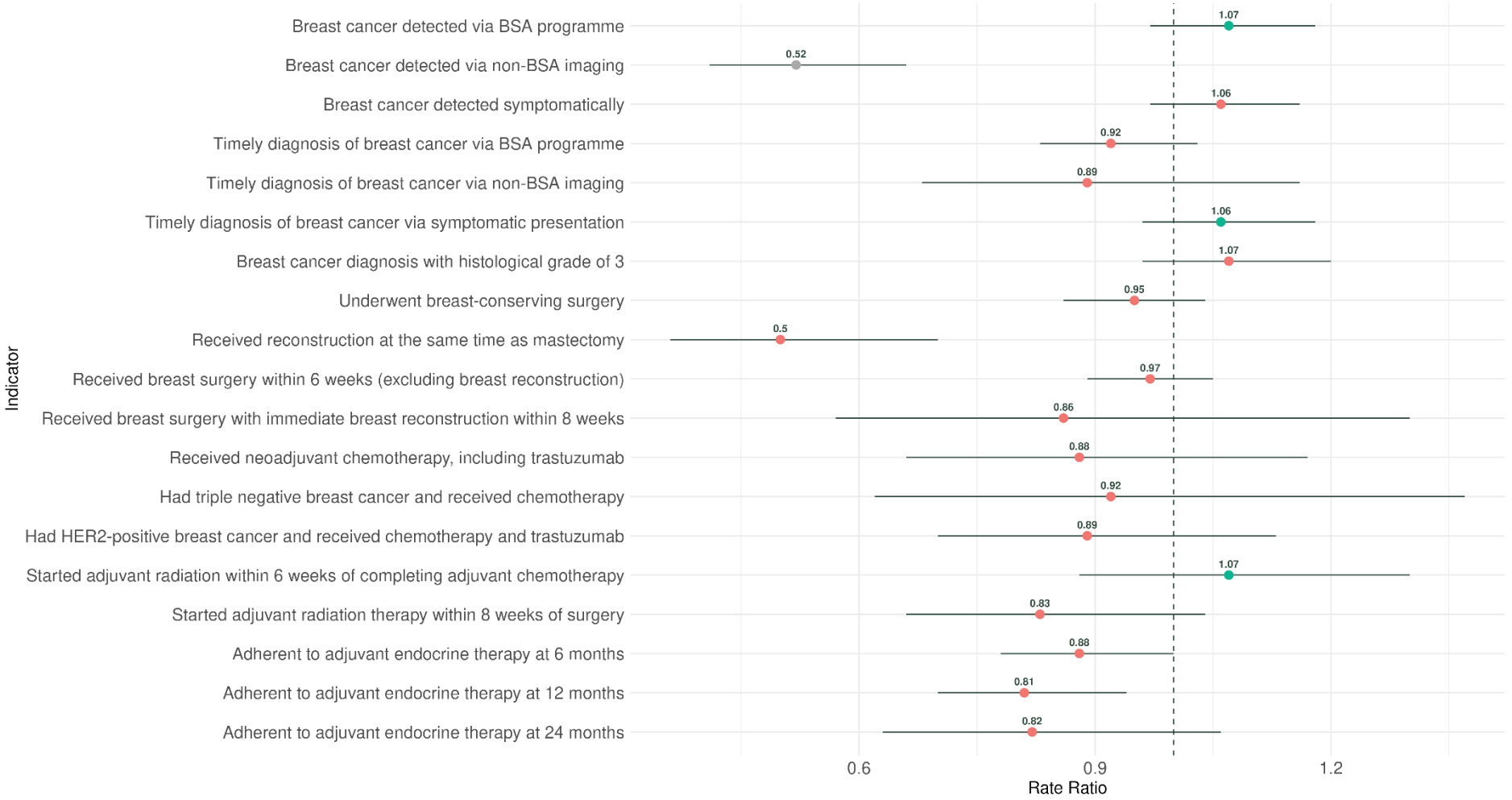
A first step in addressing equity challenges is to produce information in a way that highlights inequities so that they can be tackled, and the system can be improved in a way that reduces the likelihood of the inequities continuing. Two ways that we can shed light on inequities in a set of information are through age-standardising the data and using standardised ratios. See Appendix B for more information on these two processes.

Figure 5 presents age-standardised rate ratios for Māori alongside those for non-Māori, non-Pacific, non-Asian (nMnPnA) ethnicity (ie, those of those of European/other ethnicity) for each QPI presented in this report and its sub-measures. A rate ratio of 1 means that no inequities are occurring. For most of the indicators that we looked at, the rate ratios were less than 1, meaning inequities may have been occurring.

Further to this, points are coloured red, green or grey. A red point means that the rate ratio presented is considered worse for Māori, based on the indicator description. A green point means that it is considered better for Māori. A grey point means that further in-depth analysis of patient-level data is required.

There is one grey point in Figure 5, for breast cancer detected via non-BSA imaging. Further analysis is required to determine if this difference is worse or better for Māori than nMnPnA. This is because non-BSA imaging also encompasses private screening.

Figure 5: Rate ratios (Māori compared to nMnPnA) for the breast cancer quality performance indicators and sub-measures, 2020–2021 (age-standardised)



nMnPnA = non-Māori, non-Pacific, non-Asian

For all 10 QPIs presented in this report, Māori experienced differences in approach or outcomes compared to nMnPnA people.

Three of the indicators showed inequities that warrant prioritised improvement activity, as follows.

1. QPI 6: Māori females were 50% less likely than females of nMnPnA ethnicity to receive breast reconstruction at the same time as a mastectomy.
2. QPI 14: Māori females were less likely than females of nMnPnA ethnicity to still have endocrine therapy dispensed at six, 12 and 24 months after it was first dispensed.
3. QPI 26: Māori were 17% less likely than people of nMnPnA ethnicity to start adjuvant radiation therapy within eight weeks of surgery.

3. QUALITY PERFORMANCE INDICATORS

The remainder of this report provides the results of each indicator by sex, ethnicity, deprivation, rurality and residential location.

QPI 1: Route to detection

Indicator description

Proportion of people with breast cancer by route to detection (BSA-detected vs non-BSA image detected vs symptomatic).

Context

We focused on three potential breast cancer detection routes:

1. via BSA's national screening programme
2. via non-BSA image detection[6]
3. via the symptomatic route (ie, because breast cancer symptoms are present).

Breast screening is associated with detection of breast cancer at an earlier stage and reduced breast cancer mortality (Duffy et al 2020). Regular biennial mammograms can reduce the risk of dying from breast cancer by more than a third (Health New Zealand - Te Whatu Ora 2024b).

In New Zealand, breast screening is offered biennially for females between the ages of 45 and 69 years, and ideally there should not be significant differences between geographic, socioeconomic and ethnic groupings within Aotearoa New Zealand for any breast cancer detection route, and most eligible females should have their breast cancer detected through the BSA programme.[7]

[6] Reasons for undergoing non-BSA image detection may include an assessment that a person is at high risk (eg, because of a strong family history), ineligibility because of age for the screening programme, annual follow-up imaging after a breast cancer episode, and an incidental finding of breast cancer because of imaging for unrelated medical events.

[7] Eligibility criteria for screening through BSA exclude males, those outside the specified age range and those with symptoms.

Results: Overall

When analysing the data on routes to detection not just for eligible females but for people (including males) of all ages, we found that 51.5% had their breast cancer detected through symptomatic presentation, 36.7% through BSA screening and 11.8% through imaging not provided by BSA. Figure 1 illustrates this.

Figure 6: Proportion of people[8] of all ages who received a diagnosis of breast cancer, by route to detection, 2020–2021 (non-age standardised)

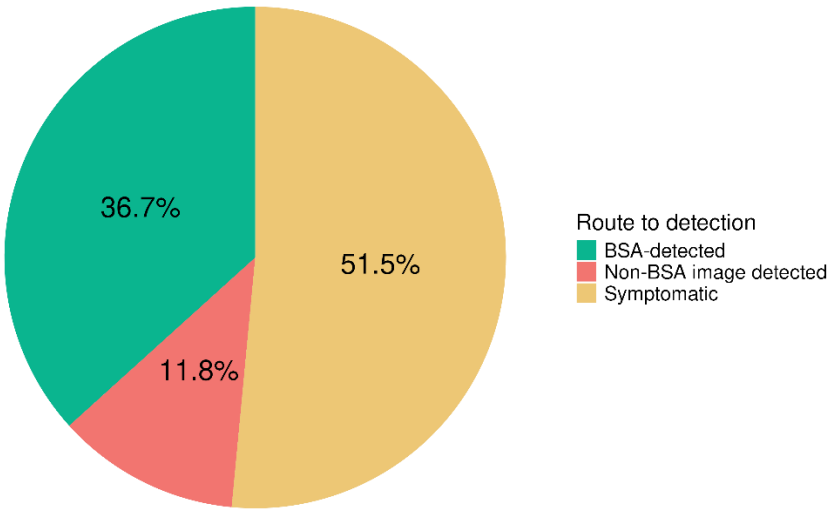
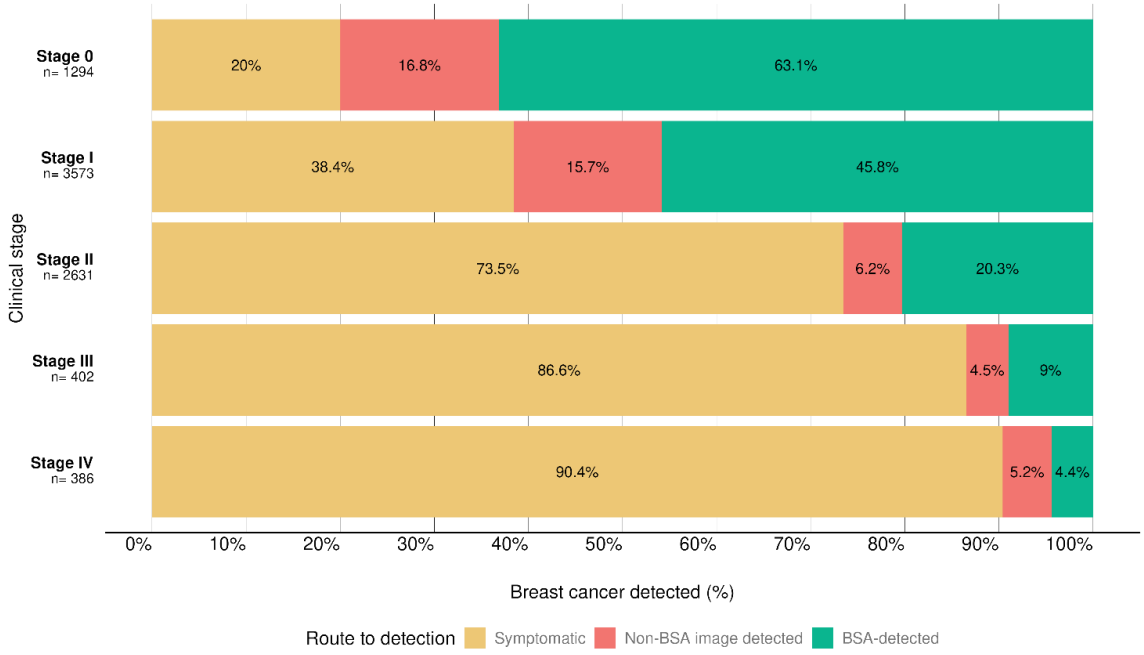


Figure 6 shows the proportions of people who were diagnosed with breast cancer in 2020–2021 by their stage of cancer and route to detection. Care should be taken when interpreting this figure: all ages and both sexes are included, and only asymptomatic females aged 45–69 were eligible for BSA screening.

[8] Where sex is specified (eg, 'females diagnosed with breast cancer'), biologically born males have been excluded. Where the term 'people' is used, biologically born females and males have both been included.

Figure 7: Proportions of people diagnosed with breast cancer by stage of breast cancer and route to detection, 2020–2021 (non-age-standardised)



Overall, and as would be expected, those who had their breast cancer detected through the BSA programme were more likely to have lower stage breast cancer compared with people who had their breast cancer detected symptomatically.

For people with stage I breast cancer, 45.8% had their breast cancer detected through the BSA programme, while 38.4% had it detected through symptomatic presentation. For people with stage III and IV breast cancer, 86.6% and 90.4% were detected through symptomatic presentation, respectively. The proportions detected through BSA were considerably lower, at 9% and 4.4% respectively.

Figure 7 shows the proportion of people whose breast cancer was detected by BSA, non-BSA image detection or symptomatically by demographic characteristics. Care should be taken when interpreting this figure: all ages and both sexes are included, and only asymptomatic females aged 45–69 years were eligible for BSA screening.

Figure 8: People with breast cancer, by route to detection, sex, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021 (non-age-standardised)

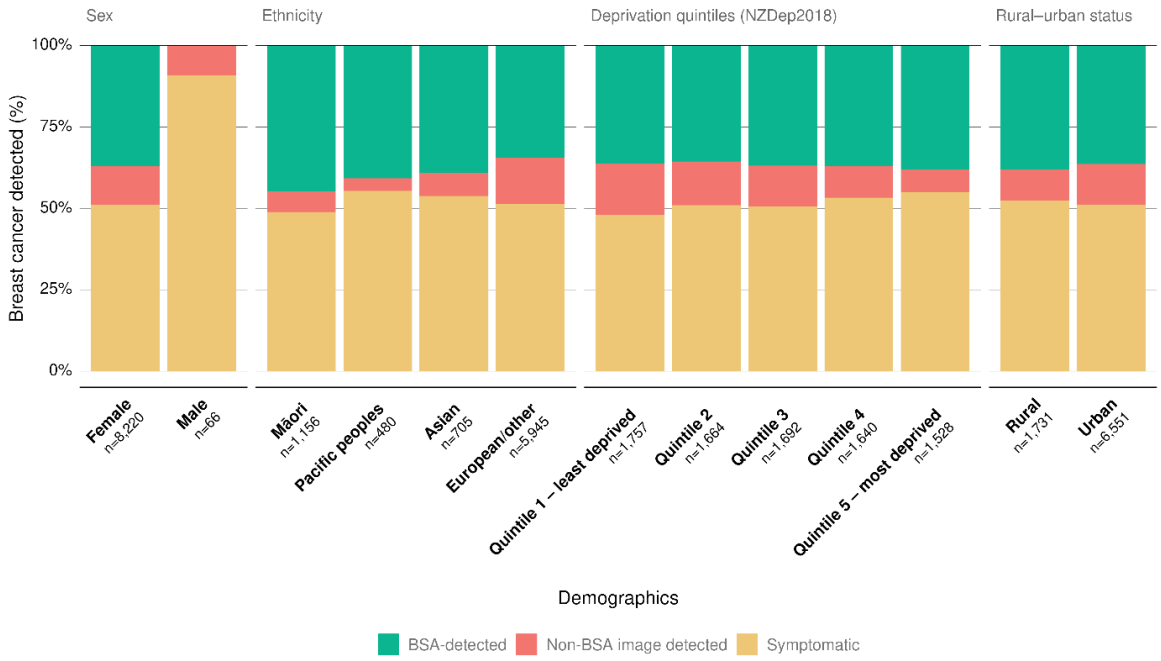
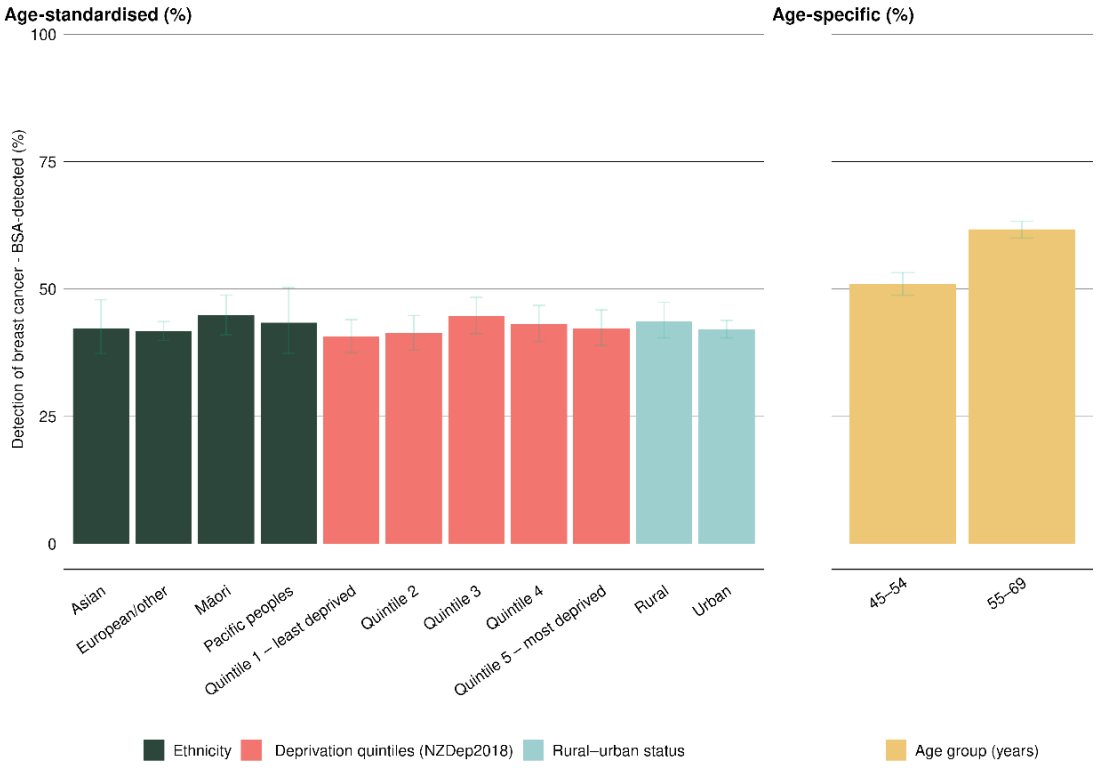


Figure 8 shows that 57.2% of Pacific peoples had their breast cancer detected following symptomatic presentation between 2020 and 2021, compared with 54.2%, 53% and 51.2% of Asian, European/other and Māori people respectively.

The proportion of cancers diagnosed following symptomatic detection appeared to increase with increasing levels of deprivation, from 44.9% for those living in areas of least deprivation (quintile 1) to 51.5% for those living in areas of highest deprivation (quintile 5).

Results: Breast cancer detected through BreastScreen Aotearoa

Figure 9: Proportion of females with breast cancer detected via BreastScreen Aotearoa, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



Once adjusted for age, there was no notable variation across ethnicity, deprivation status or rural–urban status.

The proportion of breast cancers detected in Māori and Pacific peoples through the BSA programme (44.8% and 43.4% respectively) were similar to those detected in people of Asian and European/other ethnicity (42.3% and 41.7% respectively).

Figure 10: Proportion of females with breast cancer via BreastScreen Aotearoa, by district health board of residence, 2020–2021 (non-age-standardised)

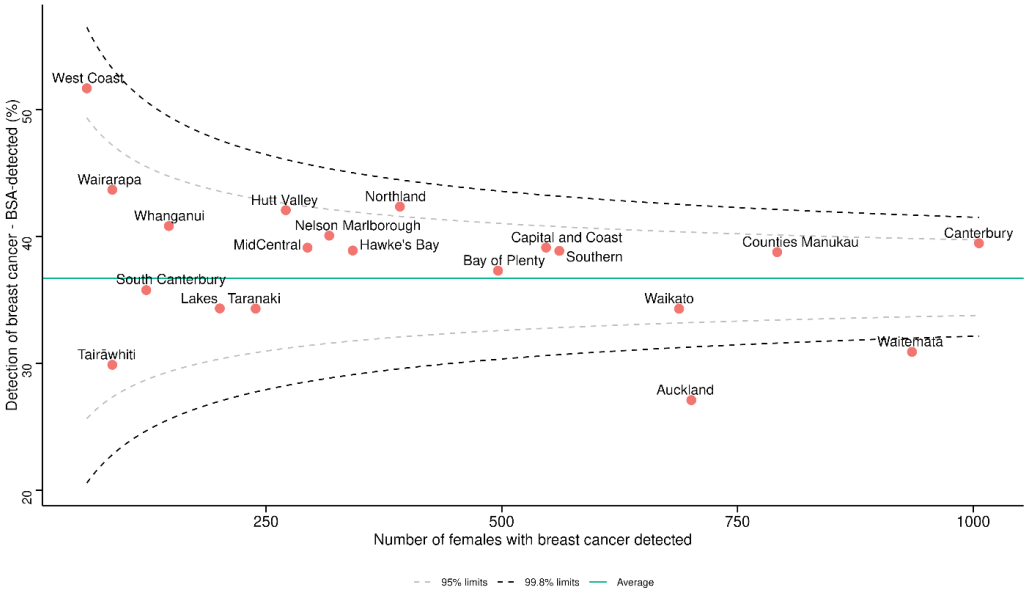


Figure 10 shows a comparison between DHBs of residence for females whose breast cancer was detected via the BSA programme.

There were no DHBs above the upper 99.8% limit. Auckland and Waitematā DHBs were below the 99.8% lower limit (27.1% and 30.9% respectively), indicating a lower proportion of females whose breast cancer was detected following BSA screening.

Results: Breast cancer detected through non-BSA image detection

Figure 11: Proportion of people with breast cancer detected via non-BSA imaging, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021

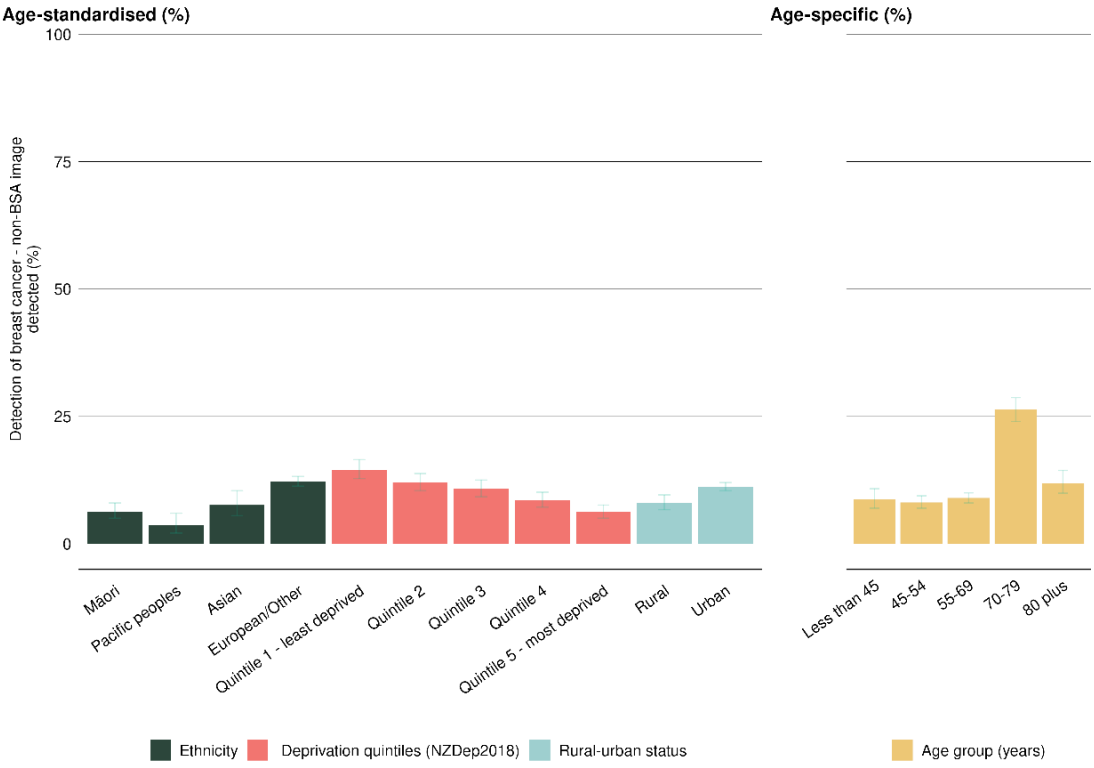


Figure 11 shows that 26.3% of people between the ages of 70 and 79 years had their breast cancer detected through non-BSA imaging: more than all other age groups. This is an expected finding, given that age group is outside the screening age. With the extension of BSA eligibility to females ages 70-74, we expect that number to go down over time.

Once adjusted for age, we found differences between ethnicities. People of European/other or Asian ethnicity were more likely (12.2% and 7.6% respectively) to have their breast cancer detected through non-BSA imaging than Māori or Pacific peoples (6.3% and 3.7% respectively).

Breast cancer detection via non-BSA imaging appeared to decrease with increasing levels of deprivation.

Figure 12: Proportion of people with breast cancer detected via non-BSA imaging, by district health board of residence, 2020–2021 (non-age-standardised)

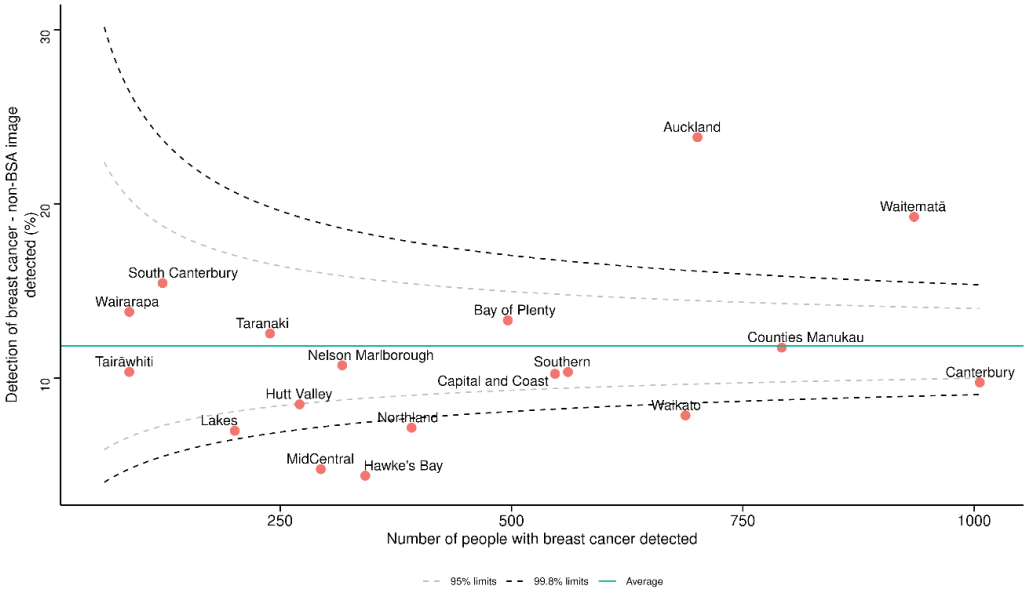


Figure 12's comparison between DHBs of residence shows that there was large regional variation for people whose breast cancer was detected through non-BSA imaging.

Two DHBs (Auckland and Waitematā) were above the upper 99.8% limit, meaning that there were a high proportion of people in those DHBs who had their breast cancer detected through non-BSA imaging (23.8% and 19.3% respectively).

Waikato, Northland, MidCentral and Hawke's Bay DHBs were below the lower 99.8% limit, meaning that there was a low proportion of people in those DHBs whose breast cancer was detected through non-BSA imaging (7.8%, 7.1%, 4.8% and 4.4% respectively).

Results: Breast cancer detected symptomatically

Figure 13: Proportion of people with breast cancer detected symptomatically, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021

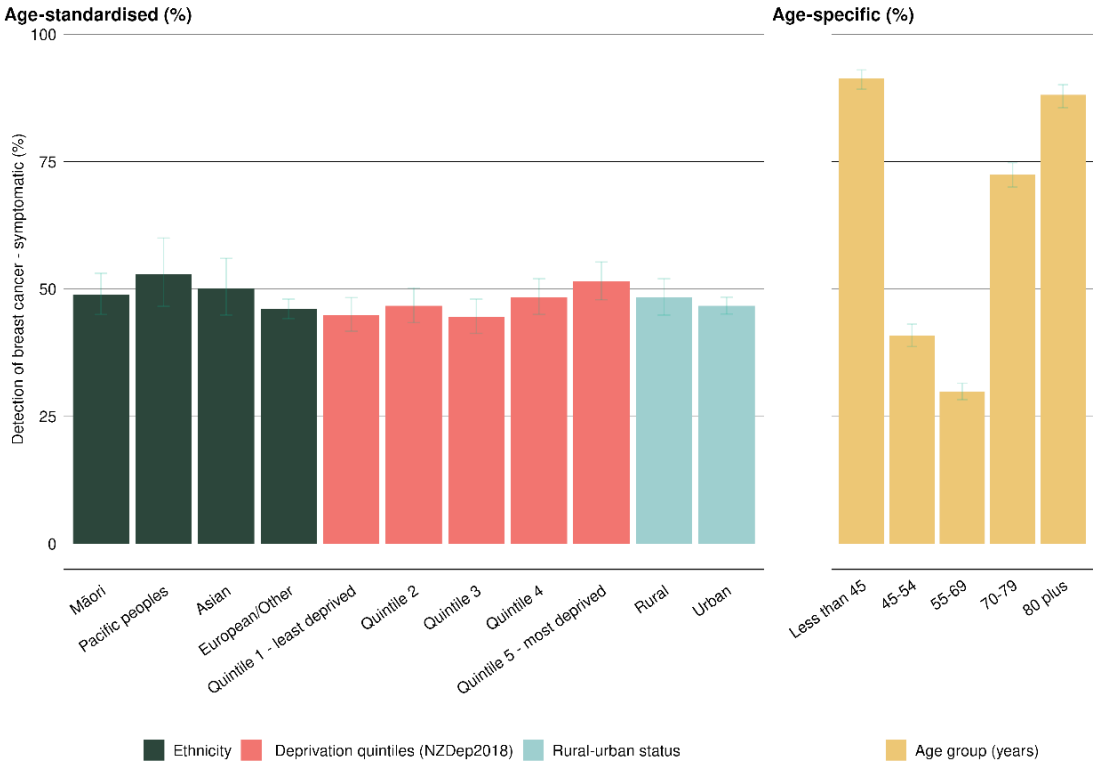


Figure 13 shows that people of screening age were far less likely to be diagnosed with breast cancer via symptomatic presentation than people in any other age group. This is as expected and suggests more females are having their breast cancer diagnosed through the BSA programme.

Once adjusted for age, the data shows that those who lived in the most deprived areas (quintiles 4 and 5) were more likely to have their breast cancer detected through symptomatic presentation (48.4% and 51.5% respectively).

In terms of ethnicity, Pacific peoples and those of Asian ethnicity (52.9% and 50.1% respectively) were more likely to be diagnosed with breast cancer via a symptomatic presentation than those who identified as Māori or European/other ethnicity (48.9% and 46.1% respectively).

Figure 14: Proportion of people diagnosed with breast cancer detected symptomatically, by district health board of residence, 2020–2021 (non-age-standardised)

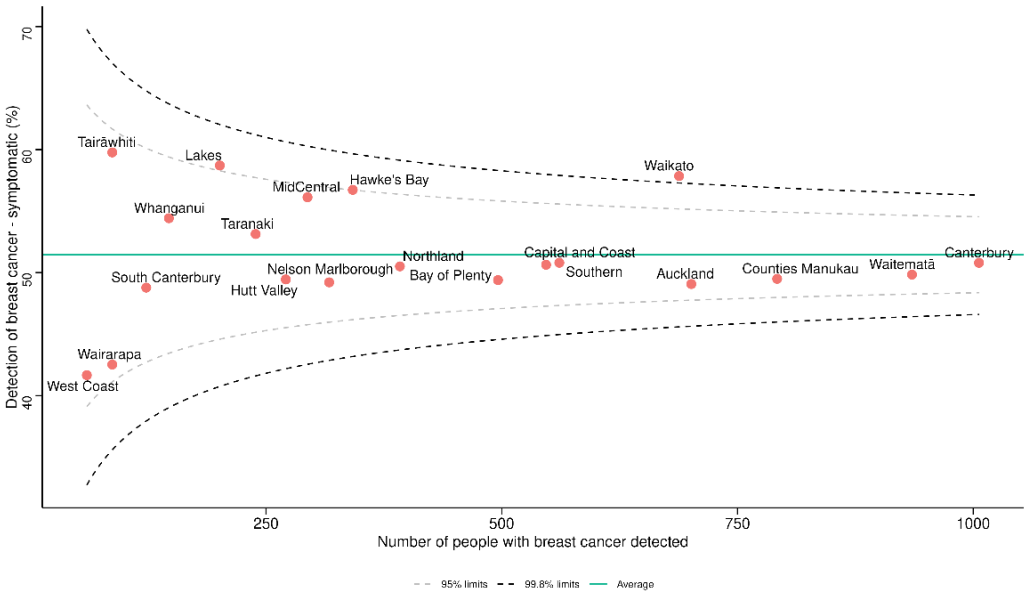


Figure 14 shows that there was some variation between DHBs; however, none were below the lower 99.8% limit. Waikato DHB was above the upper 99.8% limit: there, 57.8% of people received a diagnosis of breast cancer through symptomatic presentation.

Discussion

Among females within the eligible age range for screening, approximately 56.4% had their breast cancer detected via the BSA programme, 8.6% through non-BSA image detection and 35.4% following a symptomatic presentation.

Our findings confirm that stage 0 and stage I breast cancers were substantially more likely to be detected through the BSA programme than breast cancers at other stages. Stage II, III and IV breast cancers were much more likely to be detected through symptomatic presentation. Earlier detection of breast cancer can lead to better patient outcomes, including better survival, lower risk of complications from treatment and reduced health system costs (Seely 2023; Yeong et al 2023).

To maximise the benefits of a national screening programme, it is important to get high screening coverage. For the time period covered by this report, the BSA programme did not meet the 70% coverage target across every ethnic group. This can, at least in part, be attributed to the impacts of COVID-19 and associated restrictions, as BSA was paused during some of this time period and may have had an impact on the proportion of breast cancer diagnosed under each route to diagnosis.

Improvements could be made to ensure the BSA programme is screening more eligible females, thereby reducing the number of breast cancers detected through the symptomatic route in this age group.

However, it is expected that a proportion of breast cancers will be diagnosed in the interval between two-yearly breast mammograms, termed ‘interval cancers’ (BreastScreen Aotearoa 2012). Research from Canada and the Netherlands suggests that approximately 20–30% of breast cancers are diagnosed as interval cancers (de Munck et al 2020; Niraula et al 2020). In Australia, Kou et al (2023) found that 30.2% of females were diagnosed with an interval breast cancer. While we do not specifically analyse interval cancers in this report because those diagnosed symptomatically may not have had screening, the 35.4% of females of screening age who had their breast cancer detected after presenting with symptomatic warrants further investigation.

High breast density can contribute to reduction in detection via screening and lead to interval cancers. High breast density can ‘mask’ signs of breast cancer on mammography and is more common in younger people (Jiang et al 2023). It may be worth investigating whether measuring and reporting breast density to understand individual risk profiles may help reduce breast cancer detection through the symptomatic route.

The Breast Cancer Foundation New Zealand recommends that, ‘women aged between 40 and 50 years consider having yearly mammograms as breast cancer is more aggressive in younger females. Females can have mammograms and/or ultrasounds in alternate years through a private clinic [at their own cost] once they are eligible for the national screening programme’ (BreastNet NZ 2024).

Inequities are occurring for Māori and Pacific peoples

After age-standardisation, we found no notable variation in the proportion of those whose breast cancer was detected via the BSA programme between ethnicity, deprivation status or rural–urban status. However, there were differences in the detection of breast cancer through the symptomatic pathway in terms of ethnicity.

Pacific peoples and Māori were more likely to have their breast cancer detected symptomatically than those who identified as Asian or European/other. Those of Asian or European/other ethnicity were more likely to have their breast cancer detected through non-BSA imaging. It is important to better understand whether this reflects an issue of access to primary care, earlier onset of disease, high breast density, some other factor or a combination of factors. In addition, it is reported that those of Asian ethnicity are more likely to access breast imaging by private providers. These results warrant further investigation.

QPI 2: Histological grading

Indicator description

Proportion of people with invasive breast cancer whose cancer had a histological grade of 3.

Context

Histological grade provides an indication of aggression; that is, how fast the breast cancer is growing and how likely it is to spread. The higher the histological grade, the more aggressive the cancer. The lower the histologic grade, the more the breast cancer cells look like regular, non-cancerous breast cells.

Grade of cancer is determined by looking at three different characteristics of a cancer sample under a microscope and giving them a score between one and three (note that these numbers are different to breast cancer stage numbers). These scores are then added together to give a grade. Although the guidelines on how to allocate these scores are clear, there can be a difference in interpretation of the histological appearance of the tissue specimen, allowing the potential to lead to differences in diagnostic grade proportions between pathologists and therefore laboratories within each DHB. International studies suggest that these differences can be significant (eg, van Dooijeweert et al 2020).

Histological grade is a key indicator for determining the use of adjuvant (post-surgery) chemotherapy for hormone receptor-positive[9] breast cancer, and it influences prognosis. Histologic grade together with size, nodal status and receptor status gives the best estimation of a patient's long-term outcome (Li et al 2018; American Joint Committee on Cancer 2018).

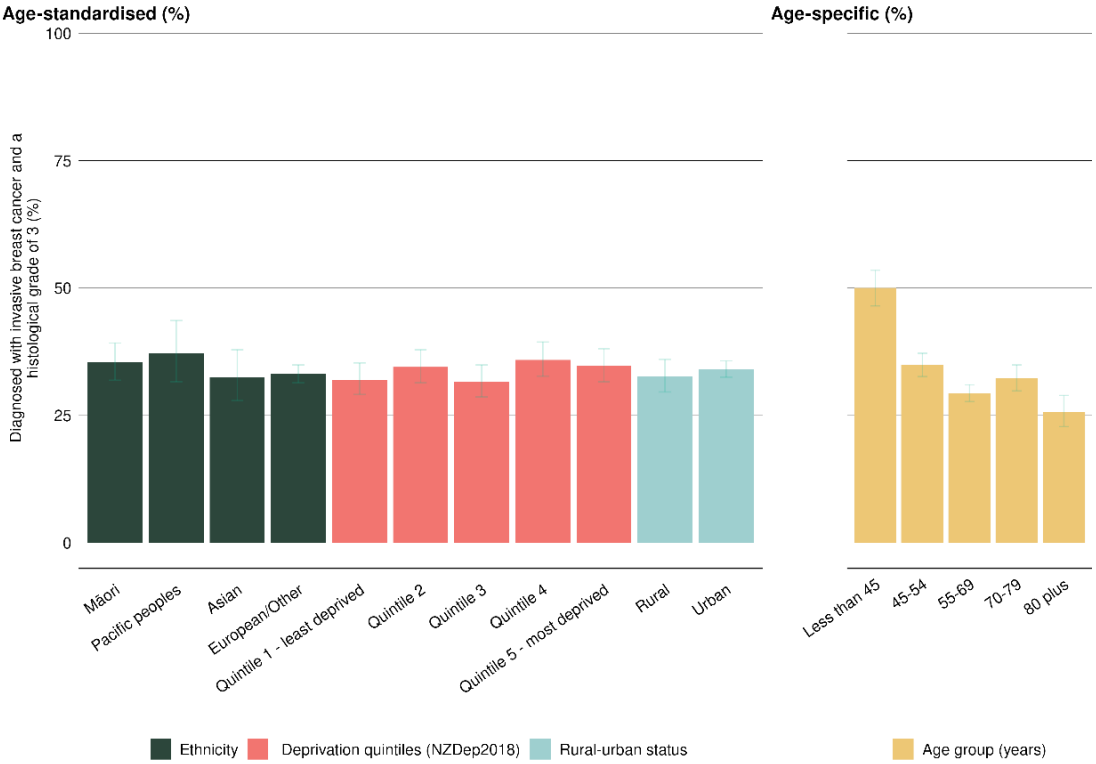
A histological grade of 1 or 2 is a strong positive predictive factor for good treatment outcomes, especially in cancers at an early stage of diagnosis. Māori and Pacific females with breast cancer are more likely to present with grade 2 or 3 invasive carcinoma (Breast Cancer Foundation New Zealand 2022).

The intent for this indicator is to report on the proportion of people with invasive breast cancer whose cancer had a histological grade of 3 to expose unwarranted variation between different demographic groups. This indicator also aims to raise awareness among pathologists about the variations occurring in tissue specimen grading, as many treatment options depend on the histological grade. For any patient, a single point variation in the overall score could determine whether adjuvant chemotherapy is recommended.

[9] Some breast cancer cells have receptors for the hormone's oestrogen or progesterone. These cells are hormone receptor-positive and need oestrogen or progesterone to grow.

Results

Figure 15: Proportion of people with invasive breast cancer and a histological grade of 3, by ethnicity, NZDep2018 quintile and rural–urban status (age-standardised), 2020–2021 (age-specific)



Of all invasive breast cancer diagnoses, 32.9% had a histological grading of 3. Of people aged less than 45 years old, 50.0% had breast cancer with a histological grade of 3.

Once adjusted for age, a grade 3 invasive breast cancer diagnosis was most common among those living in quintile 4 (35.9%). Pacific peoples had the highest proportion of grade 3 invasive breast cancer diagnoses (37.1%), followed by Māori (35.4%), European/other people (33.1%) and Asian people (32.5%).

Figure 16: Proportion of people with invasive breast cancer and a histological grade of 3, by district health board of residence, 2020–2021 (non-age-standardised)

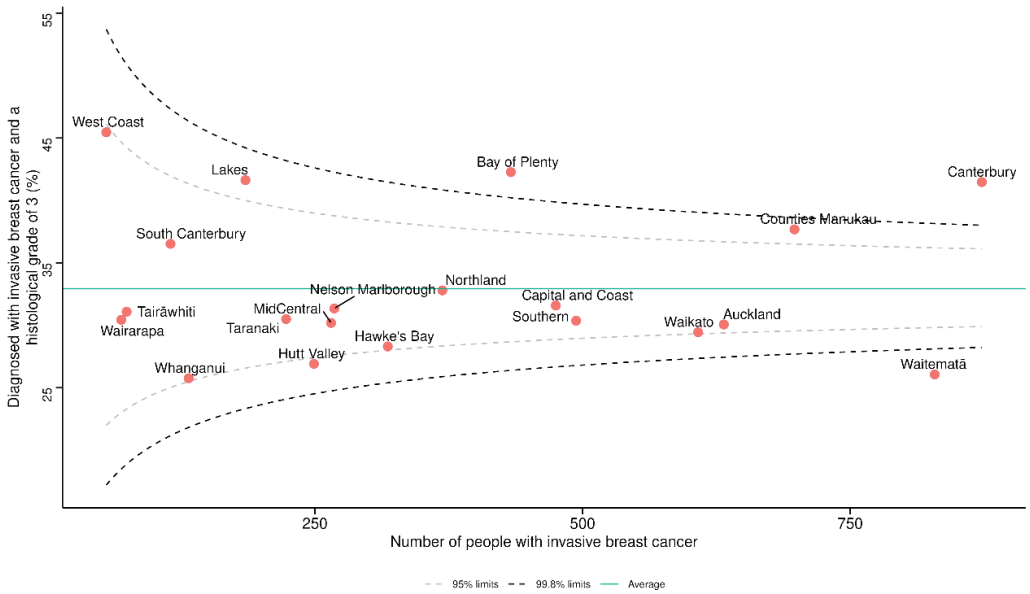


Figure 16 shows that two DHBs were above the upper 99.8% limit. Bay of Plenty and Canterbury DHBs had the highest proportion (42.3% and 41.5% respectively) of people diagnosed with grade 3 invasive breast cancer. Waitematā DHB was below the lower 99.8% limit: there, 26.1% of people were diagnosed with grade 3 invasive breast cancer.

Discussion

In New Zealand, during the time period of this analysis, 32.9% of invasive breast cancer diagnoses had a histological grading of 3. This finding is similar to a New Zealand study which found that between 2000 and 2013, 29.1% of breast cancers were grade 3 (Seneviratne et al 2016). Our results also appear comparable to an international research finding that approximately 33.4% of breast cancer cases were grade 3 (Engstrøm et al 2013).

As Figure 14 shows, a grade 3 invasive breast cancer diagnosis was most common among those aged less than 45 years. This is consistent with international evidence which indicates that people diagnosed with breast cancer at a younger age are more likely to have more aggressive tumours of a higher grade (Anders et al 2011; Figueiredo et al 2007).

We observed large variation between DHBs for people who received a diagnosis of breast cancer with a histological grade of 3. Variation between pathologists and laboratories is consistent with international literature (van Dooijeweert et al 2020). The grade of cancer is determined by looking at three different characteristics of the cancer sample under a microscope and giving them a score between one and three.

Although the guidelines on how to allocate these scores are clear, there can be a difference in interpretation of the histological appearance of the tissue specimen, allowing the potential to lead to differences in diagnostic grade proportions between pathologists and therefore laboratories within each DHB. With this indicator, we aim to raise awareness among pathologists about the variations occurring in tissue specimen grading, as many treatment options depend on histological grades. For any patient, a single point variation in the overall score could determine whether adjuvant chemotherapy is recommended. Additionally, the introduction of AI-assisted pathology has been shown to reduce inconsistencies in reporting and minimize errors (Shafi and Parwani 2023).

Māori and Pacific peoples had the highest proportion of grade 3 invasive breast cancers. Māori and those of Asian ethnicity were also less likely to receive chemotherapy than those of European/other ethnicity for triple-negative and HER2-positive invasive breast cancers (as the findings highlight in QPI 11).

As histological grade is a key indicator for determining the use of adjuvant (post-surgery) chemotherapy, it is worth investigating whether Māori and those of Asian ethnicity, with invasive grade 3 breast cancer are being offered appropriate treatment options such as chemotherapy.

QPI 5: Breast-conserving surgery

Indicator description

Proportion of females with breast cancer (invasive and/or DCIS) who undergo breast-conserving surgery (BCS).

Context

BCS is a less invasive and less major surgery than a mastectomy (especially when the mastectomy is followed by reconstruction, either at the time or subsequently). BCS is associated with fewer surgical complications, less morbidity and faster recovery than a mastectomy with or without reconstruction (EBCTCG 2005).

In addition, BCS has shorter operating times and subsequent radiation therapy has less of an impact on surrounding tissue than it does following a mastectomy with or without reconstruction.

Breast cancer patients who have had BCS have better self-reported body image and psychosocial scores compared with those who had a total mastectomy (Al-Ghazal et al 2000; Hanson et al 2022; Kim et al 2015; Ng et al 2019).

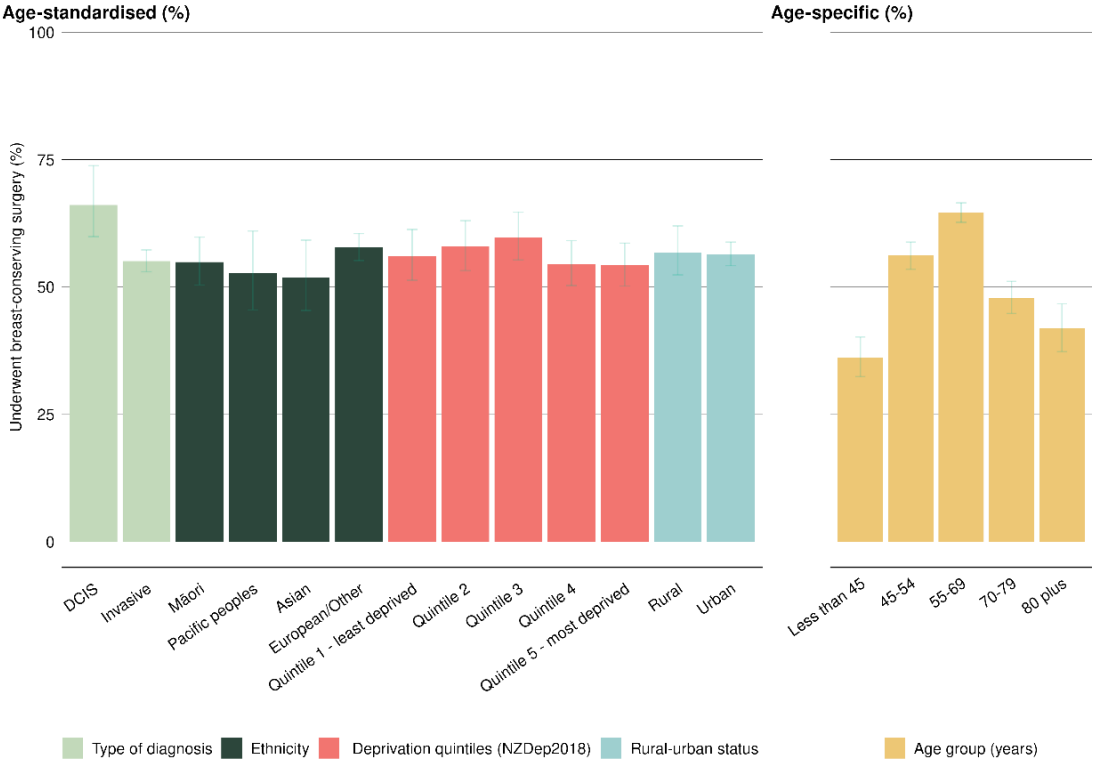
A study by Hanson et al (2022) found that after 10 years, people who had BCS reported better emotional and social outcomes compared to those who had a mastectomy and reconstruction. However, this didn't lead to feelings of regret about their surgery choices, satisfaction with their breasts, or their physical well-being.

Randomised controlled trials of BCS and radiotherapy compared with mastectomy showed no difference in long-term survival outcomes, though local recurrence rates were higher with BCS (EBCTCG 2005).

The purpose of this indicator is to report on the proportion of females with breast cancer who underwent BCS as a mechanism to expose unwarranted variation. While BCS is not always possible for, or chosen by, people with breast cancer, eligible people should be able to consider and receive it.

Results

Figure 17: Proportion of females with breast cancer (invasive and/or ductal carcinoma in situ) whose final breast operation was breast-conserving surgery, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



DCIS = ductal carcinoma in situ

In 2020 and 2021, 5,758 females (55.3%) who received breast cancer surgery underwent BCS. Of those females, 66.8% had DCIS and 53.7% had invasive breast cancer.[10]

BCS was most common for those aged between 55 and 69 (64.6%) and least common for those aged less than 45 years of age (36.2%).

After adjusting for age, BCS rates were lowest among those of Asian ethnicity (51.8%) and those living in the most deprived areas (54.5% in quintile 4 and 54.3% in quintile 5).

[10] For this QPI, both DCIS and invasive breast cancer are included, so the results are a combination of the two. Care should be taken when interpreting these results, as they will not give accurate representations of BCS rates for invasive breast cancers alone.

Figure 18: Proportion of females with breast cancer (invasive and/or ductal carcinoma in situ) whose final breast operation was breast-conserving surgery, by district health board of residence, 2020–2021 (non-age-standardised)

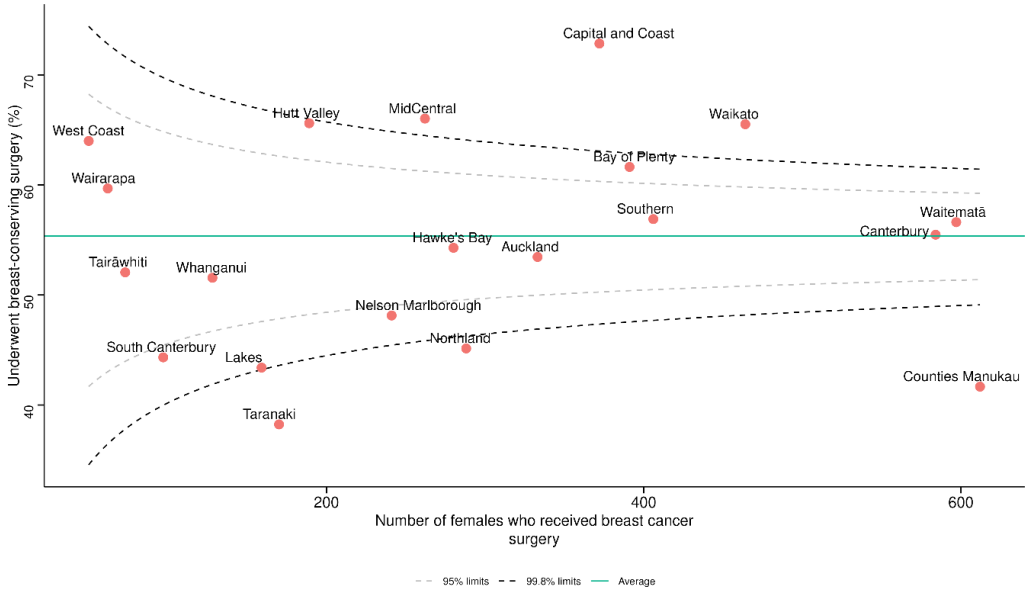


Figure 18 makes a comparison between DHBs and shows a large amount of variation.

Three DHBs were above the upper 99.8% limit (Capital & Coast, MidCentral and Waikato), indicating that a higher proportion of females underwent BCS in these areas. Three were below the lower 99.8% limit (Counties Manukau, Northland and Taranaki), where 41.7%, 45.1% and 38.2% of females respectively underwent BCS.

Discussion

Our results show variation in the proportion of females who received BCS in many of the categories analysed in New Zealand in 2020–2021.

BCS was most common for those aged between 55 and 69 years of age. Once adjusted for age, those of Asian ethnicity and Pacific peoples were less likely to receive BCS compared to Māori and those of European/other ethnicity.

Clinical guidance suggests that radiation therapy should be used to complement BCS. Therefore, some regional variation is likely attributable to the need to travel to other centres for radiation therapy ahead of or following the surgery. (For example, Taranaki residents need to travel to Palmerston North to access radiation services.)

More females living in rural areas received breast-conserving surgery compared to those in urban areas. This finding contrasts with published literature, which generally reports lower rates of breast-conserving surgery among rural populations (Davis et al 2024; Gilligan et al 2002).

The data shows that the proportion of females living in higher socioeconomic areas who received BCS was greater than it was for those who lived in lower socioeconomic areas. This finding is consistent with published literature which suggests that lower socioeconomic areas are less likely to have radiation treatment facilities, leading to a decrease in people opting for BCS (Gu et al 2018).

QPI 6: Immediate reconstruction at the time of mastectomy

Indicator description

Proportion of females receiving breast reconstruction at the same time as a mastectomy.

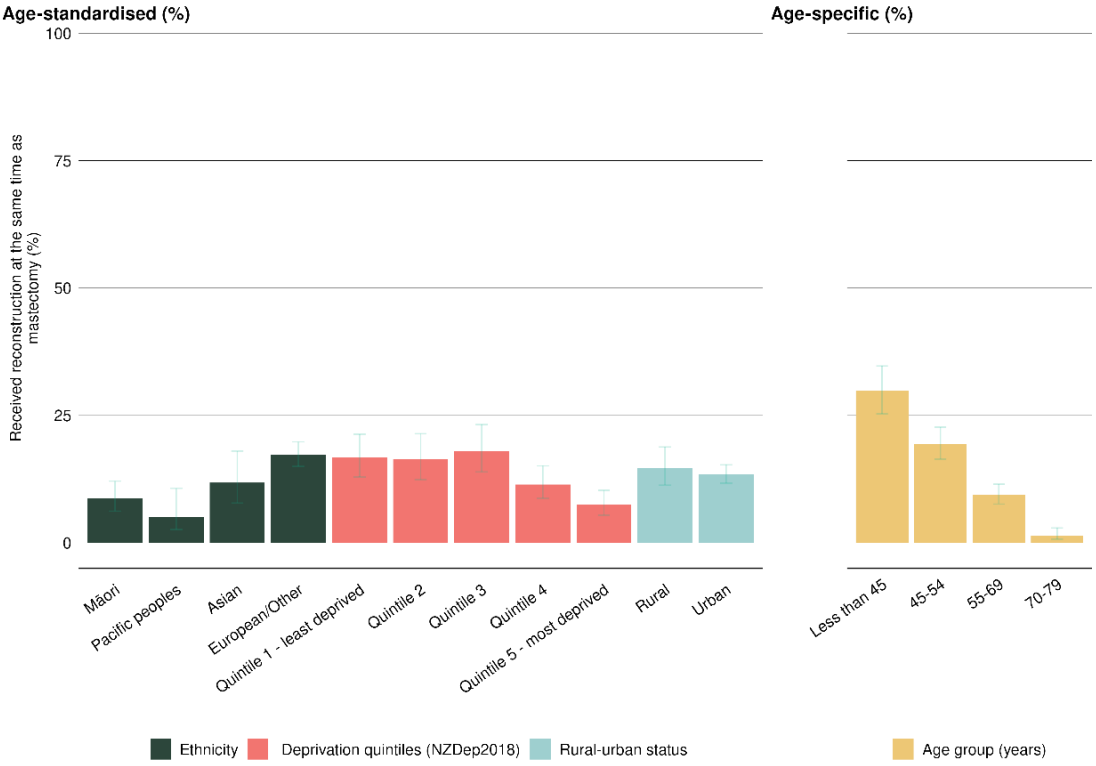
Context

For those who choose to, opting for immediate breast reconstruction following a mastectomy offers several advantages. First, it reduces the requirement for a second breast surgery; a second surgery increases the risk of complications and prolongs recovery, and in some instances will be a barrier to a person choosing to have reconstruction. Second, there is evidence that immediate reconstruction provides psychosocial benefits, including enhanced self-confidence, positive body image and less depression (Chen et al 2018; Twaddle and Qureshi 2005).

Given that immediate reconstruction is not always chosen or clinically recommended, the ideal proportion of people receiving reconstruction at the same time as a mastectomy will never be 100%. Ideally, the proportion should reflect the number of people who would like breast reconstruction immediately following surgery and for whom it is clinically appropriate – 100% of people in those circumstances should receive immediate breast reconstruction.

Results

Figure 19: Proportion of females receiving reconstruction at the same time as a mastectomy, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



In 2020 and 2021, 12.2% of females who were diagnosed with breast cancer received immediate reconstruction at the time of their mastectomy.

It was more common to receive immediate reconstruction at the time of mastectomy among those under 45 years of age than it was among those aged 55 and over (29.8% and 10.8% respectively).

Once adjusted for age, those of European/other ethnicity were more likely to receive immediate reconstruction at the time of mastectomy (17.3%) than those of Asian ethnicity (11.8%), Māori (8.7%) or Pacific peoples (5.1%).

Those living in quintile 3 (18.0%) were more likely to receive immediate reconstruction at the time of mastectomy compared to those living in the least deprived areas (11.4% in quintile 4 and 7.5% in quintile 5).

Figure 20: Proportion of females receiving reconstruction at the same time as a mastectomy, by district health board of residence, 2020–2021 (non-age-standardised)

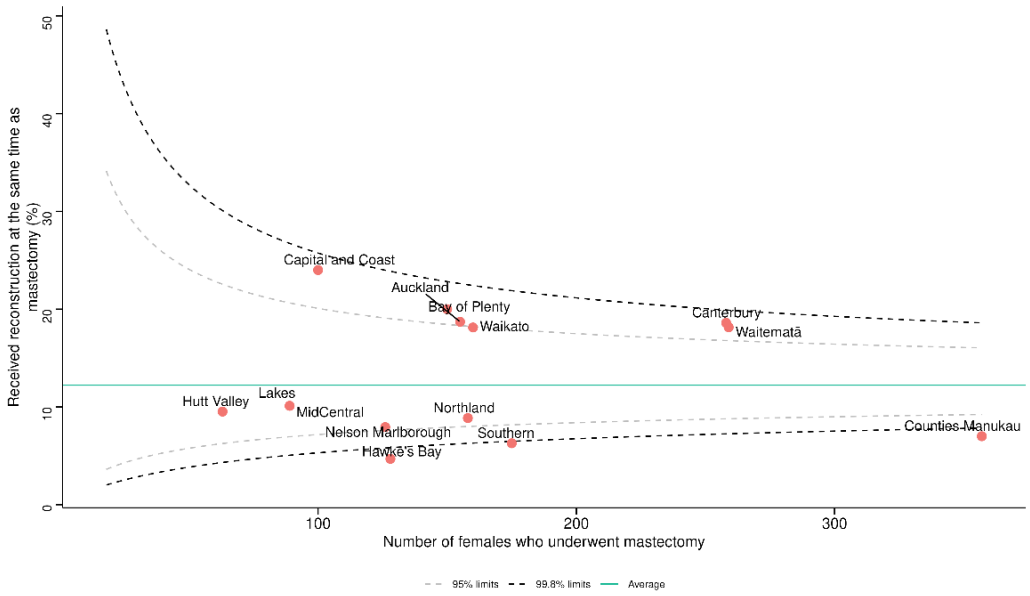


Figure 20 shows that no DHBs were above the upper 99.8% limit for this QPI. Capital & Coast DHB had the highest proportion: there, 24.0% of females received immediate reconstruction at the same time as a mastectomy. Three DHBs (Counties Manukau, Southern and Hawke's Bay) were below the lower 99.8% limit.

Discussion

Once adjusted for age, the proportion of females who received immediate reconstruction at the time of mastectomy was the highest for those of European/other ethnicity. This is consistent with published literature (Breast Cancer Foundation New Zealand 2022; Campbell et al 2018).

Patient choice is one possible reason for this. However, breast clinicians apply eligibility criteria for immediate reconstruction that consider comorbidities such as smoking and body mass index. These eligibility criteria disproportionally affect Māori and Pacific peoples, among whom rates of comorbidity and smoking, for example, are higher (Ministry of Health 2021).

Females under 45 years of age were more likely to receive immediate reconstruction at the time of mastectomy than those over the age of 55. This is consistent with international literature. It could be due to increasing risk of comorbidities with age, the use of increased age as a proxy for fitness, or a broader tendency for clinicians to offer fewer treatments to older patients (Jeevan et al 2012; Doherty et al 2020).

Public breast clinics across New Zealand do not currently follow a consistent process to determine access to breast reconstruction following cancer surgery. Results for this indicator may be reflective of this, revealing variation between all measures that we looked at (ethnicity, deprivation, age etc) and across DHBs.

Access to breast reconstruction following a mastectomy is an important quality-of-care measure for patients with breast cancer (Murphy and El-Tamer 2013). Fewer Māori and Pacific peoples receive this type of surgery compared with people of European/other ethnicity. In addition to patient choice, it would be important to investigate the factors that could be associated with this observed variation.

QPI 11: Chemotherapy with or without trastuzumab

Indicator description

Proportion of patients:

A. with triple-negative[11] stage I–III breast cancer with a tumour >1 cm or node-positive who received chemotherapy
B. with human epidermal growth factor receptor 2 (HER2)-positive stage I–III breast cancer with a tumour >1 cm or node-positive who receive chemotherapy and trastuzumab.

Context

Trastuzumab is a type of targeted cancer medication specifically used to treat HER2-positive breast cancer. It is sold under the brand name Herceptin.

Chemotherapy without trastuzumab can provide benefit to people diagnosed with triple-negative stage I–III breast cancer in different contexts. Chemotherapy with trastuzumab can provide benefit to those diagnosed with HER2-postive stage I–III breast cancer in different contexts. Some people are not recommended to undergo chemotherapy at all due to comorbidities or poor performance status. Some people with early-stage disease do not require systemic treatment.

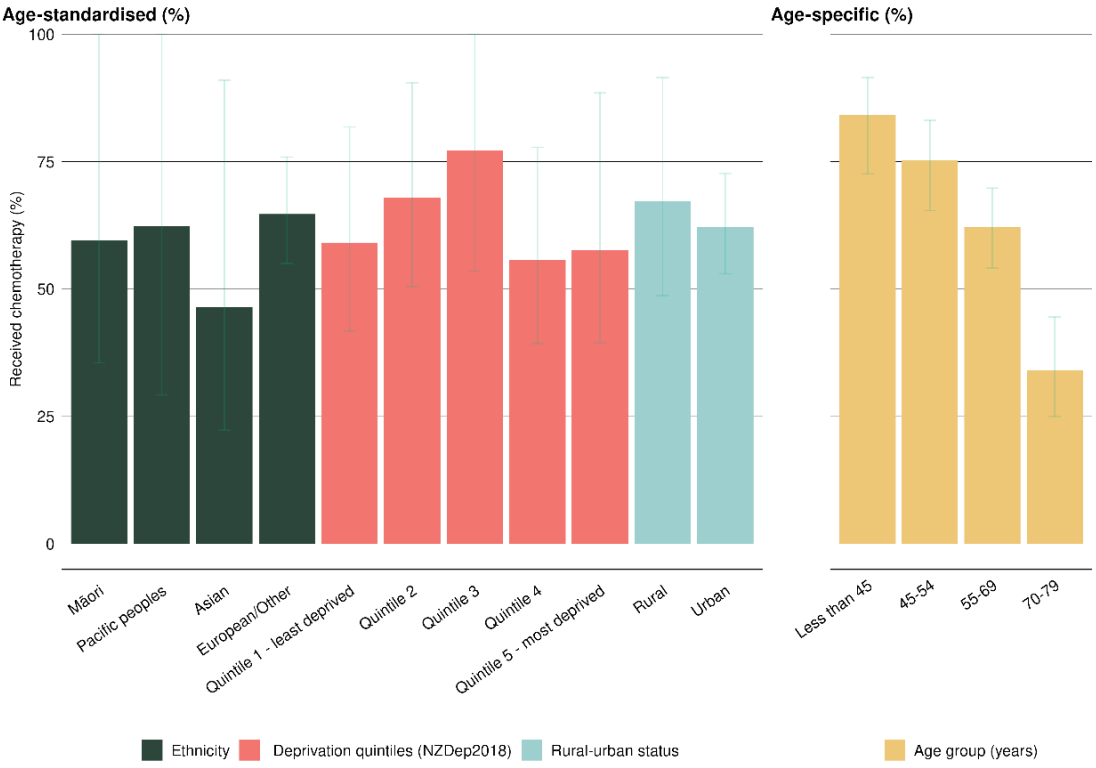
Chemotherapy with or without trastuzumab (depending on the receptor status of the tumour) adds to cure rates and improves health outcomes for people whose cancers are amenable to surgical resection.

Identifying variation in this indicator will reflect a need for a quality improvement initiative that aims to ensure all people with HER2-positive or triple-negative stage I–III breast cancer are offered chemotherapy, if appropriate, with or without trastuzumab.

[11] An aggressive kind of breast cancer that does not express any oestrogen, progesterone or HER2 receptors.

Results: Triple-negative stage I–III breast cancer

Figure 21: Proportion of people with triple-negative stage I–III breast cancer with a tumour >1 cm or node-positive who received chemotherapy, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



Between 2020 and 2021, 56.1% of people with triple-negative stage I–III breast cancer received chemotherapy. Figure 20 shows that 84.2% of people with triple-negative stage I–III breast cancer under the age of 45 years received chemotherapy, compared to 34.1% of those aged 70–79.

Once adjusted for age, those who lived in the most deprived areas were less likely (55.7% in quintile 4 and 57.6% in quintile 5) to receive chemotherapy than those who lived in quintile 3 (77.2%).

Those of European/other ethnicity were more likely to receive chemotherapy than people of any other ethnicity (64.7%). Low numbers of people of Pacific and Asian ethnicity mean that caution should be taken when interpreting these results.

Figure 22: Proportion of people with triple-negative stage I–III breast cancer with a tumour >1 cm or node-positive who received chemotherapy, by district health board of residence, 2020–2021 (non-age-standardised)

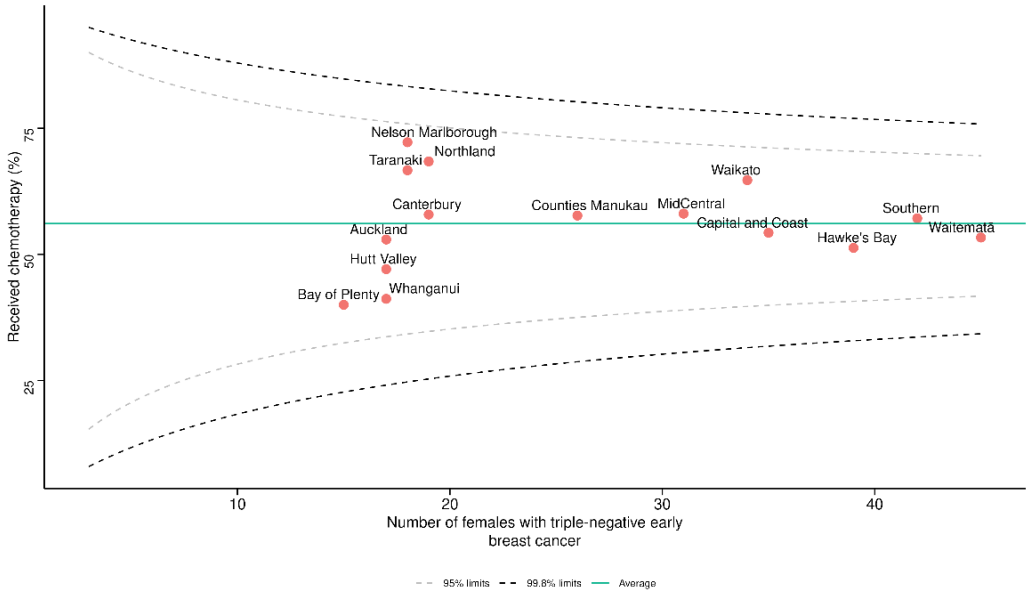
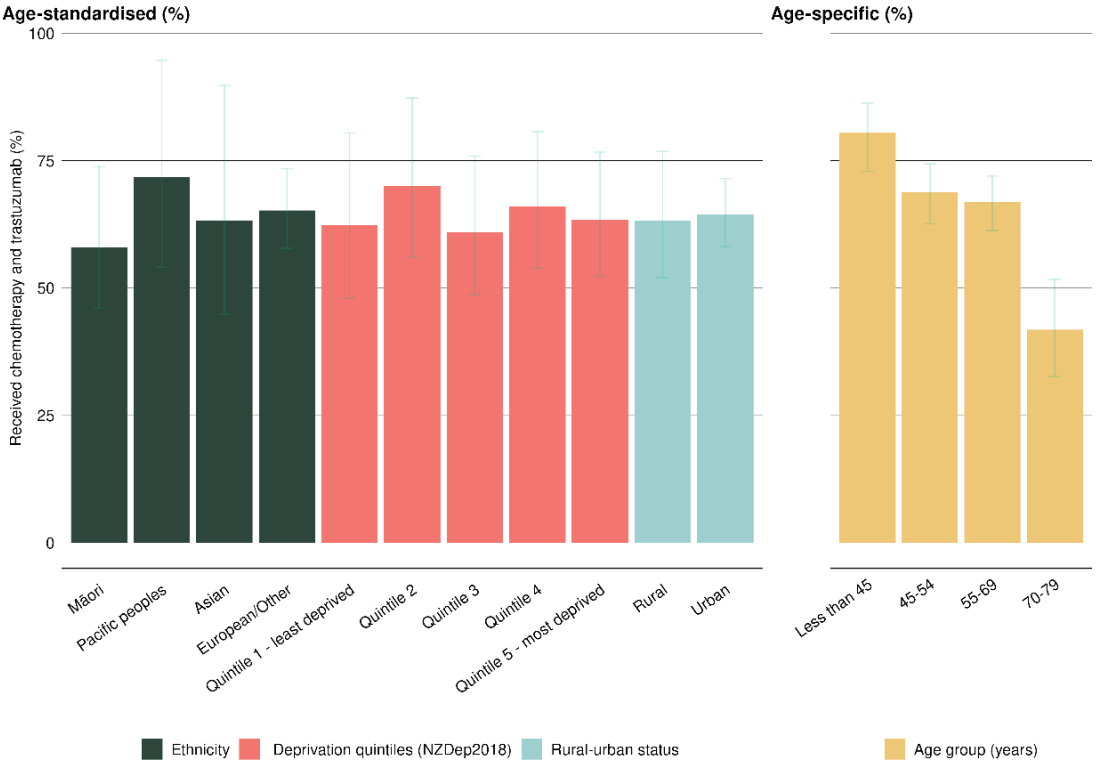


Figure 22's comparison between DHBs indicates that although there was some regional variation in the proportion of breast cancer patients who received chemotherapy, there were no DHBs that were above or below the 99.8% limits. The lowest proportion was at Bay of Plenty DHB, where 40.0% received chemotherapy. The highest proportion was at Nelson Marlborough DHB, where 72.2% received chemotherapy.

Results: HER2-positive stage I–III breast cancer

Figure 23: Proportion of people with HER2-positive stage I–III breast cancer with a tumour >1 cm or node-positive who received chemotherapy and trastuzumab, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



Between 2020 and 2021, 63.1% of people with HER2-positive stage I–III breast cancer received chemotherapy and trastuzumab. Figure 22 shows that 80.5% of people under the age of 45 years received chemotherapy and trastuzumab, compared to 41.8% of those aged 70–79.

Once adjusted for age, Māori were less likely (58.0%) to receive chemotherapy and trastuzumab than those of Asian (63.3%) or European/other (65.2%) ethnicity and Pacific peoples (71.8%).

Figure 24: Proportion of people with HER2-positive stage I–III breast cancer with a tumour >1 cm or node-positive who received chemotherapy and trastuzumab, by district health board of residence, 2020–2021 (non-age-standardised)

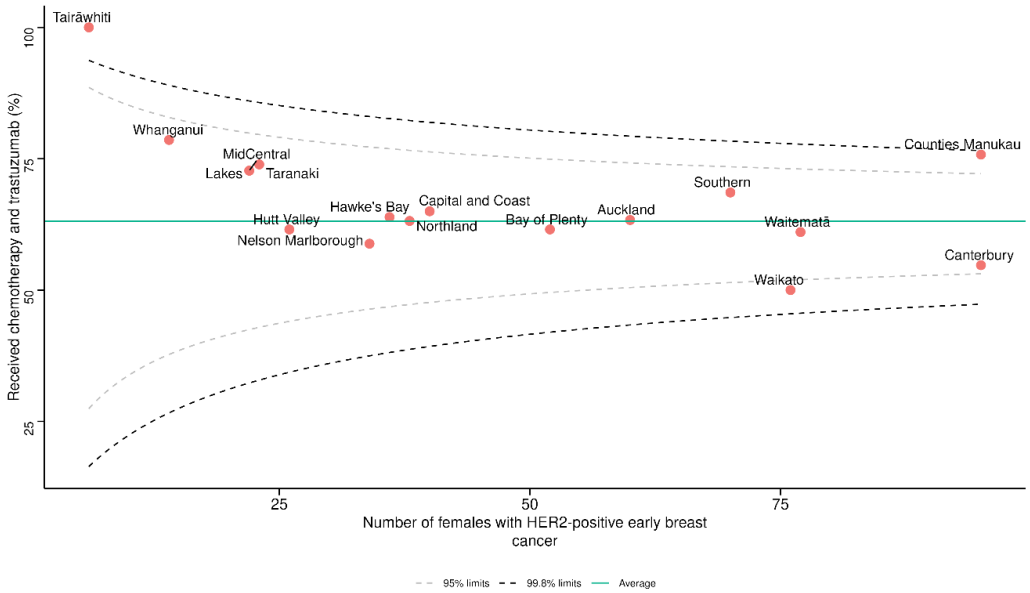


Figure 24 shows that two DHBs were above the 95% upper limit and 75.8% of people living in Counties Manukau DHB received chemotherapy and trastuzumab. Due to small numbers, care should be taken when interpreting the proportion for Tairāwhiti DHB. Waikato DHB was below the lower 95% limit; there, 50% of females with HER2-postive stage I–III breast cancer received chemotherapy and trastuzumab.

Discussion

In 2020–2021, 56.1% of people with triple-negative stage I–III breast cancer received chemotherapy, and 63.1% of people with HER2-positive stage I–III breast cancer received chemotherapy and trastuzumab.

A higher proportion of people under 45 years of age with triple-negative or HER2-positive stage I–III breast cancer received chemotherapy than the proportion among those aged 70–79. International literature supports these findings. Older patients with cancer are less likely to receive more invasive treatments such as chemotherapy, due to factors such as increased frailty and comorbidities and less biologically aggressive cancers (Craigs et al 2018; Kreling et al 2006; Trapani 2023).

Clinicians consider additional factors such as oestrogen and/or progesterone status and tumour grade when making a recommendation about adjuvant chemotherapy plus trastuzumab; this can lead to variation in practice between regions. Particularly for the smaller (<2 cm) HER2-positive, hormone receptor-positive, node-negative breast cancers, clinicians carefully weigh the benefit of adjuvant chemotherapy and trastuzumab against the potential harm from treatment.

Patients with smaller HER2-positive stage I–III breast cancer that are also hormone receptor-positive have a more favourable prognosis than those with hormone receptor-negative HER2-positive breast cancer. These patients may also be offered endocrine therapy as an alternative to chemotherapy and trastuzumab in some regions, based on the UK National Health Service's 'Predict' estimates (National Health Service 2024b). Whilst this is not widely accepted international practice, it could account for some of the regional variation found (Loibl et al 2024).

It could be useful for regions with lower rates of chemotherapy delivery for stage I–III HER2-positive breast cancer to compare their processes with centres with higher rates.

QPI 13: Neoadjuvant chemotherapy

Indicator description

Proportion of people with stage II or III breast cancer who are either triple-negative or HER2-positive and receive neoadjuvant chemotherapy, including neoadjuvant trastuzumab.

Context

Neoadjuvant chemotherapy is chemotherapy administered prior to surgery to reduce the size of a tumour. People with HER2-positive and triple-negative breast cancer have the best responses to neoadjuvant chemotherapy; pathologic complete responses range from 30% to 60% (Cortazar et al 2014).

Neoadjuvant chemotherapy can improve a person's treatment response, increasing their chance of a successful surgery and their treatment options following surgery (Korde et al 2021). As a result, neoadjuvant therapy can significantly improve overall survival and reduce the likelihood of disease spread.

For those breast cancer patients for whom it is appropriate, neoadjuvant chemotherapy is an important aspect of treatment. Variation in its use should not be due to age, ethnicity, deprivation or geographic location.

Results

Figure 25: Proportion of people with stage II or III breast cancer who were either triple-negative or HER2-positive and received neoadjuvant chemotherapy, including neoadjuvant trastuzumab, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021

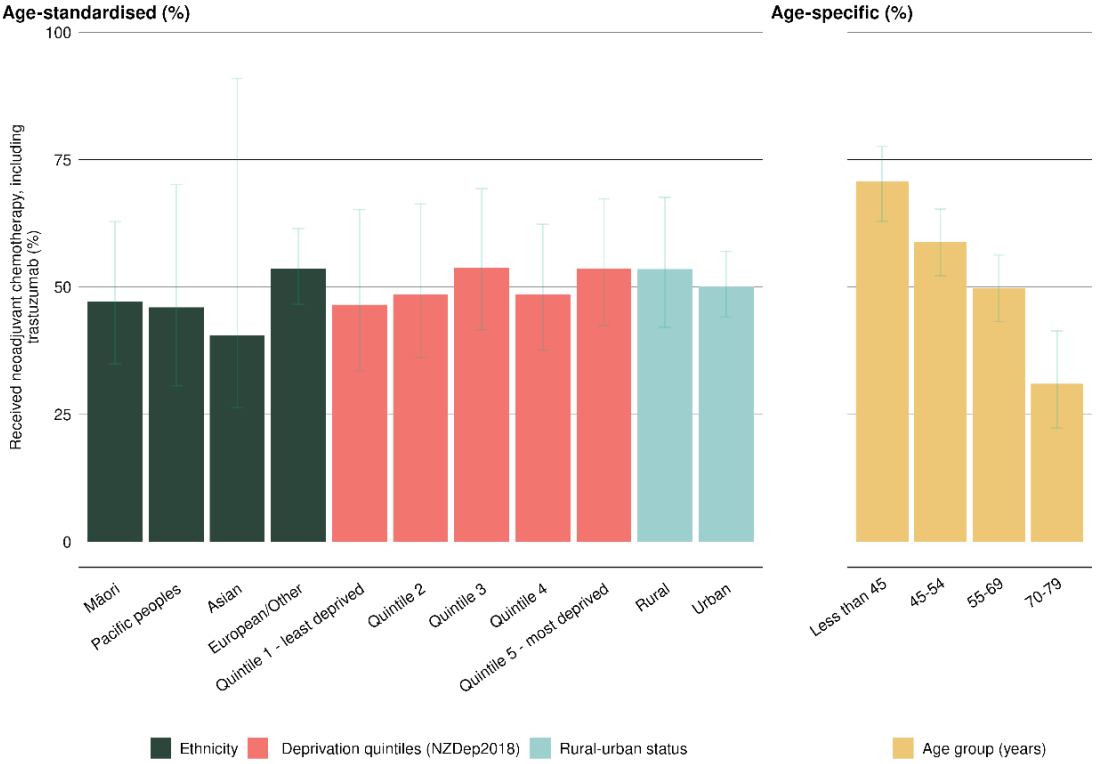


Figure 25 shows that 70.8% of people under the age of 45 years received neoadjuvant chemotherapy, compared to 31.0% of people aged 70–79.

Once adjusted for age, those of Asian ethnicity were less likely (40.5%) than those of any other ethnicity to receive neoadjuvant chemotherapy. People that lived in the least deprived areas (quintile 1) were less likely (46.5%) to receive chemotherapy than those living in any other deprivation quintile. Those that lived rurally were more likely to receive neoadjuvant chemotherapy than those who lived in urban areas.

Figure 26: Proportion of people with stage II or III breast cancer who were either triple-negative or HER2-positive and received neoadjuvant chemotherapy, including neoadjuvant trastuzumab, by district health board of residence, 2020–2021 (non-age-standardised)

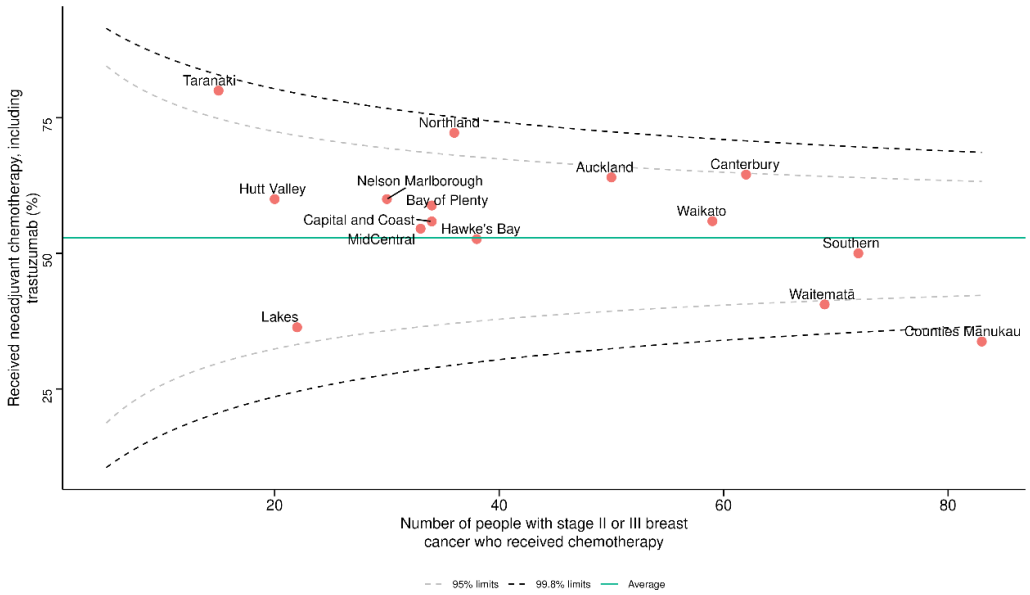


Figure 26 shows that no DHBs were above the upper 99.8% limit. In comparison, Waitematā and Counties Manukau DHBs were below the lower 99.8% limit (40.6% and 33.7% respectively).

Discussion

Younger people were more likely to receive neoadjuvant chemotherapy, compared to those in older age groups. This is consistent with international literature that has found that younger females have a higher proportion of biologically aggressive breast cancer (Biganzoli et al 2021).

Neoadjuvant chemotherapy is considered less often in older patents due to comorbidities and toxicity concerns related to treatment such as risk of infection, bleeding, anaemia, diarrhoea, acute kidney injury and cardiotoxicity (Hoffmann et al 2023).

Comparing age-adjusted figures, Pacific peoples and Māori were less likely to receive neoadjuvant chemotherapy than those who identified as Asian or European/other. This may in part be due to a higher likelihood of comorbidities in Pacific peoples and Māori (Tin Tin et al 2018).

Nevertheless, our data also shows that Māori and Pacific peoples are more likely to present with later stages of breast cancer than European/other ethnicities; accordingly, Māori and Pacific peoples should be offered more neoadjuvant chemotherapy. Further investigation into the reason for the lower rates of neoadjuvant chemotherapy in these ethnicities is needed, so that we can better understand how to reduce this inequity.

We found variation between DHBs for this QPI: 33.7% of people in Counties Manukau DHB received neoadjuvant chemotherapy, compared to 64.0% in Auckland DHB. Although geographically close, the ethnic diversity of these two regions is different. These results warrant further investigation, especially given the concerns regarding inequity for Māori and Pacific peoples with breast cancer in the Auckland region.

QPI 14: Adjuvant endocrine therapy adherence

Indicator description

Proportion of females with endocrine-sensitive stage I–III breast cancer who complete two years of endocrine therapy (after their first script is dispensed).

Measure: proportion still being dispensed[12] endocrine therapy at:

A. six months
B. 12 months
C. 24 months.

Context

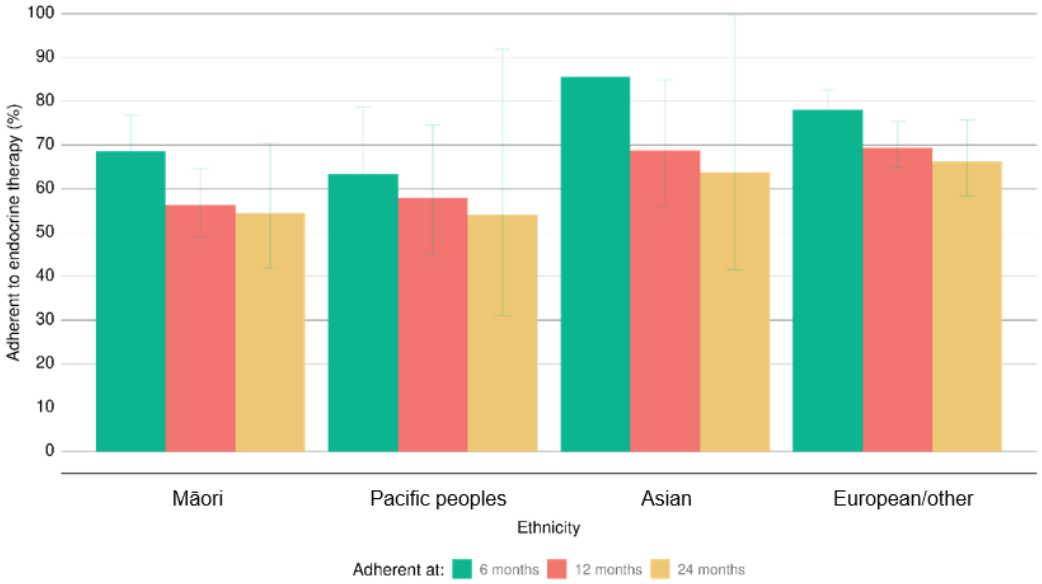
Adjuvant endocrine therapy significantly decreases the risk of breast cancer recurrence and increases the likelihood of long-term survival of people with endocrine-sensitive stage I–III breast cancer (EBCTCG 2005). The benefit of taking adjuvant endocrine therapy, which is primarily a community-dispensed tablet or injection, increases with time on therapy (EBCTCG 1998). Long-term adherence to adjuvant endocrine therapy is therefore a key part of treatment success.

Everyone who receives adjuvant endocrine therapy should continue to receive it for five years. Identifying differences in adherence will allow us to develop targeted quality improvements that aim to reduce inequities.

[12] Due to data limitations, adherence was measured using prescription dispensed date as a proxy measure.

Results: Overall

Figure 27: Proportion of females with endocrine-sensitive stage I–III breast cancer who completed up to two years of adjuvant endocrine therapy, 2020–2021 (non-age-standardised)



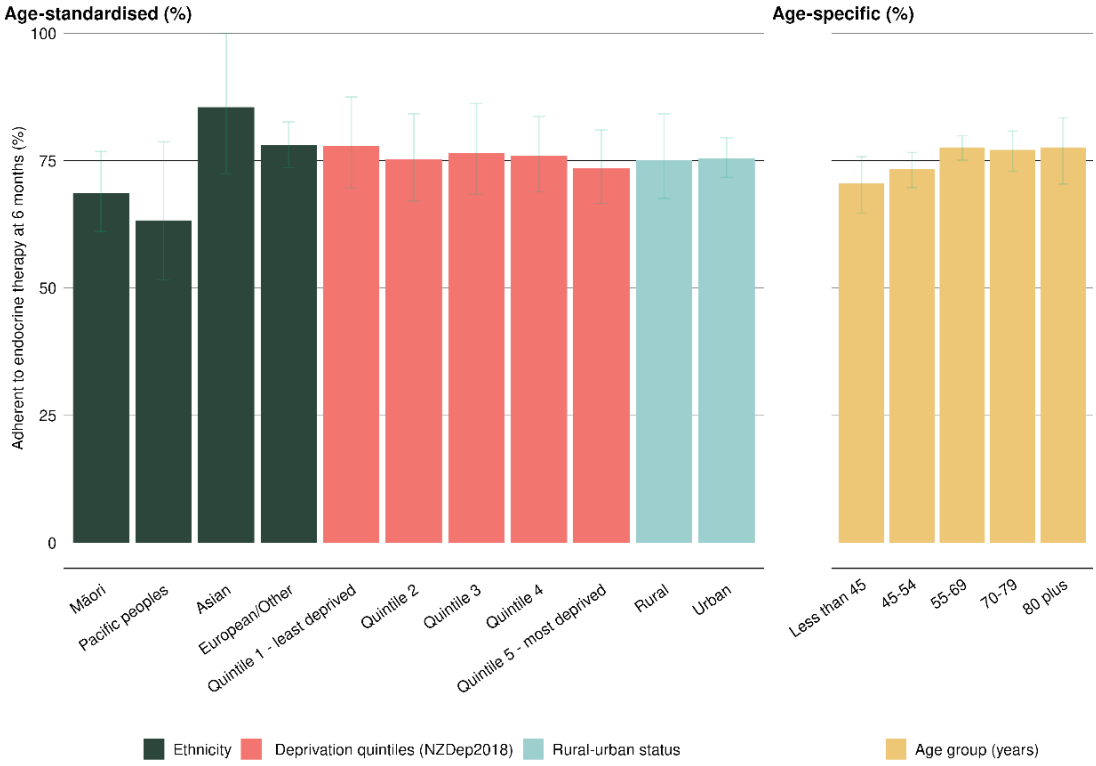
At six months after first being dispensed endocrine therapy, Pacific peoples and Māori and were much less likely (63% and 69% respectively) than females of European/other or Asian ethnicity to still be receiving it (78% and 86% respectively).

At 12 months, 56% of Māori and 58% of Pacific peoples continued to receive adjuvant endocrine therapy. These are lower proportions than those for European/other or Asian ethnicity (both at 69%).

The pattern continued at 24 months. Pacific peoples and Māori were less likely to be receiving endocrine therapy at 24 months (both at 54%) than those of Asian and European/other ethnicity (64% and 66% respectively).

Results: Adherence at six months

Figure 28: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at six months, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



We found that 75.8% of females initially dispensed endocrine therapy were still receiving it at six months. Among females under the age of 45 years old, 70.5% were still receiving it at six months, compared with 77.6% of those over the age of 80 years (77.6%).

Once adjusted for age, Pacific peoples and Māori were much less likely (63.3% and 68.6% respectively) than females of European/other or Asian ethnicity (78.0% and 85.5% respectively) to still be receiving endocrine therapy at six months.

Figure 29: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at six months, by district health board of residence, 2020–2021 (non-age-standardised)

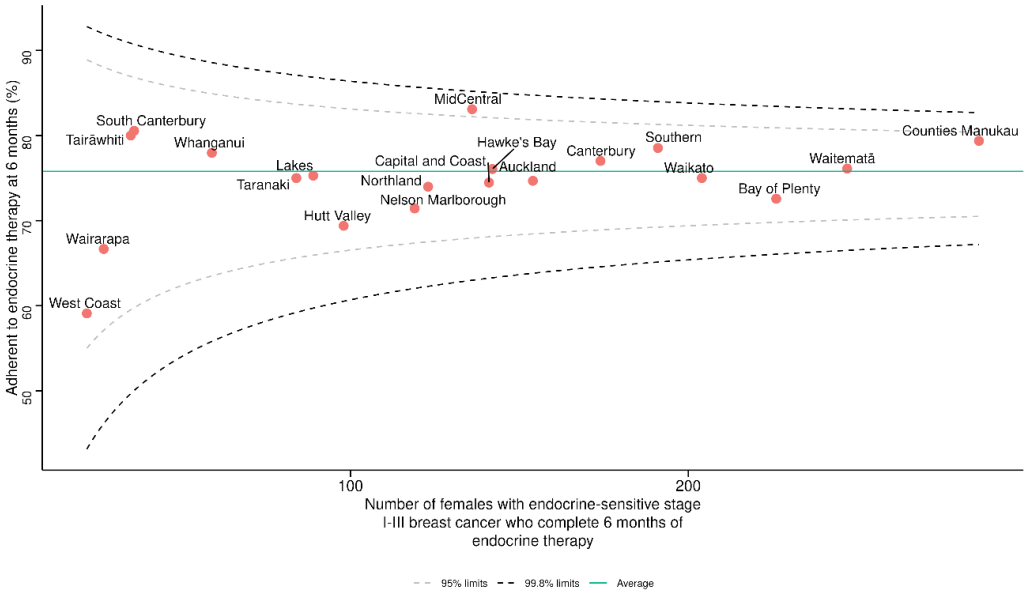
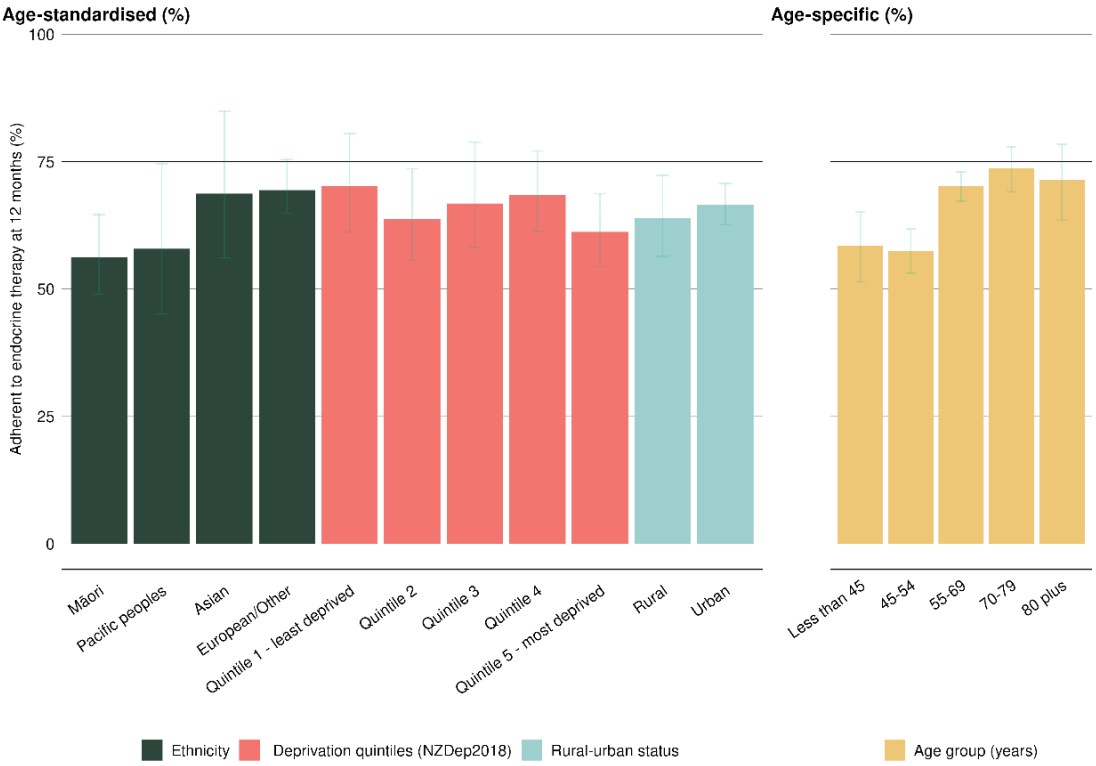


Figure 29 shows that no DHBs were above or below the upper or lower 99.8% limits, although MidCentral DHB had a slightly higher proportion for this QPI (83.1%).

Results: Adherence at 12 months

Figure 30: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at 12 months, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



We found that 67.0% of females were still receiving endocrine therapy after 12 months. Age was a factor: those aged 45–54 were less likely (57.5%) to be receiving endocrine therapy at 12 months than those aged 55–69, 70–79 years or older than 80 (70.2%, 73.7% and 71.5% respectively).

After adjusting for age, 56.3% of Māori continued to receive adjuvant endocrine therapy at 12 months. This is lower than the equivalent proportion for Pacific peoples and people of European/other or Asian ethnicity (57.9%, 69.4% and 68.7% respectively).

Those living in urban areas were more likely to still be receiving endocrine therapy at 12 months than those living in rural areas (66.5% and 63.9% respectively).

Figure 31: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at 12 months, by district health board of residence, 2020–2021 (non-age-standardised)

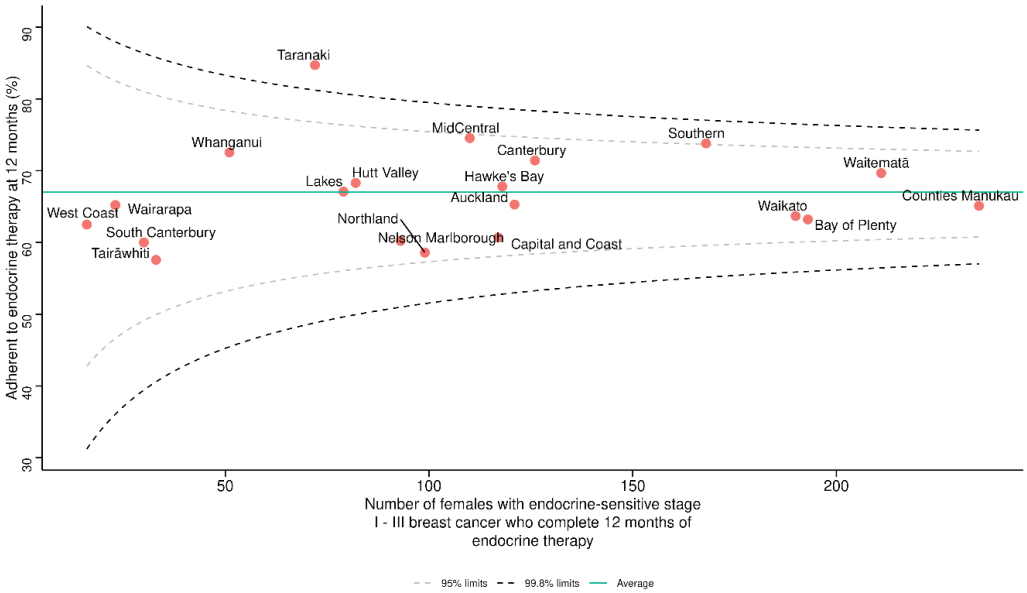
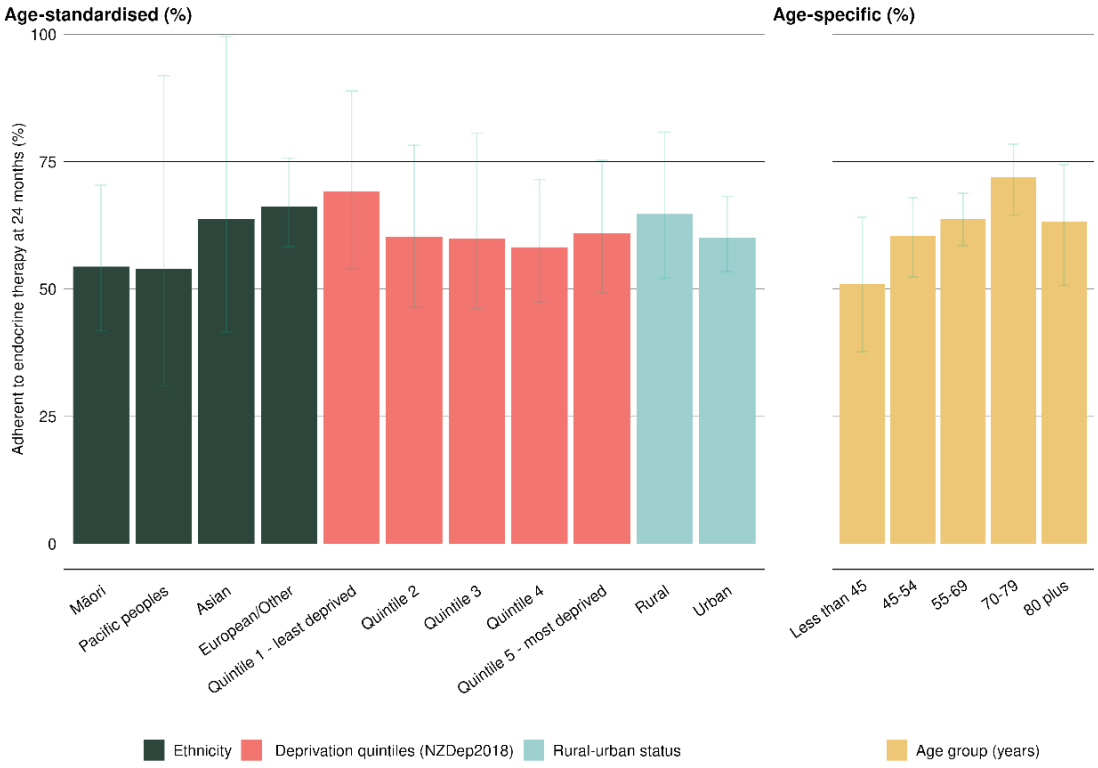


Figure 31 shows that no DHBs were below the lower 95% limit. Taranaki DHB was above the upper 95% limit: there, 84.7% of females continued to receive endocrine therapy at 12 months.

Results: Adherence at 24 months

Figure 32: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at 24 months, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



We found that 63.9% of females were continuing to receive endocrine therapy after 24 months.[13] Age continued to be a factor: females less than 45 years old and aged 45–54 were less likely (51.0% and 60.4% respectively) to receive endocrine therapy at 24 months than those aged 55–69, 70–79 and older than 80 (63.8%, 72.0% and 63.3% respectively).

Once adjusted for age, Pacific peoples and Māori were less likely to be receiving endocrine therapy at 24 months (54.0% and 54.4% respectively) than those of Asian and European/other ethnicity (63.8% and 66.2% respectively). Females living in rural areas were more likely to be receiving endocrine therapy after 24 months than those living in urban areas (64.7% and 60.0% respectively).

[13] Patient numbers for this timepoint are smaller due to insufficient follow-up time.

Figure 33: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at 24 months, by district health board of residence, 2020–2021 (non-age-standardised)

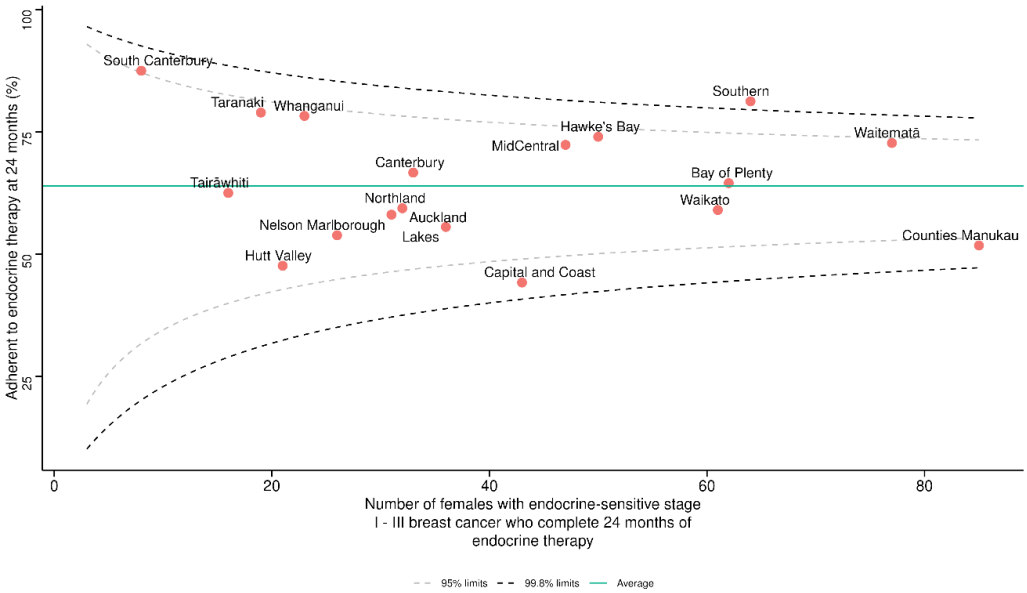


Figure 33 shows that Counties Manukau and Capital & Coast DHBs were below the lower 95% limit: there, 51.8% and 44.2% of females respectively were still receiving endocrine therapy after 24 months. Southern DHB was above the upper 99.8% limit: the equivalent figure there was 87.5%.

Discussion

For this indicator, the terms adherence and dispensing are used interchangeably. Adherence describes when a person is taking a medication as prescribed. Due to data limitations, adherence itself is not captured in this indicator. However, the date when a person's medication was dispensed by a pharmacist is captured; we have used this as a proxy for adherence. For example, if a pharmacist regularly dispenses a person's medication, an assumption is made that they are likely following their treatment plan, and therefore are adherent.

We found that overall adherence to endocrine therapy in 2020–2021 decreased over time. Overall adherence at six, 12 and 24 months was 75.8%, 67% and 63.9% respectively. These rates are lower than those in most published literature in the international context. A systematic review of adherence to adjuvant endocrine therapy published in 2022 including 26 studies reported a mean five-year adherence rate of 66.2% (Yussof et al 2022).

Tamoxifen and aromatase inhibitors are types of endocrine therapy. An earlier systematic review including 29 studies published in 2012 found that 15–20% of females stopped tamoxifen in the first year of therapy, and 5–25% stopped aromatase inhibitors during the first two years (Murphy et al 2012). Discontinuation rates at five years ranged from 31% to 73% (Murphy et al 2012).

The high rate of endocrine therapy discontinuation within the first two years of therapy is concerning, given that the evidence suggests that early discontinuation of endocrine therapy significantly increases the risk of breast cancer mortality (Hershman et al 2011). We also know from large randomised controlled trials and patient-level meta-analyses that one to two years of endocrine therapy is inferior to five years (EBCTCG 2005). Further investigation is warranted to determine why New Zealand has a high rate of endocrine therapy discontinuation within the first two years of therapy.

At 24 months, there appeared to be notably fewer patients continuing endocrine therapy in Capital & Coast and Counties Manukau DHBs. Variation in follow-up practice between regions could account for differences. For example, some centres discharge patients from medical oncology follow-up after completion of chemotherapy, while others continue it for five to 10 years.

Inequities exist in adjuvant endocrine therapy dispensing

Our results suggest that Māori, Pacific peoples and younger females are the least likely to continue having adjuvant endocrine therapy dispensed. As these groups already experience worse breast cancer outcomes, particular attention should be given to strategies targeting improvements in adherence to endocrine therapy for these groups.

At six months, 12 months and 24 months after first being dispensed endocrine therapy, Māori and Pacific peoples were much less likely than those of European/other ethnicity to still be receiving it. Between 12 and 24 months, the proportion of Pacific peoples being dispensed adjuvant endocrine therapy decreased from 57.9% to 54.0%, and the equivalent figure for Māori decreased from 56.3% to 54.4%. These numbers are concerning, as endocrine therapy significantly increases disease-free survival and reduces mortality (EBCTCG 2005).

Dispensing data suggests that Māori females have lower adherence to endocrine therapy compared to European females. There exists evidence that this can be due to

increased barriers to accessing primary health care providers, medication costs and the difficulty of organising time off work (Seneviratne et al 2015). Further investigation is warranted to inform where quality improvement initiatives can be targeted for Māori and Pacific peoples to increase adjuvant endocrine therapy adherence.

Females aged less than 45 years were less likely than all other age groups to continue to have adjuvant endocrine therapy dispensed after 24 months. This finding is of high significance, because younger females with hormone receptor-positive breast cancer have more aggressive cancers with worse outcomes than older females, making it even more important for younger females to take endocrine therapy for at least five years (Brown et al 2023).

Younger females may be more likely to stop endocrine therapy due to busy lifestyles (eg, the demands of juggling work and family), and may be less willing to tolerate side effects, which can include sexual dysfunction, weight gain, hot flushes, low mood and aching joints (Yussof et al 2022). This finding suggests that one of the areas of focus should be on trying to improve endocrine therapy continuation in younger females.

A recent meta-analysis of interventions to promote adherence to endocrine therapy found that lowering of endocrine therapy costs was the most effective factor; more effective communication and psychosocial interventions also showed promise (Bright et al 2023).

QPI 23: Timely diagnosis

Indicator description

Proportion of patients for whom time from referral to diagnosis of breast cancer is within 28 days.

Context

The rapid detection and diagnosis of breast cancer is a key determinant of better breast cancer survival. A timely diagnosis allows cancer treatment to occur more promptly, increasing the likelihood of the treatment's success and a positive health outcome. International research indicates that the optimal timeframe from referral to diagnosis for cancer is within 28 days (Miles and Asbridge 2019). This also aligns with the Faster Diagnosis Standard, introduced in England in October 2021, which aims to ensure patients will be diagnosed or have cancer ruled out within 28 days (National Health Service 2024a).

We have used date of diagnostic procedure as a proxy for date of diagnosis, acknowledging that patients may have received their diagnosis after this date.

Results: Overall

In 2020–2021, 3,081 people were diagnosed with breast cancer within 28 days of referral via the BreastScreen Aotearoa (BSA) programme, 992 people were diagnosed following non-BSA imaging and 4,316 people were diagnosed following symptomatic presentation (Figure 34).

Figure 34: Proportion of people diagnosed with breast cancer within 28 days of referral, 2020–2021, by route to diagnosis (non-age-standardised)

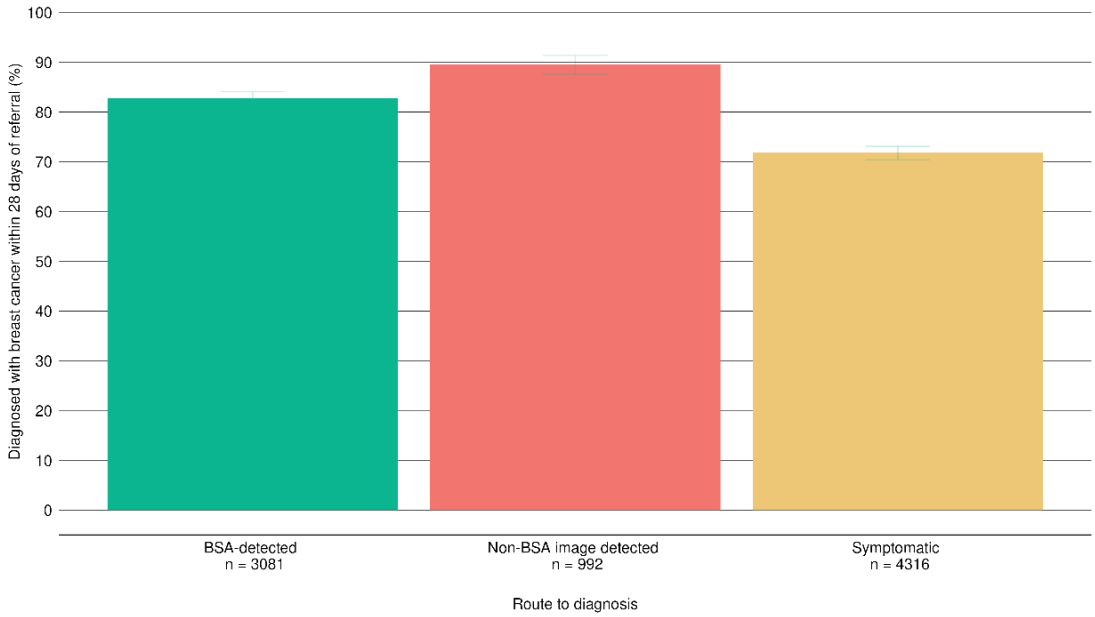
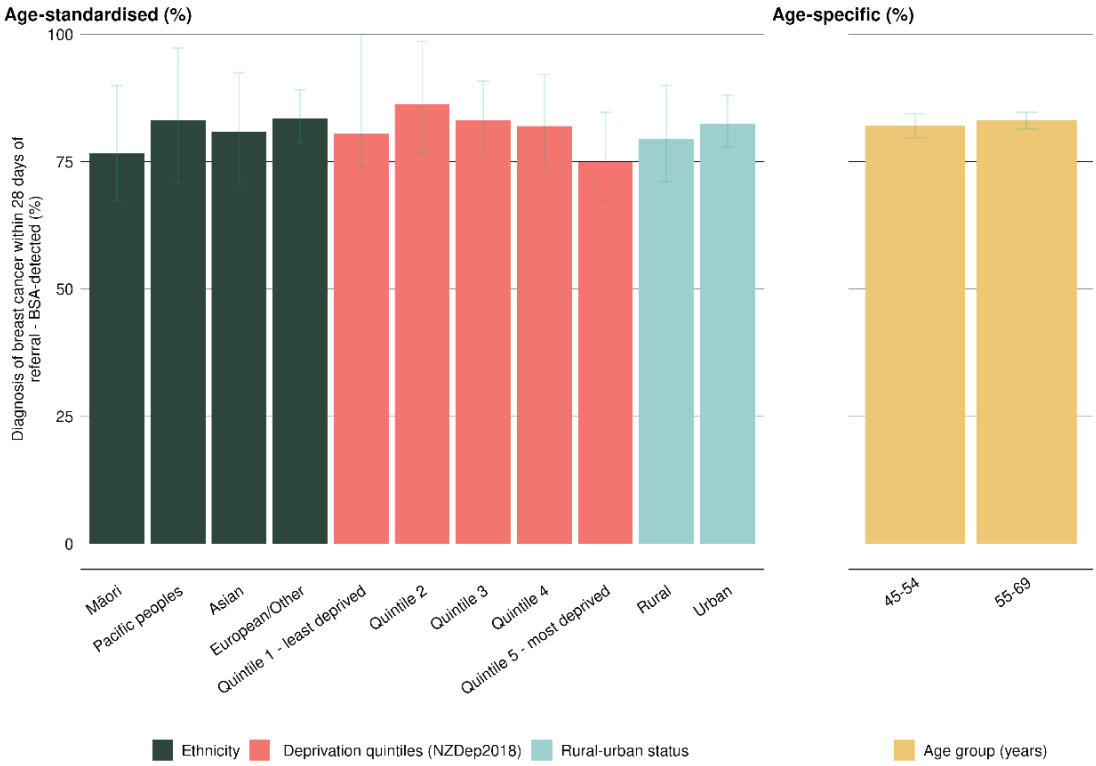


Figure 34 shows that most people who received a breast cancer diagnosis received their diagnostic procedure within 28 days of referral. Of those who were referred following a symptomatic presentation, 71.8% were diagnosed within 28 days, compared to 89.6% diagnosed via non-BSA image detection and 82.8% diagnosed through the BSA programme.

Results: BreastScreen Aotearoa-detected

Figure 35: Proportion of females diagnosed with breast cancer (confirmed by diagnostic biopsy, including cytological procedure) via BreastScreen Aotearoa within 28 days of the date of the outcome of the screening mammogram, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



The overall proportion of females diagnosed with breast cancer through the BSA programme within 28 days was 82.8%.

Once adjusted for age, these results show that it was more common to receive a diagnosis outside of the 28-day window among those who lived in the least deprived areas (86.4%) than among those who lived in the most deprived areas (75.2%). Māori were less likely to receive a diagnosis within 28 days (76.6%) compared to those of European/other ethnicity (83.5%), Pacific peoples (83.2%) and those of Asian ethnicity (80.9%).

Figure 36: Proportion of females diagnosed with breast cancer (confirmed by diagnostic biopsy, including cytological procedure) via BreastScreen Aotearoa within 28 days of the date of the outcome of the screening mammogram, by district health board of residence, 2020–2021 (non-age-standardised)

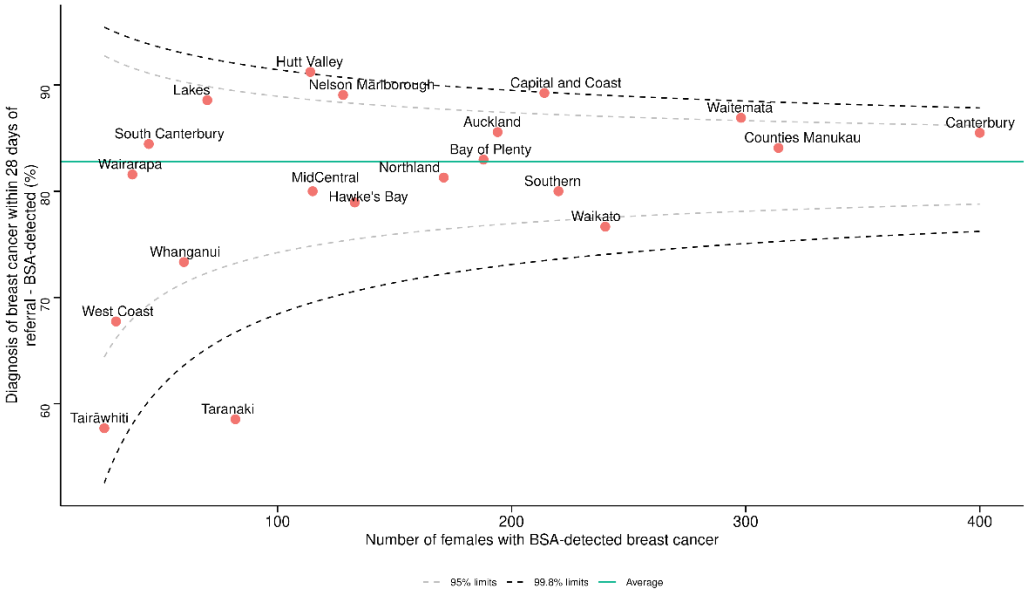


Figure 36 shows wide variation across the country. Low numbers in Tairāwhiti, West Coast, Whanganui, Wairarapa and South Canterbury DHBs mean that caution should be taken when interpreting their results. Taranaki DHB was below the lower 99.8% limit: there, only 58.5% of females who were diagnosed with breast cancer through the BSA programme received their diagnosis within 28 days.

Results: Non-BreastScreen Aotearoa image detected

Figure 37: Proportion of people diagnosed with breast cancer (confirmed by diagnostic biopsy, including cytological procedure) via non-BreastScreen Aotearoa imaging within 28 days of the date of the initial abnormal imaging, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021

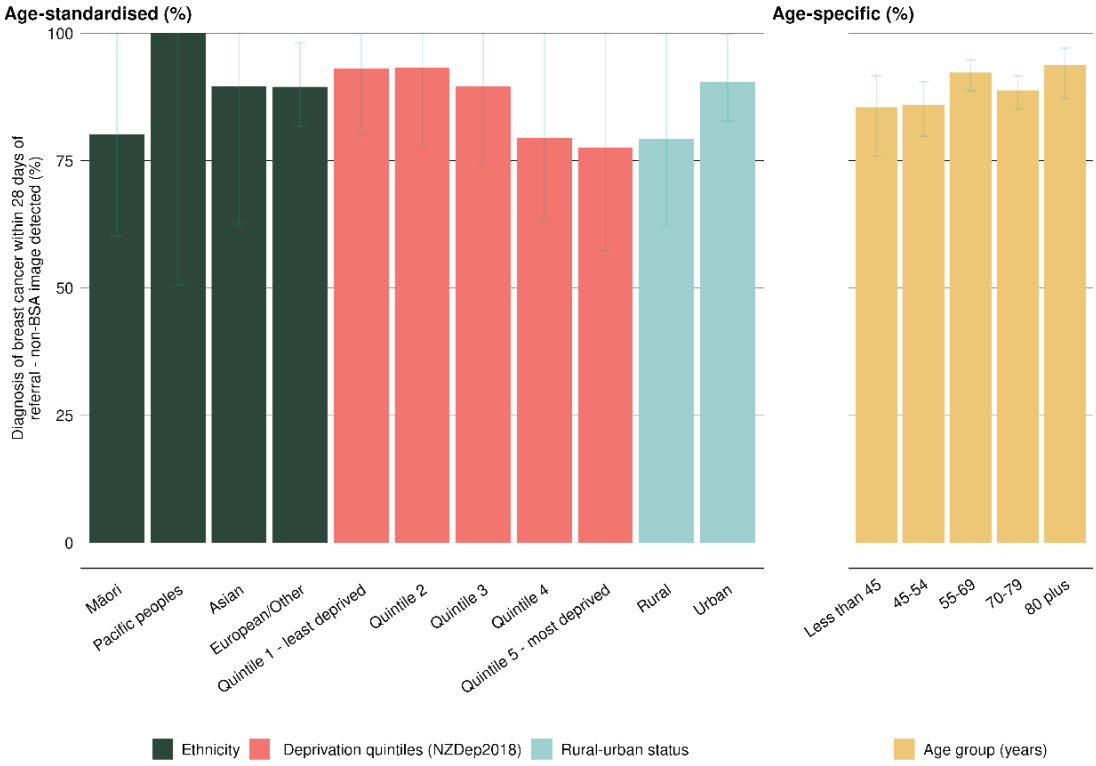


Figure 36 shows that of people diagnosed with breast cancer through non-BSA image detection in 2020 or 2021, 90.3% of people received their diagnosis within 28 days of referral. After adjusting for age, 100% of Pacific peoples received a diagnosis within 28 days, noting that the number was small (18).

In terms of ethnicity, those who identified as European/other or Asian were more likely to receive a diagnosis within 28 days through non-BSA imaging (89.5% and 89.6% respectively), compared with 80.1% of Māori. Further investigation is warranted as to why Māori are less likely to receive a timely diagnosis compared to other ethnicities.

We found that 77.6% of people living in quintile 5 areas and 79.4% of people living in quintile 4 areas (the more deprived areas) who were diagnosed with breast cancer through non-BSA image detection received their results within 28 days of referral. Those who lived in the least deprived areas (quintile 1 and quintile 2) were more likely to receive their results within 28 days of referral (93.1% and 93.2% respectively).

Figure 38: Proportion of people diagnosed with breast cancer (confirmed by diagnostic biopsy, including cytological procedure) via non-BreastScreen Aotearoa imaging within 28 days of the date of the initial abnormal imaging, by district health board of residence, 2020–2021 (non-age-standardised)

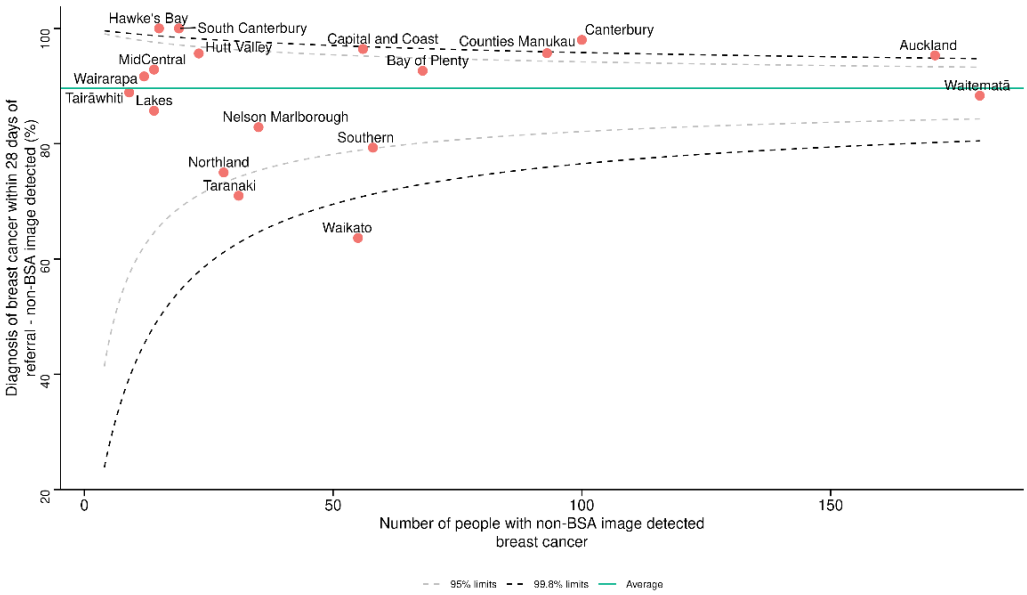


Figure 38 shows that there was regional variation in the proportion of people diagnosed with breast cancer via non-BSA image detection who received their diagnosis within 28 days.

Several DHBs were above the 99.8% upper limit. For example, in Canterbury and Auckland DHBs 98.0% and 95.3% of people diagnosed with breast cancer through non-BSA image detection respectively received their diagnosis within 28 days. Conversely, Waikato DHB was below the lower 99.8% limit: there, only 63.6% of people diagnosed with breast cancer through non-BSA image detection received their diagnosis within 28 days.

Results: Symptomatic detection

Figure 39: Proportion of people symptomatically diagnosed with breast cancer (confirmed by diagnostic biopsy, including cytological procedure) within 28 days of the date of the receipt of specialist referral, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021

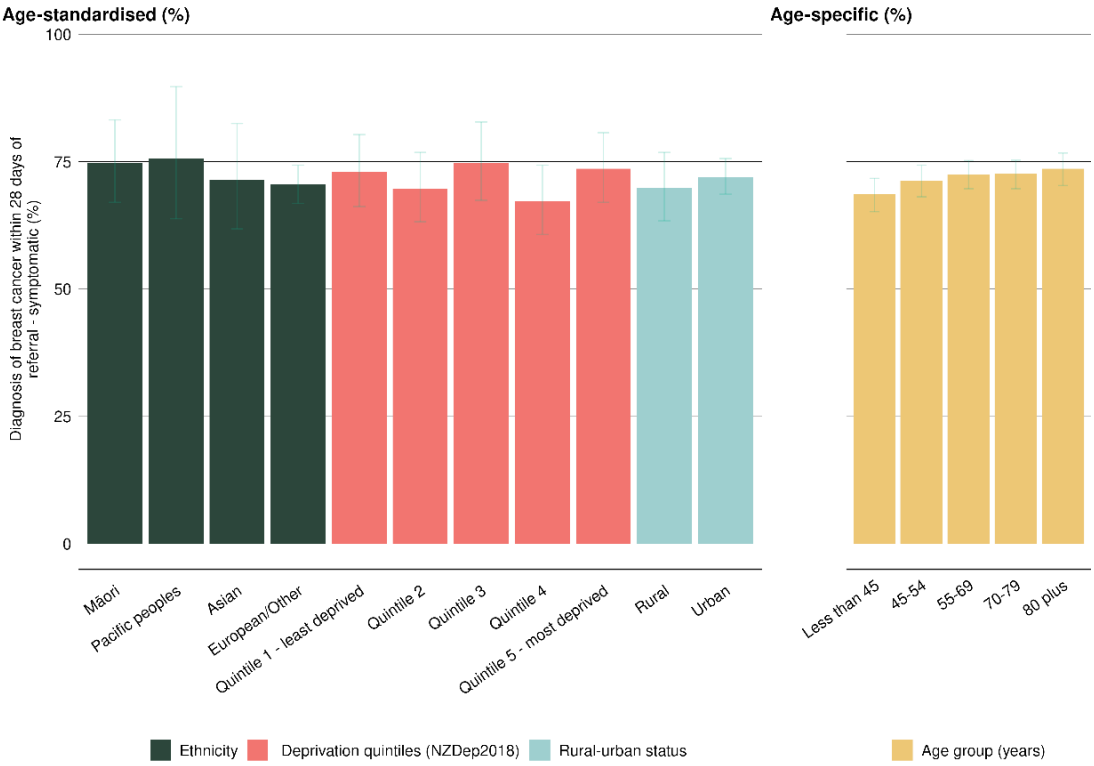


Figure 39 shows that once adjusted for age, the highest proportions of people who received a diagnosis of breast cancer within 28 days of a symptomatic presentation were for Pacific peoples and Māori (75.6% and 74.7% respectively). Those of Asian or European/other ethnicity had the lowest proportions (71.5% and 70.5% respectively).

Figure 40: Proportion of people symptomatically diagnosed with breast cancer (confirmed by diagnostic biopsy, including cytological procedure) within 28 days of the receipt of specialist referral to the date of diagnostic biopsy (including cytological procedure), by district health board of residence, 2020–2021 (non-age-standardised)

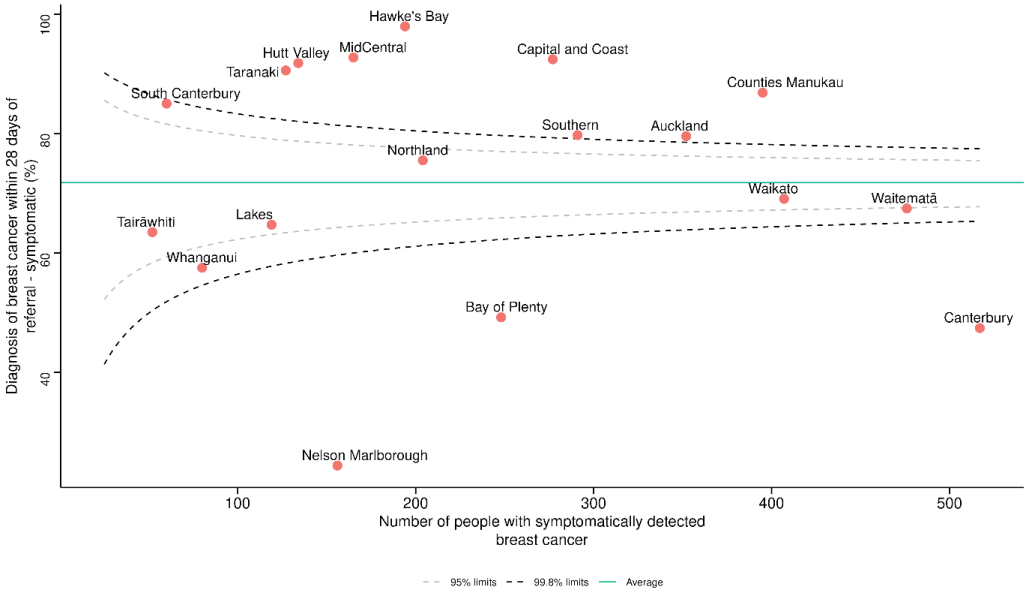


Figure 40 shows that many DHBs were above the 99.8% limit. People living in Nelson Marlborough DHB had a low proportion of breast cancer diagnoses made through symptomatic presentation (24.4%). Bay of Plenty and Canterbury DHBs also had low proportions.

Discussion

In New Zealand in 2020–2021, 82.8% of people diagnosed with breast cancer received their diagnosis within 28 days if their cancer was detected through the BSA programme, compared with 89.6% whose cancer was detected through non-BSA image detection and 71.8% whose cancer was symptomatically detected.

However, cancer was much more likely to be detected symptomatically (4,316 people) than through non-BSA image detection (992 people) or BSA detection (3,081 females). The finding that those diagnosed with breast cancer through the symptomatic route experience a slower time to diagnosis is of concern.

People whose cancer was diagnosed symptomatically generally had a higher stage at diagnosis, which already signals poorer prognosis. Therefore, timeliness to treatment is of high importance. Slower time to diagnosis means slower time to treatment, which negatively impacts outcomes (An et al 2022). Further investigation is needed to determine why those whose cancer is detected via a symptomatic route are slower to be diagnosed than those for whom it is detected through screening.

Māori were less likely to receive a diagnosis of breast cancer through the BSA programme within 28 days compared to all other ethnicities. This result was also found for those whose cancer was detected via a non-BSA route. One New Zealand study found that the differences in prognosis between ethnicities reflected a delay in time to diagnosis, rather than in time to original presentation, which was similar for all ethnicities (Lethaby et al 1992). The finding that Māori experience a slower time to diagnosis after non-BSA image detection warrants further investigation.

We found a large amount of variation between DHBs in the proportion of people who received their diagnosis within 28 days of referral. One explanation for this variation could be that some people needed to travel to different DHBs to undergo a biopsy (eg, those who live in Taranaki typically travel to Palmerston North for this). The logistics of arranging this may have led to longer delays.

The variation we found suggests that there is room for improvement in referral routes: the aim of this improvement would be to ensure that all suspected breast cancer patients obtain a diagnosis within 28 days of referral, regardless of the route to detection.

QPI 24: Time to surgery

Indicator description

Proportion of females treated with surgery (excluding females having neoadjuvant chemotherapy or neoadjuvant endocrine therapy) within:

A. six weeks of decision to treat with breast surgery
B. eight weeks of decision to treat with breast surgery and undergoing immediate reconstruction.

Context

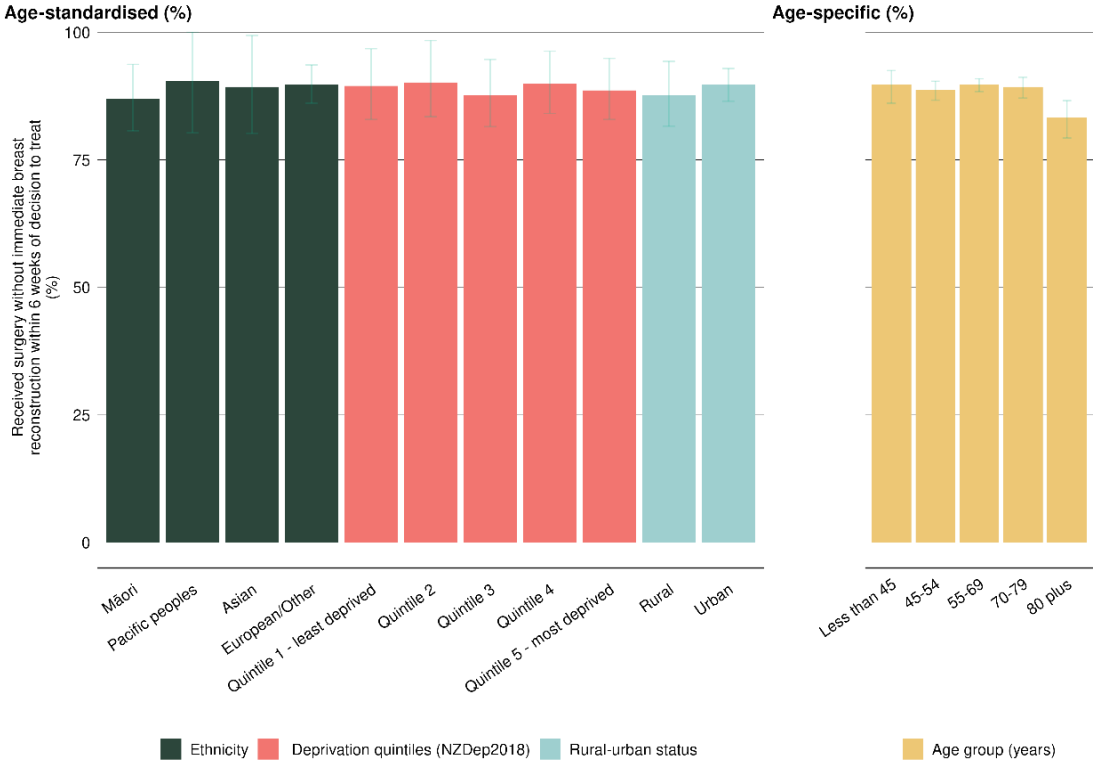
A wait for surgery can increase anxiety for people with cancer and their families and may result in worse outcomes (Hanna et al 2020). When clinicians agree that it is the best course of action, prompt surgical intervention increases the likelihood of treatment success and increases overall survival.

People considering immediate reconstruction face added complexity in the treatment decision-making process. The pros and cons of additional surgery over cancer resection, and of the different reconstruction options, need to be communicated and considered. This frequently requires additional consultations and often referral to another service (eg, plastic surgery). The two-week difference between A and B in the indicator reflects this.

Māori experience longer median wait times for surgery (Breast Cancer Foundation New Zealand 2022; Seneviratne et al 2015; Tin Tin et al 2018). Reporting this QPI by ethnicity assists us to identify this inequity and work to resolve it.

Results: Surgery without immediate breast reconstruction and within six weeks

Figure 41: Proportion of females treated with surgery (excluding females having neoadjuvant chemotherapy or neoadjuvant endocrine therapy) within six weeks of the decision to treat with breast surgery (excluding females whose first surgery was a mastectomy with immediate reconstruction), by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



Of those females diagnosed with breast cancer in 2020–2021 who didn't receive neoadjuvant chemotherapy or endocrine therapy, 88.9% were treated with surgery within six weeks of decision to treat (see Table 27 in Appendix C). We identified little variation across groups such as sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status.

Figure 42: Proportion of females treated with surgery (excluding females having neoadjuvant chemotherapy or neoadjuvant endocrine therapy) within six weeks of the decision to treat with breast surgery (excluding females whose first surgery was a mastectomy with immediate reconstruction), by district health board of residence, 2020–2021 (non-age-standardised)

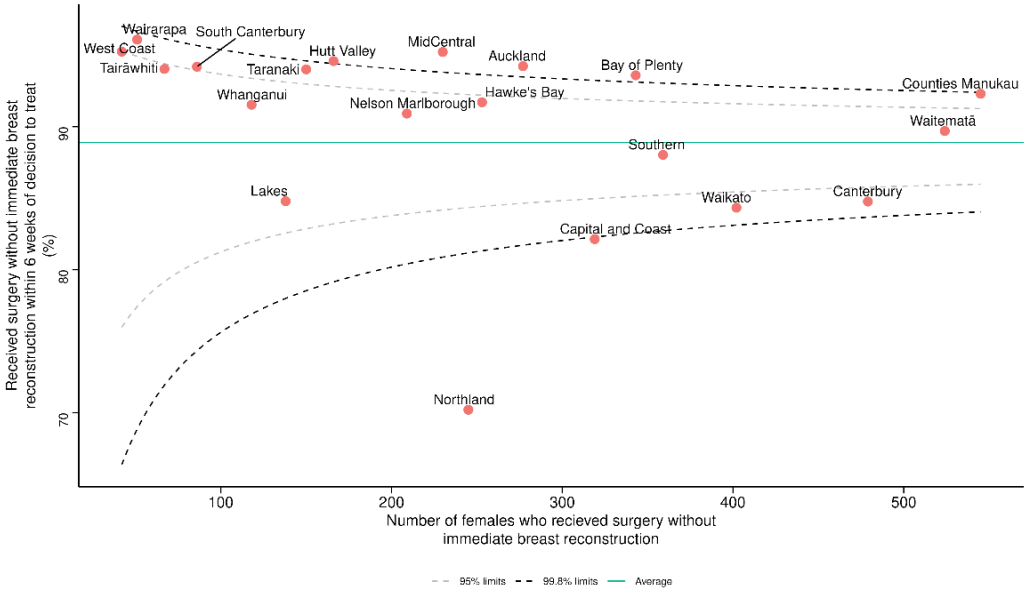
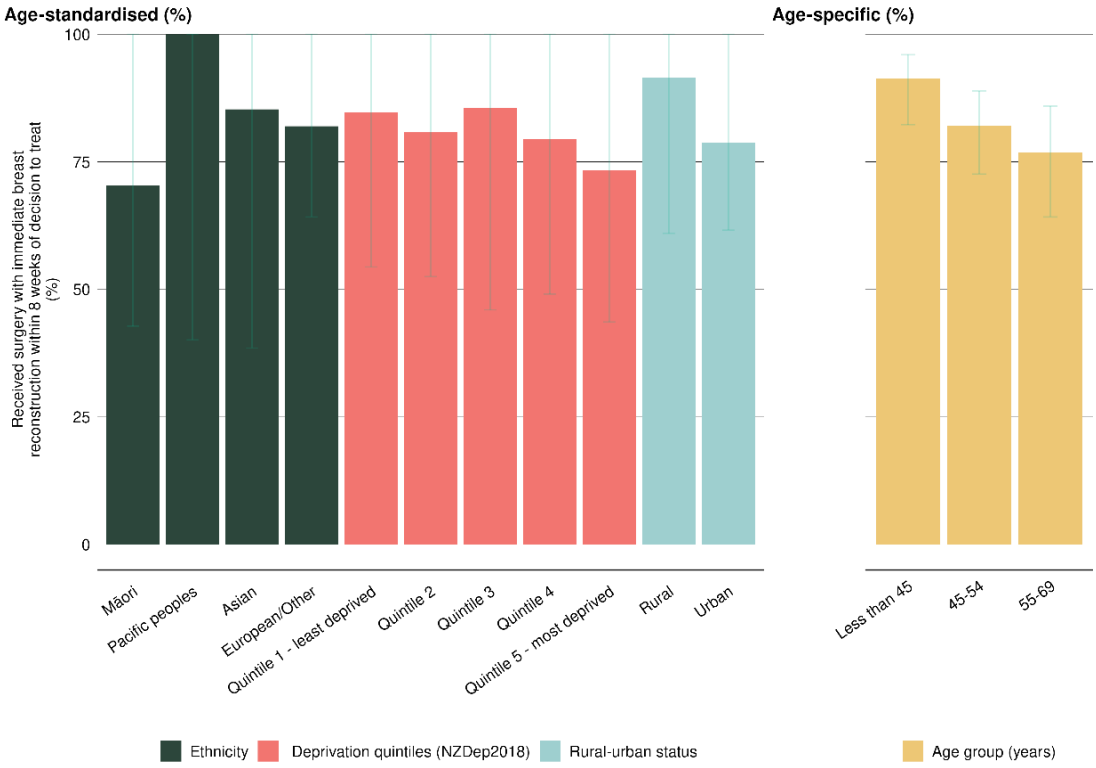


Figure 42 shows a large amount of variation between DHBs. In MidCentral, Auckland and Bay of Plenty DHBs, a high proportion of females (95.2%, 94.2% and 93.6% respectively) received breast surgery within six weeks of the decision to treat with surgery. In Northland DHB, the proportion was low (70.2%).

Results: Surgery with immediate breast reconstruction and within eight weeks

Figure 43: Proportion of females treated with surgery (excluding females having neoadjuvant chemotherapy or neoadjuvant endocrine therapy) within eight weeks of the decision to treat with breast surgery and undergoing mastectomy with immediate reconstruction as their first surgery, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



The overall proportion of females treated with surgery and immediate reconstruction (excluding females having neoadjuvant chemotherapy or neoadjuvant endocrine therapy) within eight weeks of the decision to treat was 83.8%.

Once adjusted for age, Māori were less likely to receive surgery (70.4%) in this context than females of European/other ethnicity (82%). Due to low numbers, caution is required when interpreting the data for Pacific peoples and those of Asian ethnicity.

Figure 44: Proportion of females treated with surgery (excluding females having neoadjuvant chemotherapy or neoadjuvant endocrine therapy) within eight weeks of the decision to treat with breast surgery and undergoing mastectomy with immediate reconstruction as their first surgery, by district health board of residence, 2020–2021 (non-age-standardised)

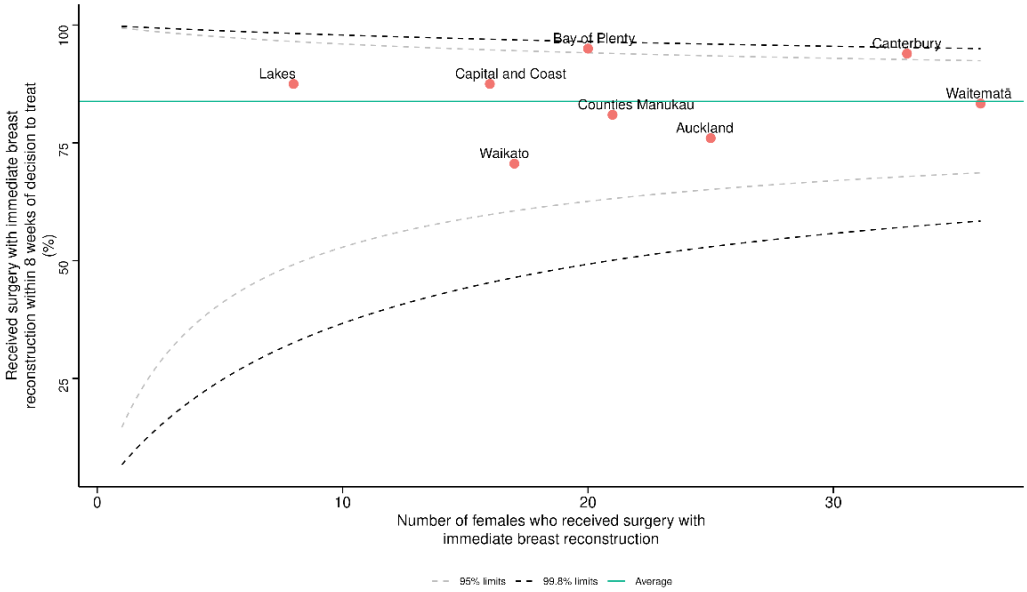


Figure 44 shows minimal variation across the country. Information in this funnel plot should be interpreted with caution due to low numbers; not all DHBs are represented here, due to small number suppression.

Discussion

Previous research has found that Māori experience longer median wait times for surgery (Breast Cancer Foundation New Zealand 2022; Seneviratne et al 2015; Tin Tin et al 2018). However, we identified little variation between ethnicities when looking at females who were treated with surgery (excluding mastectomy with immediate reconstruction) within six weeks of the decision to treat.

When looking at females treated with surgery and undergoing immediate reconstruction within eight weeks of the decision to treat, we found variation by ethnicity. Māori were less likely to receive surgery within eight weeks of the decision to treat in this context than females of Asian and European/other ethnicity were.

In terms of timing, we note that clinicians consider a range of factors in deciding whether and when a patient is placed on a surgical waitlist. Factors that increase surgical risk (eg, smoking, a high body mass index or hypertension) may prevent a patient from being placed onto the waitlist until the surgical risk is minimised. This may lead to longer waiting times, and this indicator does not capture this.

When looking at females treated with surgery within eight weeks of the decision to treat who were undergoing immediate reconstruction, we found that no DHBs were above or below the 99.8% limits.

When looking at females treated with surgery within six weeks of the decision to treat who were not undergoing immediate reconstruction, we found that Hutt Valley, MidCentral, Auckland and Bay of Plenty DHBs were above the upper 99.8% limit, indicating a higher proportion of females who received surgery within six weeks of the decision to treat with breast surgery. Northland and Capital & Coast DHBs were below the 99.8% lower limit.

This regional variation at six weeks warrants further investigation, particularly because Māori experience longer median wait times for surgery (Breast Cancer Foundation New Zealand 2022). There was not enough data to accurately identify regional variation for women undergoing mastectomy with immediate reconstruction as their first surgery and receiving this within eight weeks.

QPI 26: Access to radiation therapy

Indicator description

Proportion of patients with invasive cancer who start adjuvant radiation therapy within:

A. eight weeks of surgery
B. six weeks of completing adjuvant chemotherapy.

Context

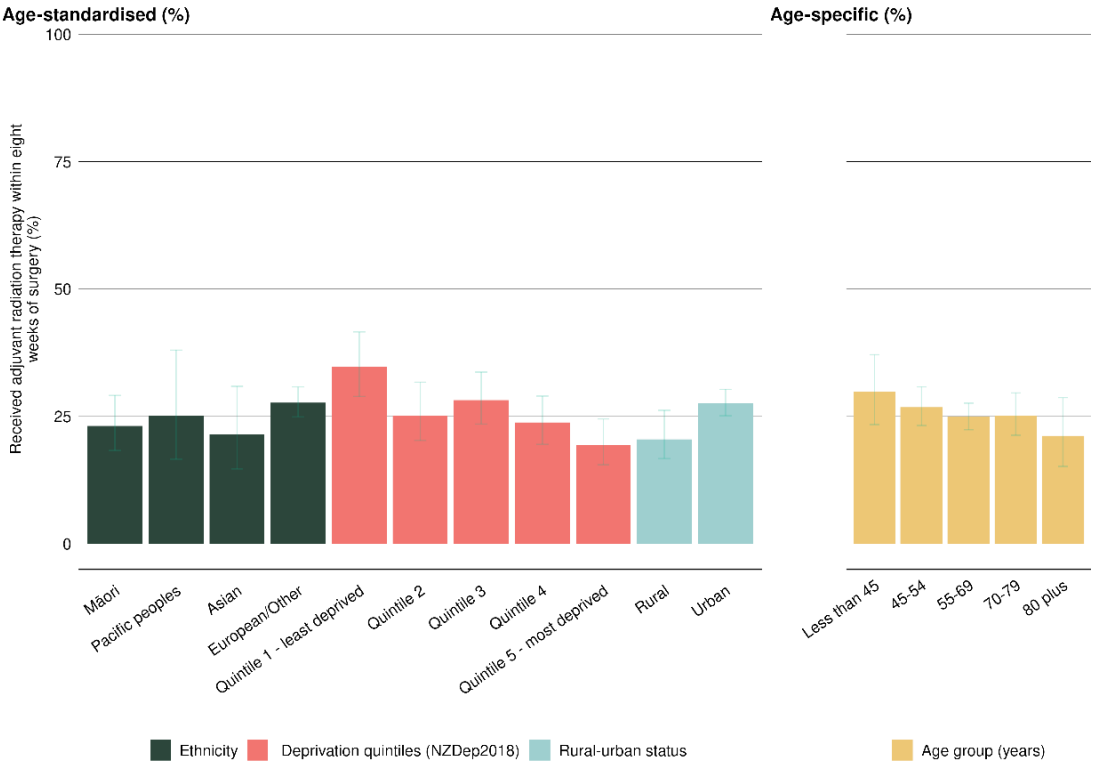
The local cancer recurrence rate is higher in patients treated with adjuvant radiation therapy for breast cancer more than eight weeks after surgery than it is in those treated within eight weeks of surgery (Huang et al 2003). Similarly, delaying the initiation of radiation therapy after completion of adjuvant chemotherapy adversely impacts survival outcomes (Cao et al 2021).

A 2014 New Zealand-based study showed that more Māori than New Zealand/European females experienced delays longer than 90 days for adjuvant radiation therapy (39.8% and 30.6% respectively) (Seneviratne et al 2014).

This indicator aims to identify this inequity to inform the development of quality improvement initiatives to improve outcomes for Māori.

Results: Received adjuvant radiation therapy within eight weeks of completing surgery

Figure 45: Proportion of people with invasive breast cancer who started adjuvant radiation therapy within eight weeks of surgery, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



Overall, 25.5% of people with invasive breast cancer started adjuvant radiation therapy within eight weeks of surgery. People aged less than 45 years old were more likely to start adjuvant radiation therapy within eight weeks of surgery (29.8%) than those aged over 80 (21.2%).

When adjusted for age, there was a higher proportion of people of European/other ethnicity who started adjuvant radiation therapy within eight weeks of surgery (27.7%) than those who identified as Pacific peoples (25.1%), Māori (23.1%) and Asian (21.5%).

Those living in quintiles 1 were more likely (34.7%) to receive adjuvant radiation therapy within eight weeks of surgery than females living in any other quintile.

We also found large variation between those living in rural and urban areas. Of those living in rural areas, 20.5% started adjuvant radiation therapy within eight weeks of surgery, compared to 27.6% of people living in urban areas.

Figure 46: Proportion of people with invasive cancer who started adjuvant radiation therapy within eight weeks of surgery, by district health board of residence, 2020–2021 (non-age-standardised)

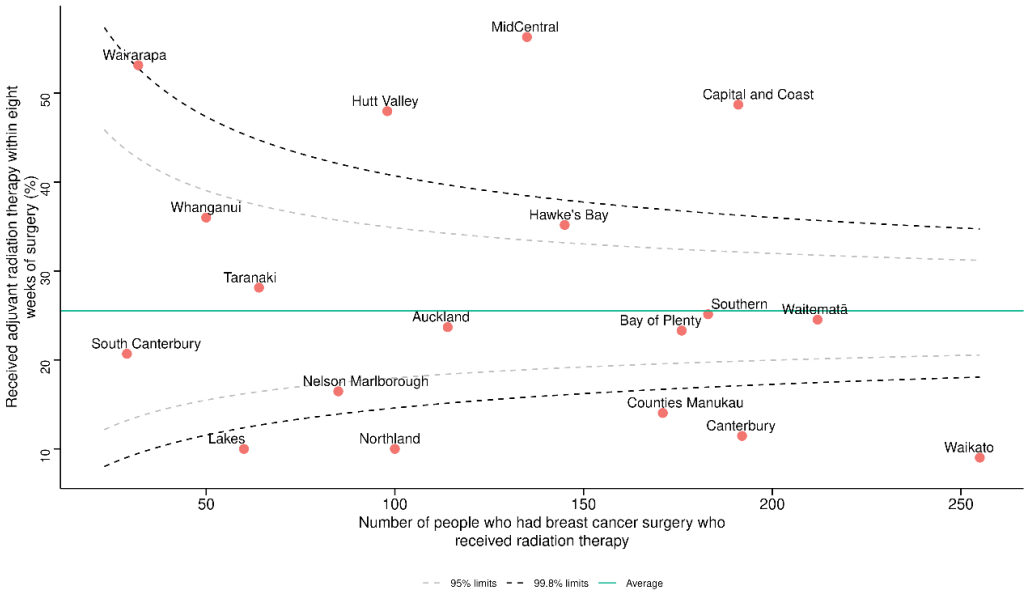
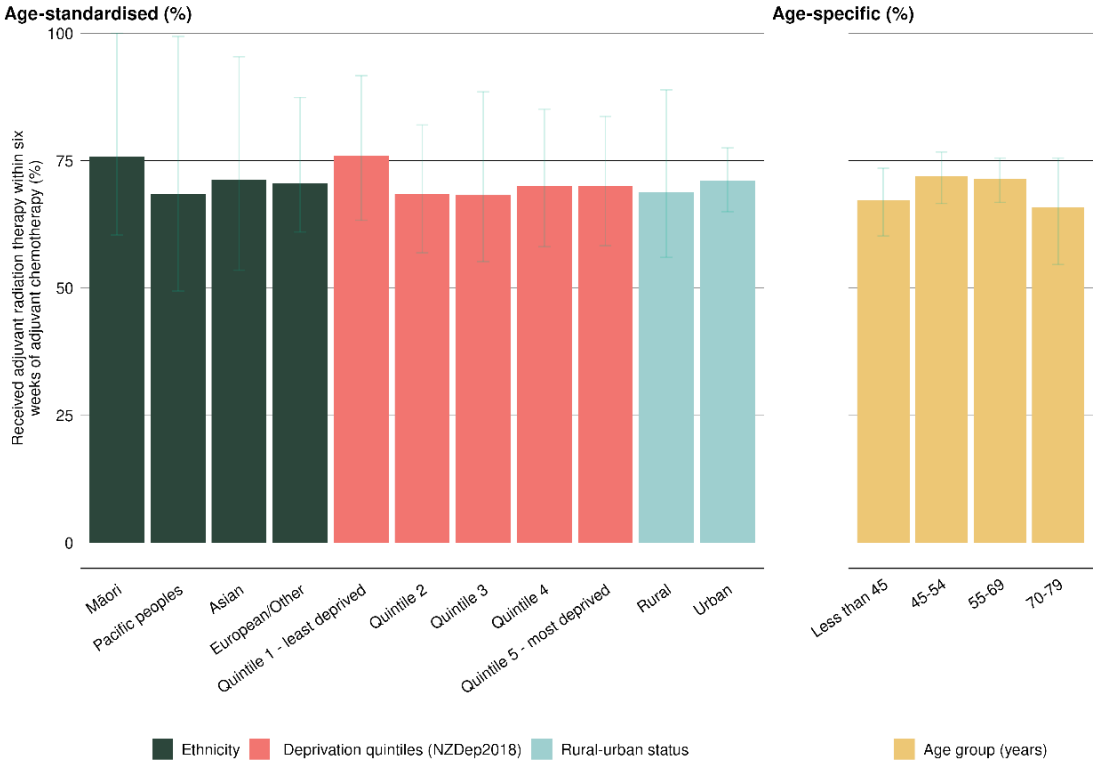


Figure 46 shows wide geographic variation for this QPI. There were four DHBs (MidCentral, Wairarapa, Hutt Valley and Capital & Coast) above the upper 99.8% limit: 56.3%, 53.1%, 48.0% and 48.9% respectively of people with invasive breast cancer started adjuvant radiation therapy within eight weeks of surgery in those areas. Five DHBs were below the lower 99.8% limit. For example, 9.0% of females living in the Waikato DHB area started adjuvant radiation therapy within eight weeks of surgery.

Results: Received adjuvant radiation therapy within six weeks of completing adjuvant chemotherapy

Figure 47: Proportion of people with invasive cancer who started adjuvant radiation therapy within six weeks of completing adjuvant chemotherapy, by ethnicity, NZDep2018 quintile, rural–urban status (all age-standardised) and age (age-specific), 2020–2021



The overall proportion of people who started adjuvant radiation therapy within six weeks of completing adjuvant chemotherapy was 70.3%.

It was more common for those of screening age to start adjuvant radiation therapy within six weeks of completing adjuvant chemotherapy than any other age group (71.9% for those aged 45–54 and 71.4% for those aged 55–69).

Once adjusted for age, the proportion of people to have started adjuvant radiation therapy within six weeks of completing adjuvant chemotherapy was lower among Pacific peoples (68.4%) than among Māori and those of Asian or European/other ethnicity (75.8%, 71.2% and 70.6% respectively).

Figure 48: Proportion of people with invasive cancer who started adjuvant radiation therapy within six weeks of completing adjuvant chemotherapy, by district health board of residence, 2020–2021 (non-age-standardised)

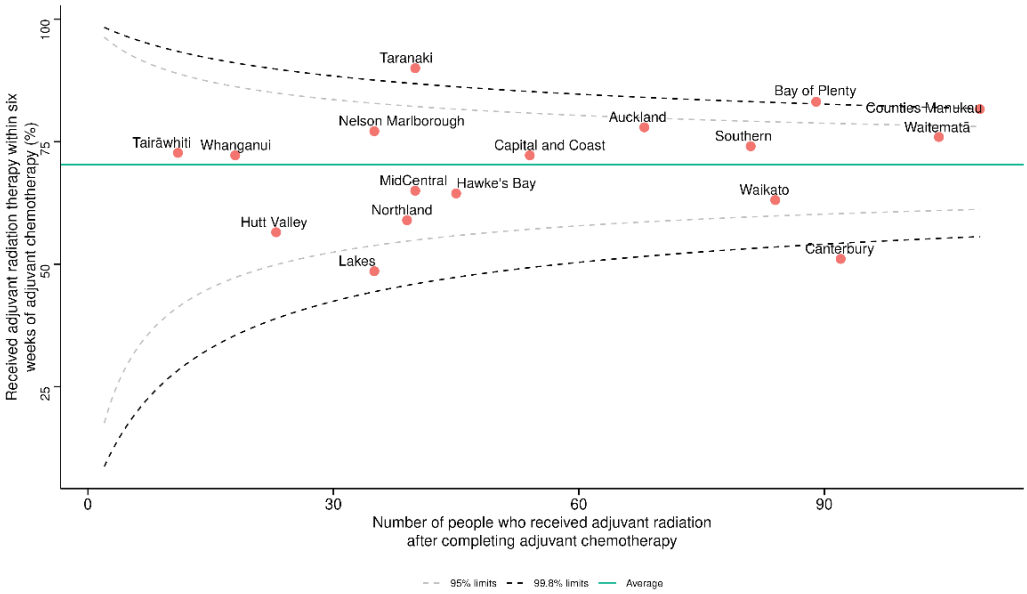


Figure 48 indicates wide difference by DHB. For example, Taranaki DHB was above the upper 99.8% limit: there, 90.0% of people started their adjuvant radiation therapy within six weeks of completing adjuvant chemotherapy. In contrast, Canterbury DHB was below the lower 99.8% limit: there, only 51.1% of people did so.

Discussion

Delays in adjuvant radiation therapy are more common for those living in rural areas

Compared to those living in rural areas, people living in urban areas were more likely to begin adjuvant radiation therapy within eight weeks of surgery.

Delays for rural people are well documented; those who live rurally usually have a longer travel distance to a facility which provides radiation therapy (Haynes et al 2008; Seneviratne et al 2014).

Health New Zealand - Te Whatu Ora administers the National Travel Assistance (NTA) scheme, which reimburses people who need to travel to receive treatment. Currently, the scheme only funds travel and accommodation for a single support person; this is not conducive to ensuring whānau support during treatment (Health New Zealand - Te Whatu Ora 2024a).

Furthermore, the NTA is based on a reimbursement model. Some Māori working in the wider cancer sector have described it as, 'a failure in itself … you must pay for the journey before it is of use to you. What if you don't have that money in the first place?' Māori working in the cancer sector are frustrated that the recommendations from a 2018 review of NTA have not been implemented (Te Aho o Te Kahu 2023).

There is a large amount of regional variation

We found a large amount of regional variation in the proportion of females with invasive breast cancer who started adjuvant radiation therapy within eight weeks of surgery. Proportions were lower in Canterbury, Waikato and Counties Manukau DHBs. This could partly be explained by our methodology: we used district of residence (where the patient lives), rather than district of service (where the patient receives treatment) to create our funnel plots. However, this does not completely explain the wide variation, which warrants further investigation.

In New Zealand, radiation oncology services are organised regionally, hosted by a single district referred to as a 'centre'. Each centre offers radiation therapy service to its local population. There are six public regional radiation oncology centres nationally, located in Auckland, Hamilton, Palmerston North, Wellington, Christchurch and Dunedin (Te Aho o Te Kahu 2022a).

Many patients in 2020-2021 would have travelled to receive radiation therapy (eg, patients from Nelson Marlborough and South Canterbury would have travelled to Christchurch for treatment).

The workforce and machines are not increasing with patient demand

The overall proportion of females with invasive breast cancer who started adjuvant radiation therapy within six weeks of completing adjuvant chemotherapy was 70.3%. Only 25.5% of females with invasive breast cancer started adjuvant radiation therapy within eight weeks of surgery. This is a concerning number; it is likely to be related to a workforce shortage and linear accelerator (LINAC) capacity not keeping up with demand.

Studies have estimated that 48% of new cancer cases had an indication for radiation treatment (eg, Barton et al 2014). However, 55% of LINACs in New Zealand are old enough to need replacement. The age profile of these LINACs has fallen behind what is standard in high-income countries (European Coordination Committee of the Radiological Electromedical and Healthcare IT Industry 2019). One report found that although staffing levels have increased, they have not kept up with the increase in patient demand. The radiation therapy workforce is struggling to sustain the current level of service and uphold quality standards (Royal Australian and New Zealand College of Radiologists 2023).

This shortage is not unique to New Zealand. A global survey published in the *Journal of Global Oncology* in 2018 looked at the ratio of new cancer cases per clinical oncologists (Matthew 2018). For countries with comparable health systems, these ratios are:

- New Zealand – 525:1
- Australia – 272:1
- UK – 689:1
- Canada – 352:1.

APPENDIX A: GLOSSARY

Term	Description
Adjuvant chemotherapy	Chemotherapy after surgery
Advanced breast cancer (ABC)	Cancer that either has spread to other areas of the body (stage IV) or cannot be surgically removed
Biopsy	Removal of tissue to be looked at under a microscope to help in the diagnosis of a disease
Breast Cancer Foundation New Zealand	A non-government organisation supporting early diagnosis and optimal treatment to ensure no one dies from breast cancer
Breast-conserving surgery (BCS)	An operation that aims to remove breast cancer while avoiding a mastectomy (removal of the breast)
BreastScreen Aotearoa (BSA)	Aotearoa New Zealand's free breast screening programme for females aged 45–69 years, run by the National Screening Unit within Health New Zealand – Te Whatu Ora
Breast neuroendocrine tumours	A breast tumour that forms from cells that release hormones into the blood in response to a signal from the nervous system
Carcinoma	The medical term for cancer
Chemotherapy	Treatment aimed at destroying cancer cells using anti-cancer drugs
Cure rate	The percentage of people who are cured of a disease or condition after treatment. For cancer, this time period is usually five years
Denominator	The bottom number in a fraction
Diagnosis	The process of identifying a disease, such as cancer, from its signs and symptoms, and via investigations
Disease-free survival	The length of time after diagnosis and treatment of a primary cancer for which a patient survives without any recurrence of that cancer
Ductal carcinoma in situ (DCIS)	The presence of abnormal cells inside a breast-milk duct that look like cancer but have not yet invaded through the wall of the milk duct or spread elsewhere
Early Breast Cancer Trialists' Collaborative Group (EBCTCG)	A group established in 1983 to bring together and analyse evidence of all randomised trials of the treatment of breast cancer

Term	Description
Grade of cancer	A description of a tumour based on how abnormal the cancer cells and tissue look under a microscope and how quickly the cancer cells are dividing. Grade is an important prognostic indicator and helps determine appropriate treatment
Histology	The study of tissues and cells under a microscope
Hormone receptor-positive	Describes cells that have a group of proteins that bind to a specific hormone
Human epidermal growth factor receptor 2 (HER2)	A protein that may be overexpressed by breast cancer cells taken out during a biopsy or surgery. HER2-positive (overexpressing) breast cancer tends to be more aggressive than some of the other sub-types in the absence of targeted treatment. HER2 receptors can be targeted with antibodies; for example, trastuzumab. Knowing if the breast cancer is HER2-positive or HER2-negative is very important in deciding appropriate drug treatment options
HER2-positive	Describes cells that have a protein called HER2 on their surface. In normal cells, HER2 helps control cell growth. Cancer cells that make too much HER2 may grow more quickly and are more likely to spread to other parts of the body
Immediate reconstruction	Breast reconstruction completed at the same time as a mastectomy
Invasive breast cancer	Breast cancer that has spread into surrounding breast tissue and has the potential to spread elsewhere, as distinct from ductal carcinoma in situ
Linear accelerator (LINAC)	A machine that uses electricity to form a stream of fast-moving subatomic particles. This creates high-energy radiation that may be used to treat cancer
Local recurrence	Recurrence in the same breast or in the chest wall on the same side as the original cancer
Lymph nodes	Glands found in clusters throughout the lymphatic system. They act as a form of filter of tissue fluid or lymph, which drains to regional nodes via tiny channels called lymphatics. These are one of the first places a cancer may spread
Morbidity	The extent of ill-health a particular condition causes
Mortality	The death rate, which reflects the number of deaths per unit of population in any specific region, age group, disease or other classification, usually expressed as deaths per 1,000, 10,000 or 100,000
Multidisciplinary meeting	A treatment-planning approach that includes several doctors and other health care professionals who are experts in different specialties (disciplines)

Term	Description
National Travel Assistance (NTA)	A scheme administered by Health New Zealand – Te Whatu Ora, which financially helps people who need to travel long distances or travel frequently for treatment
Neoadjuvant chemotherapy	Chemotherapy before surgery
New Zealand Cancer Registry (NZCR)	A population-based register of all primary malignant diseases diagnosed in Aotearoa New Zealand, excluding squamous and basal cell skin cancers
Node positive	Cancer that has spread to the lymph nodes
Numerator	The top number of a fraction
Performance status	A measure of a patient's general health and ability to tolerate treatment
Primary breast lymphoma	A rare type of blood cancer that occurs in the breast
Prognosis	An assessment of the expected future course and outcome of a patient with cancer
Radiation therapy	Treatment using radiation (eg, high-energy X-rays) to destroy cancer cells
Receptors	Proteins in or on cells that can attach to certain substances in the blood that are commonly found in breast cancer
Recurrence	New cancer cells, at the site of original tumour or elsewhere in the body, detected following treatment
Stage	A way of describing the size of a cancer and how far it has spread; important because it helps indicate prognosis and decide which treatments are appropriate
Stratify	To arrange or classify (for example, in stratifying patients into well-defined risk groups)
Te Aho o Te Kahu – Cancer Control Agency	A government agency created in recognition of the impact cancer has on the lives of New Zealanders and aims to lead and unite efforts to deliver better cancer outcomes for Aotearoa New Zealand
Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register (Te Rēhita)	A population-based register which collects information about all pre-invasive and invasive breast cancer patients in Aotearoa New Zealand
Tissue	A group or layer of cells that work together to perform a specific function
Triple-negative breast cancer	An aggressive kind of breast cancer that does not express any oestrogen, progesterone or HER2 receptors

Term	Description
Tumour	An abnormal mass of tissue that results when cells divide more than they should or do not die when they should. Tumours may be benign (not cancer) or malignant (cancer)

APPENDIX B: DATA AND METHODOLOGY

Using funnel plots

Where possible, this report uses funnel plots to make comparisons between district health boards (DHBs). We plotted the proportions for each DHB against the total number of patients used to estimate the proportion. The average across all DHBs appears as a green line.

While there are no targets assigned to each quality performance indicator (QPI), we note that districts should consider further action if their proportions fall outside of the 95% limits or if their results vary significantly from their peers. Where the significant difference relates to a positive finding, services may choose to share their processes and the lessons they have learned with other services. Where it relates to a negative finding, services may choose to look more closely at local data and plan quality improvement activity, using input from better-performing services.

Cancer Care Data Explorer

The Cancer Care Data Explorer is an interactive tool that allows people to explore the quality of cancer care and outcomes for those in New Zealand diagnosed with cancer. It provides baseline data by cancer group and DHB. The tool is available on the **website** of Te Aho o Te Kahu – Cancer Control Agency (the Agency), and districts can use it to help understand the results this report sets out.

Te Tiriti o Waitangi

Te Tiriti o Waitangi (the Treaty of Waitangi) provides an imperative for the Crown to protect and promote the health and wellbeing of Māori, including by responding to and meeting Māori health needs.

The Waitangi Tribunal Health Services and Outcomes Inquiry (Wai 2575), initiated in November 2016, hears all claims concerning grievances relating to health services and outcomes of national significance for Māori.

Given that Māori have the poorest overall health status in New Zealand and are significantly disadvantaged in terms of health inequities, it is essential that the health system ensures the rights and meets the needs of Māori (Ministry of Health 2019).

From the initial hearings related to primary health care, the Waitangi Tribunal made several recommendations in accordance with the principles of equity, active protection, options and partnership.

Since its inception, Te Aho o Te Kahu has been working with cancer-specific working groups to develop QPIs to support quality improvement activity that will help to address and deliver improvements for all the people of New Zealand, particularly Māori. The QPI reports Te Aho o Te Kahu has been producing present data stratified by ethnicity, which highlights inequities.

Data improvement projects

The QPIs this report presents are surrogate measures for quality of care (that is, quality of care can be inferred from them), and there are limitations in the data presented. However, by identifying and monitoring variations in practice and outcomes, we can work across the health sector to improve cancer care so that it is equitable for all people across the country. This section outlines data limitations and gives an overview of the Agency's current data improvement projects.

We are prioritising the development of solutions to address data gaps issues associated with the nine 'aspirational' QPIs with the CanShare programme, described below.

CanShare – sharing cancer information

CanShare is a national health informatics platform that will allow the timely sharing of complete and accurate cancer data.

CanShare is based on the SNOMED CT medical terminology,[14] Fast Healthcare Interoperability Resources[15] and the Aotearoa New Zealand Health Information Standards Organisation standards. Its primary intent is to support clinical and patient decision-making at the time and point of care.

Outcomes from this work will include advanced analytics capability supporting up-to-date monitoring of cancer care throughout Aotearoa New Zealand. CanShare has engaged in several projects addressing areas of cancer data need, including the following.

[14] A standardised collection of medical terms used in clinical documentation and reporting.

[15] An interoperability standard for electronic exchange of health care information.

The anti-cancer therapy – nationally organised workstreams project

The anti-cancer therapy – nationally organised workstreams (ACT-NOW) project develops a detailed database of information on patients receiving systemic anti-cancer therapy across the country. ACT-NOW engages with the medical oncology, haematology, pharmacist and nursing communities to identify and reduce variation, enhance equity of access and support resource planning.

The Agency is working closely with Health New Zealand – Te Whatu Ora Data and Digital to design and build the IT infrastructure to receive, validate, store, link and analyse ACT-NOW data.

More information about ACT-NOW can be found on the Agency's **website**.

The structured pathology reporting of cancer in Aotearoa New Zealand – data standards project

Consistent and comprehensive national structured pathology reporting of cancer is a priority for Te Aho o Te Kahu. We have established a project to develop data standards to enable the timely sharing of pathology information for decision-making purposes. The data standards will identify and describe clinically relevant data elements to aid implementation in requesting and reporting pathology workflows for each cancer. Development and adoption of data standards is fundamental to support the sector to operate successfully in a digital data health environment. We will develop data standards for most cancers over the coming years.

More information about the structured pathology data standards programme can be found on the Agency's **website**.

The radiation oncology collection project

Over 2017–2018, the Ministry of Health worked with DHBs and private providers to develop the radiation oncology collection (ROC), a central repository of detailed radiation oncology information. Te Aho o Te Kahu has continued this work. You can view the ROC dashboard here.

The purpose of the ROC is to collect and report data to inform linear accelerator capacity planning, support fairer access to radiotherapy and drive more equitable radiation oncology treatment.

The next phase of the project is to analyse ROC data to inform service improvement. The national Radiation Oncology Working Group has identified some variations and is undertaking further investigations.

More information about the ROC project is available on the Agency's **website**.

These projects, along with others, such as work to update national guidance for multidisciplinary meetings and understand and reduce cancer treatment waiting times, will provide additional data that we can use to calculate QPIs and support ongoing quality improvement initiatives.

Other agencies, such as the Ministry of Health and Health New Zealand – Te Whatu Ora, are also currently working on data quality improvement projects that will assist our ability to calculate and report on aspirational QPIs.

Data sources

We obtained all patient data for this report from Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register (Te Rēhita), which is governed by the Breast Cancer New Zealand National Register Trust, funded by the Breast Cancer Foundation New Zealand.

Te Rēhita is a national database of information on demographics, diagnosis, surgery, follow-up, timeliness, risk and additional factors, histology, therapies, advanced breast cancer and so on.

The treatment data for QPI 14: Adjuvant endocrine therapy adherence contains data from other national collections databases, as follows.

- **Pharmaceutical Information Database (PHARMS)** – a data warehouse which contains claim and payment information from pharmacists for subsidised dispensings that have been processed by the General Transaction Processing System.
- **New Zealand ePrescription Service (NZePS)** – a service facilitating the exchange of prescription information between prescribing and dispensing systems.

Data processing

We considered a patient to have been diagnosed with primary breast cancer when they were registered on Te Rēhita for the first time with a diagnosis of breast cancer. We excluded breast neuroendocrine tumours and primary breast lymphomas.

Te Rēhita links data from a broad range of sources to identify new diagnoses and local and distant recurrences and to ensure data quality and completeness. Sources include the New Zealand Cancer Registry, other national collections, local hospital lists (eg, from multidisciplinary team meetings, faster cancer treatment data, oncology and palliative care), NZePS, BreastScreen Aotearoa, private providers and general practitioners. For cancer registrations at the patient level, Te Rēhita uses National Health Index numbers to obtain information on patient care and follow-up.

This report includes only publicly funded treatments.

Statistical analysis

Most results discussed in this report are descriptive. We have reported the results of categorical data as percentages. We typically grouped results by district health board of residence (ie, where the patient resided at the time of diagnosis).

Ethnicity

Ethnicity is a measure of cultural identity. It is not a measure of race ancestry, nationality or citizenship. Ethnicity is self-perceived. People can identify with multiple ethnic groups and change ethnicities over time.

This report uses 'prioritised ethnicity' according to the Ethnicity Data Protocols developed by the Health Information Standards Organisation (Health New Zealand – Te Whatu Ora, 2024b). This means that where people identify with more than one ethnic group, we have allocated one ethnicity to them, in an order of priority. It ensures that ethnic groups of policy importance or of small size are not diluted by the New Zealand/European ethnic group. The priority we used was Māori, Pacific peoples, Asian, European/other.

Public versus private treatment

This analysis only covers people who received publicly funded cancer treatment – not those treated privately. This is important to remember: the data may hide inequities by making it look like those who access care privately (more typically those of European/other ethnicity and those with higher incomes) are not receiving treatment. If a breast cancer patient received a mixture of public and private treatment, they were counted in the denominator but not the numerator. Table 3 gives an outline of those excluded.

Table 3: Privately treated patients by treatment received, 2020–2021

Private treatment	Patients excluded	Relevant QPI
Surgery	1,892	5, 6, 24, 26
Chemotherapy	524	11, 13
Biological therapy	965	11, 13, 14
Radiation therapy	810	26
Total	**2,101**	

QPI = quality performance indicator

Sex and gender

The Agency recognises that a person's current gender may differ from the sex recorded at birth and what is indicated on their current legal documents.

A person's sex is based on their sex characteristics observed and recorded at birth or infancy. A person's gender refers to someone's social and personal identity as male, female or another gender or genders that may be non-binary.

Throughout this report, we refer to males and females based on the Stats NZ definition of sex (Stats NZ 2021). This is due to data limitations in combination with the low number of people whose sex was female but who identified as male.

Where sex is specified (eg, 'females diagnosed with breast cancer'), biologically born males have been excluded. Where the term 'people' is used, biologically born females and males have both been included.

A total of 71 males were diagnosed with breast cancer between 1 January 2020 and 31 December 2021.

Suppression rules

We have not presented results when there were five or fewer patients in a group. This is to ensure adequate privacy and confidentiality for patients and providers.

We have also suppressed additional results if the results where there are five or fewer patients in a group can be calculated. This is referred to as secondary suppression. More information on this approach can be found on the **Stats NZ website** (Stats NZ 2019).

Stratification

Stratifying variables for this report included age group, sex, ethnic group, stage, NZDep2018 quintile (linked to cancer registrations using health domicile codes) and urban/rural status. Appendix C gives stratified data.

Our staging definitions come from the American Joint Committee on cancer staging manual (eighth edition). We used a mix of clinical anatomic and pathological stages. Clinical anatomic staging determines how much cancer there is based on physical examination, imaging tests and biopsies of affected areas. In comparison, pathological staging is determined when a patient has surgery to remove a tumour and combines the results of both the clinical staging and the surgical results (American Joint Committee on Cancer 2018).

Index of Deprivation (NZDep) is an area-based measure of socioeconomic deprivation in New Zealand (Atkinson et al 2015). It measures the level of deprivation for people in each area, based on nine Census variables. In this report, NZDep is displayed in quintiles. Each NZDep quintile contains about 20% of small areas in New Zealand.

We determined rural–urban status at time of diagnosis using the Rural Health Research Network's Geographic Classification for Health, a rural–urban geographic classification designed specifically for New Zealand, allowing health researchers and policymakers to accurately monitor variations in health outcomes across different areas. For more information on this classification, visit the Rural Health Research Network's **website**.

Age standardisation

Age standardisation is an important method for comparing outcomes across different ethnic groups.

In New Zealand, different populations vary in terms of the ages of people in each group. For example, some ethnicities, genders and regions may comprise more young people,

or more older people, than others. Age is an important determinant of cancer incidence and outcomes. A population with a younger age distribution may seem to have similar or better outcomes than those with an older population –but this may be only because of differences between them in terms of their age distribution. Standardising age structures between groups allows for more accurate comparisons, enabling a clearer examination of disparities.

Age-standardised proportions are calculated by the direct standardisation method, which multiplies the non-age-standardised proportions by a standard population. The standard population used in this publication is a cohort of all Māori diagnosed with breast cancer between 2020 and 2021 who were included in the analysis as follows.

Table 4: Māori diagnosed with breast cancer, 2020–2021

Age group (years)	Population distribution (%)
20–29	0.95
30–34	1.89
35–39	3.44
40–44	5.85
45–49	12.73
50–54	14.36
55–59	15.99
60–64	17.11
65–69	13.50
70–74	5.59
75–79	4.73
80–84	3.87
85+	0.95
Total	100.00

Note: age groups 0–4, 5–9, 10–14 and 15–19 are excluded from the analysis. The age group 20–29 is an aggregate of the age groups 20–24 and 24–29. The age group 85+ is an aggregate of the age groups 85–89, 90–94, 95–99 and 100+.

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Confidence intervals, relative standard error and significance testing

A confidence interval represents a range of values that express the uncertainty around an estimate, such as an age-standardised proportion. It shows how much the estimate could vary if a different set of data had been used. Confidence intervals are usually calculated with a specific probability, most commonly 95%. This means that there is a 95% chance that the true value lies within the given range.

Confidence intervals are most often used when working with sample data to estimate how likely it is that the result is true of the whole population. Therefore, they are often used to decide if a difference between two groups being looked at is likely to be a true difference: if the confidence intervals overlap, there may not be a true difference.

This report uses whole-population data rather than sampled data, so the confidence intervals it entails should be interpreted differently. Overlapping confidence intervals do not indicate that a difference between compared groups is not a true difference.

Confidence intervals are presented in this report to give an impression of the precision of the results (ie, whether the numbers are large or small). Wider confidence intervals indicate a smaller number of people within the group. Proportions with wide confidence intervals are more likely to fluctuate over time. Conversely, narrow confidence intervals indicate a larger number of people: in this case, we can be more certain that the results are a true representation of what is occurring nationally, and that there is less likely to be variation over time.

For this report, we calculated confidence intervals for age-standardised proportions at the 95% level, following the method outlined by Fay and Feuer (1997). For non-age-standardised proportions by DHB, we use Wilson's formula, which approximates the exact method (Rothman 2012), also at the 95% level.

We also calculated relative standard error to assess the stability of the age-standardised proportions. If a relative standard error is greater than 30%, the results are deemed to be 'unstable' (VanEenwyk 2012). The tables in Appendix C of this report note this where appropriate.

APPENDIX C: SUPPLEMENTARY TABLES

QPI 1: Route to detection

Table 5: People diagnosed with breast cancer, by route to detection, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

		BreastScreen Aotearoa-detected			Non-BreastScreen Aotearoa image detected			Symptomatic		
			Age-standardised proportion[3]			Age-standardised proportion[3]			Age-standardised proportion[3]	
	People with breast cancer[1]	% detected[2]	%	Confidence interval (95%)	% detected[2]	%	Confidence interval (95%)	% detected[2]	%	Confidence interval (95%)
All cases[4]										
Total	8,286	36.7	42.4	40.9–43.9	11.8	10.5	9.9–11.3	51.5	47.1	45.6–48.6
Year of diagnosis										
2020	4,083	36.1	41.7	39.6–43.9	12.3	10.8	9.8–11.9	51.7	47.5	45.4–49.7
2021	4,203	37.3	43.1	41.0–45.3	11.4	10.4	9.4–11.4	51.3	46.5	44.5–48.7
Age group (years)										
Less than 45	861	-	-	-	8.7	-	-	91.3	-	-
45–54	1,964	51.0	-	-	8.1	-	-	40.9	-	-
55–69	3,307	61.7	-	-	9.0	-	-	29.9	-	-
70–79	640	-	-	-	26.3	-	-	72.4	-	-
80 plus	812	-	-	-	11.9	-	-	88.1	-	-
Sex										
Female	8,220	37.0	42.7	41.2–44.2	11.9	10.6	9.9–11.3	51.1	46.7	45.3–48.3
Male	66	-	-	-	9.1	3.9†	1.0–31.5	90.9	96.1	62.3–100.0

		BreastScreen Aotearoa-detected			Non-BreastScreen Aotearoa image detected			Symptomatic		
			Age-standardised proportion[3]			Age-standardised proportion[3]			Age-standardised proportion[3]	
	People with breast cancer[1]	% detected[2]	%	Confidence interval (95%)	% detected[2]	%	Confidence interval (95%)	% detected[2]	%	Confidence interval (95%)
Ethnicity										
Māori	1,156	44.8	44.8	41.0–48.8	6.3	6.3	5.0–8.0	48.9	48.9	45.0–53.1
Pacific peoples	480	40.8	43.4	37.4–50.3	3.8	3.7	2.1–6.0	55.4	52.9	46.6–60.0
Asian	705	39.1	42.3	37.3–47.9	7.1	7.6	5.5–10.4	53.8	50.1	44.9–56.0
European/other	5,945	34.5	41.7	39.9–43.6	14.1	12.2	11.3–13.2	51.4	46.1	44.2–48.0
Deprivation quintile (NZDep2018)										
Quintile 1 – least deprived	1,757	36.2	40.6	37.5–44.0	15.9	14.5	12.8–16.5	47.9	44.9	41.7–48.3
Quintile 2	1,664	35.6	41.3	38.0–44.8	13.4	12.0	10.4–13.8	51.0	46.7	43.4–50.2
Quintile 3	1,692	36.9	44.7	41.2–48.4	12.6	10.8	9.2–12.5	50.5	44.6	41.3–48.0
Quintile 4	1,640	37.0	43.1	39.7–46.8	9.7	8.5	7.2–10.1	53.3	48.4	45.0–52.0
Quintile 5 – most deprived	1,528	38.0	42.3	38.9–45.9	6.9	6.2	5.0–7.6	55.1	51.5	47.9–55.3
Rural–urban status										
Rural	1,731	38.0	43.7	40.4–47.4	9.5	8.0	6.7–9.6	52.4	48.3	44.9–52.0
Urban	6,551	36.4	42.1	40.4–43.8	12.4	11.2	10.4–12.0	51.2	46.7	45.1–48.4

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3] Age-standardised proportions are calculated after removing cases with an unknown diagnostic route.

[4] Total numbers are different to the sum of the sub-categories due to the exclusion of cases with an unknown diagnostic route.

Table 6: People diagnosed with breast cancer, by route to diagnosis and district health board of residence, 2020–2021

		BreastScreen Aotearoa-detected		Non-BreastScreen Aotearoa image detected		Symptomatic	
		Proportion		Proportion		Proportion	
	Number of females with breast cancer detected[1]	Detection of breast cancer – BSA-detected (%)	Confidence interval (95%)	Detection of breast cancer – non-BSA image detected (%)	Confidence interval (95%)	Detection of breast cancer – symptomatic (%)	Confidence interval (95%)
Auckland	701	27.1	23.9–30.5	23.8	20.8–27.1	49.1	45.4–52.8
Bay of Plenty	496	37.3	33.2–41.6	13.3	10.6–16.6	49.4	45.0–53.8
Canterbury	1,006	39.5	36.5–42.5	9.7	8.1–11.7	50.8	47.7–53.9
Capital & Coast	547	39.1	35.1–43.3	10.2	8.0–13.1	50.6	46.5–54.8
Counties Manukau	792	38.8	35.4–42.2	11.7	9.7–14.2	49.5	46.0–53.0
Hawke's Bay	342	38.9	33.9–44.2	4.4	2.7–7.1	56.7	51.4–61.9
Hutt Valley	271	42.1	36.3–48.0	8.5	5.7–12.4	49.4	43.5–55.4
Lakes	201	34.3	28.1–41.1	7.0	4.2–11.4	58.7	51.8–65.3
MidCentral	294	39.1	33.7–44.8	4.8	2.9–7.8	56.1	50.4–61.7
Nelson Marlborough	317	40.1	34.8–45.5	10.7	7.8–14.6	49.2	43.8–54.7
Northland	392	42.3	37.6–47.3	7.1	5.0–10.1	50.5	45.6–55.4
South Canterbury	123	35.8	27.9–44.6	15.4	10.1–22.9	48.8	40.1–57.5
Southern	561	38.9	34.9–43.0	10.3	8.1–13.1	50.8	46.7–54.9
Tairāwhiti	87	29.9	21.3–40.2	10.3	5.5–18.5	59.8	49.3–69.4
Taranaki	239	34.3	28.6–40.5	12.6	8.9–17.4	53.1	46.8–59.4
Waikato	688	34.3	30.9–37.9	7.8	6.1–10.1	57.8	54.1–61.5
Wairarapa	87	43.7	33.7–54.1	13.8	8.1–22.6	42.5	32.7–53.0

		BreastScreen Aotearoa-detected		Non-BreastScreen Aotearoa image detected		Symptomatic	
	Number of females with breast cancer detected[1]	Proportion		Proportion		Proportion	
		Detection of breast cancer – BSA-detected (%)	Confidence interval (95%)	Detection of breast cancer – non-BSA image detected (%)	Confidence interval (95%)	Detection of breast cancer – symptomatic (%)	Confidence interval (95%)
Waitematā	935	30.9	28.0–33.9	19.3	16.9–21.9	49.8	46.6–53.0
West Coast	60	51.7	39.3–63.8	*	*	41.7	30.1–54.3
Whanganui	147	40.8	33.2–48.9	4.8	2.3–9.5	54.4	46.4–62.3

[1] Excludes people registered with cancer from death certificates only.

* Suppressed due to a low number of cases

QPI 2: Histological grading

Table 7: Patients with invasive breast cancer and a histological grade of 3, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of people with invasive breast cancer[1]	Diagnosed with invasive breast cancer and a histological grade of 3 (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	7,364	32.9	33.8	32.4–35.2
Year of diagnosis				
2020	3,613	34.0	34.9	32.8–37.0
2021	3,751	31.9	32.7	30.8–34.7
Age group (years)				
Less than 45	792	50.0	-	-
45–54	1,648	34.9	-	-
55–69	2,866	29.3	-	-
70–79	1,269	32.3	-	-
80 plus	789	25.7	-	-
Sex				
Female	7,300	33.0	33.8	32.4–35.2
Male	64	29.7	22.3†	10.9–55.7
Ethnicity				
Māori	1,053	35.4	35.4	31.9–39.2
Pacific peoples	440	38.6	37.1	31.6–43.6
Asian	577	35.4	32.5	27.9–37.9
European/other	5,294	31.7	33.1	31.4–34.9
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	1,538	31.7	32.0	29.1–35.3
Quintile 2	1,451	33.1	34.5	31.4–37.9
Quintile 3	1,499	31.1	31.6	28.6–34.9
Quintile 4	1,480	35.1	35.9	32.7–39.4
Quintile 5 – most deprived	1,392	33.8	34.7	31.6–38.1

			Age-standardised proportion	
	Number of people with invasive breast cancer[1]	Diagnosed with invasive breast cancer and a histological grade of 3 (%)[2]	%	Confidence interval (95%)
Rural–urban status				
Rural	1,555	31.1	32.6	29.6–36.0
Urban	5,806	33.4	34.1	32.5–35.7

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3] Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

[†] The reliability of this data is questionable due to a high relative standard error.

Table 8: Patients with invasive breast cancer and a histological grade of 3, by district health board of residence, 2020–2021

		Proportion	
	Number of people with invasive breast cancer[1]	Diagnosed with invasive breast cancer and a histological grade of 3 (%)	Confidence interval (95%)
District health board of residence			
Auckland	632	30.1	26.6–33.7
Bay of Plenty	433	42.3	37.7–47.0
Canterbury	873	41.5	38.2–44.8
Capital & Coast	475	31.6	27.6–35.9
Counties Manukau	698	37.7	34.2–41.3
Hawke's Bay	318	28.3	23.6–33.5
Hutt Valley	249	26.9	21.8–32.7
Lakes	185	41.6	34.8–48.8
MidCentral	265	30.2	25.0–36.0
Nelson Marlborough	268	31.3	26.1–37.1
Northland	369	32.8	28.2–37.7
South Canterbury	115	36.5	28.3–45.6
Southern	494	30.4	26.5–34.6
Tairāwhiti	74	31.1	21.7–42.3
Taranaki	223	30.5	24.8–36.8
Waikato	608	29.4	26.0–33.2
Wairarapa	69	30.4	20.8–42.1
Waitematā	829	26.1	23.2–29.1
West Coast	55	45.5	33.0–58.5
Whanganui	132	25.8	19.1–33.8

[1] Excludes people registered with cancer from death certificates only.

QPI 5: Breast-conserving surgery

Table 9: Females with breast cancer (invasive and/or ductal carcinoma in situ) who underwent breast-conserving surgery, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females who received breast cancer surgery[1]	Underwent breast-conserving surgery (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	5,758	55.3	56.4	54.4–58.5
Year of diagnosis				
2020	2,835	54.4	55.2	52.4–58.2
2021	2,923	56.3	57.5	54.7–60.5
Age group (years)				
Less than 45	574	36.2	-	-
45–54	1,371	56.2	-	-
55–69	2,442	64.6	-	-
70–79	951	47.9	-	-
80 plus	420	41.9	-	-
Sex				
Female	5,758	55.3	56.4	54.4–58.5
Diagnosis type				
Ductal carcinoma in situ	728	66.8	66.1	59.9–73.8
Invasive	5,030	53.7	55.1	53.0–57.3
Ethnicity				
Māori	974	55.2	54.9	50.4–59.8
Pacific peoples	398	52.0	52.7	45.5–61.0
Asian	493	50.7	51.8	45.4–59.2
European/other	3,893	56.3	57.8	55.2–60.5
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	999	56.0	56.0	51.3–61.3
Quintile 2	1,036	56.8	58.0	53.2–63.0
Quintile 3	1,210	57.8	59.8	55.3–64.7
Quintile 4	1,264	52.9	54.5	50.3–59.1
Quintile 5 – most deprived	1,246	53.9	54.3	50.2–58.6

			Age-standardised proportion	
	Number of females who received breast cancer surgery[1]	Underwent breast-conserving surgery (%)[2]	%	Confidence interval (95%)
Rural–urban status				
Rural	1,274	55.5	56.8	52.4–62.0
Urban	4,482	55.3	56.4	54.2–58.8

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3] Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

Table 10: Females with breast cancer (invasive and/or ductal carcinoma in situ) who underwent breast-conserving surgery, by district health board of residence, 2020–2021

		Proportion	
	Number of females who received breast cancer surgery[1]	Underwent breast-conserving surgery (%)	Confidence interval (95%)
District health board of residence			
Auckland	333	53.5	48.1–58.7
Bay of Plenty	391	61.6	56.7–66.3
Canterbury	584	55.5	51.4–59.5
Capital & Coast	372	72.8	68.1–77.1
Counties Manukau	612	41.7	37.8–45.6
Hawke's Bay	280	54.3	48.4–60.0
Hutt Valley	189	65.6	58.6–72.0
Lakes	159	43.4	35.9–51.2
MidCentral	262	66.0	60.1–71.5
Nelson Marlborough	241	48.1	41.9–54.4
Northland	288	45.1	39.5–50.9
South Canterbury	97	44.3	34.8–54.2
Southern	406	56.9	52.0–61.6
Tairāwhiti	73	52.1	40.8–63.1
Taranaki	170	38.2	31.3–45.7
Waikato	464	65.5	61.1–69.7
Wairarapa	62	59.7	47.3–71.0
Waitematā	597	56.6	52.6–60.5
West Coast	50	64.0	50.1–75.9
Whanganui	128	51.6	43.0–60.0

[1] Excludes people registered with cancer from death certificates only.

QPI 6: Immediate reconstruction at the time of mastectomy

Table 11: Females receiving reconstruction at the same time as a mastectomy, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females who underwent mastectomy[1]	Received reconstruction at the same time as a mastectomy (%)[2]	%	Confidence interval (95%)
All cases				
Total	2,567	12.2	13.6	12.0–15.2
Year of diagnosis				
2020	1,292	11.8	13.0	10.9–15.4
2021	1,275	12.7	14.0	11.9–16.5
Age group (years)				
Less than 45	366	29.8	-	-
45–54	599	19.4	-	-
55–69	862	9.4	-	-
70–79	496	1.4	-	-
80 plus	*	*	-	-
Sex				
Female	2,567	12.2	13.6	12.0–15.2
Ethnicity				
Māori	435	9.2	8.7	6.2–12.1
Pacific peoples	192	6.8	5.1	2.6–10.7
Asian	243	13.6	11.8	7.8–18.0
European/other	1,697	13.4	17.3	15.0–19.8
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	438	16.2	16.7	12.9–21.3
Quintile 2	447	13.9	16.4	12.4–21.4
Quintile 3	510	13.9	18.0	13.9–23.2
Quintile 4	594	11.4	11.4	8.7–15.1
Quintile 5 – most deprived	575	7.3	7.5	5.4–10.3

			Age-standardised proportion	
	Number of females who underwent mastectomy[1]	Received reconstruction at the same time as a mastectomy (%)[2]	%	Confidence interval (95%)
Rural–urban status				
Rural	566	12.2	14.6	11.3–18.8
Urban	1,999	12.3	13.4	11.7–15.3

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3]Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

* Suppressed due to low number of cases.

Table 12: Females receiving reconstruction at the same time as a mastectomy, by district health board of residence, 2020–2021

		Proportion	
	Number of females who underwent mastectomy[1]	Received reconstruction at the same time as a mastectomy (%)	Confidence interval (95%)
District health board of residence			
Auckland	155	18.7	13.4–25.6
Bay of Plenty	150	20.0	14.4–27.1
Canterbury	258	18.6	14.3–23.8
Capital & Coast	100	24.0	16.7–33.2
Counties Manukau	357	7.0	4.8–10.1
Hawke's Bay	128	4.7	2.2–9.8
Hutt Valley	63	9.5	4.4–19.3
Lakes	89	10.1	5.4–18.1
MidCentral	89	10.1	5.4–18.1
Nelson Marlborough	126	7.9	4.4–14.0
Northland	158	8.9	5.4–14.3
South Canterbury	*	*	*
Southern	175	6.3	3.5–10.9
Tairāwhiti	*	*	*
Taranaki	*	*	*
Waikato	160	18.1	12.9–24.8
Wairarapa	*	*	*
Waitematā	259	18.1	13.9–23.3
West Coast	*	*	*
Whanganui	*	*	*

[1] Excludes people registered with cancer from death certificates only.

* Suppressed due to low number of cases.

QPI 11(a): Chemotherapy with or without trastuzumab

Table 13: Patients with triple-negative stage I–III breast cancer with a tumour >1 cm or node-positive who received chemotherapy, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females with triple-negative stage I–III breast cancer[1]	Received chemotherapy (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	417	56.1	63.4	55.1–72.8
Year of diagnosis				
2020	218	52.3	58.5	47.5–71.6
2021	199	60.3	68.3	55.9–82.8
Age group (years)				
Less than 45	57	84.2	-	-
45–54	89	75.3	-	-
55–69	143	62.2	-	-
70–79	88	34.1	-	-
80 plus	*	*	*	*
Sex				
Female	417	56.1	63.4	55.1–72.8
Ethnicity				
Māori	47	59.6	59.6	35.5–100.0
Pacific peoples	15	66.7	62.3	29.2–100.0
Asian	29	62.1	46.4†	22.3–91.0
European/other	326	54.6	64.7	55.0–75.9
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	81	49.4	59.1	41.7–81.8
Quintile 2	89	61.8	67.9	50.5–90.5
Quintile 3	78	66.7	77.2	53.5–100.0
Quintile 4	89	51.7	55.7	39.3–77.8
Quintile 5 – most deprived	80	51.2	57.6	39.5–88.5

			Age-standardised proportion	
	Number of females with triple-negative stage I–III breast cancer[1]	Received chemotherapy (%)[2]	%	Confidence interval (95%)
Rural–urban status				
Rural	98	56.1	67.2[†]	48.7–91.5
Urban	319	56.1	62.2	53.0–72.7

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Age-specific data.

[3] Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

* Suppressed due to low number of cases.

[†] The reliability of this data is questionable due to a high relative standard error.

Table 14: Patients with triple-negative stage I–III breast cancer with a tumour >1 cm or node-positive who received chemotherapy, by district health board of residence, 2020-2021

		Proportion	
	Number of females with triple-negative stage I–III breast cancer[1]	Received chemotherapy (%)	Confidence interval (95%)
District health board of residence			
Auckland	17	52.9	31.0–73.8
Bay of Plenty	15	40.0	19.8–64.3
Canterbury	19	57.9	36.3–76.9
Capital & Coast	35	54.3	38.2–69.5
Counties Manukau	26	57.7	38.9–74.5
Hawke's Bay	39	51.3	36.2–66.1
Hutt Valley	17	47.1	26.2–69.0
Lakes	*	*	*
MidCentral	31	58.1	40.8–73.6
Nelson Marlborough	18	72.2	49.1–87.5
Northland	19	68.4	46.0–84.6
South Canterbury	*	*	*
Southern	42	57.1	42.2–70.9
Tairāwhiti	*	*	*
Taranaki	18	66.7	43.7–83.7
Waikato	34	64.7	47.9–78.5
Wairarapa	*	*	*
Waitematā	45	53.3	39.1–67.1
West Coast	*	*	*
Whanganui	17	41.2	21.6–64.0

[1] Excludes people registered with cancer from death certificates only.

* Suppressed due to low number of cases.

QPI 11(b): Chemotherapy with or without trastuzumab

Table 15: Patients with HER2-positive stage I–III breast cancer with a tumour >1 cm or node-positive who received chemotherapy and trastuzumab, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females with HER2-positive stage I–III breast cancer[1]	Received chemotherapy and trastuzumab (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	811	63.1	64.3	58.7–70.4
Year of diagnosis				
2020	400	65.2	65.7	57.7–74.6
2021	411	61.1	62.6	54.9–71.2
Age group (years)				
Less than 45	133	80.5	-	-
45–54	234	68.8	-	-
55–69	296	66.9	-	-
70–79	98	41.8	-	-
80 plus	*	*	-	-
Sex				
Female	806	63.4	64.5	58.9–70.6
Male	*	*	*	*
Ethnicity				
Māori	146	60.3	58.0	46.0–73.8
Pacific peoples	100	72.0	71.8	54.1–94.7
Asian	73	67.1	63.3	44.8–89.8
European/other	492	61.6	65.2	57.8–73.4
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	137	58.4	62.3	48.0–80.4
Quintile 2	139	69.8	70.0	56.1–87.3
Quintile 3	153	59.5	60.9	48.7–75.9
Quintile 4	184	64.7	66.0	53.9–80.7
Quintile 5 – most deprived	198	63.1	63.4	52.3–76.7

			Age-standardised proportion	
	Number of females with HER2-positive stage I–III breast cancer[1]	Received chemotherapy and trastuzumab (%)[2]	%	Confidence interval (95%)
Rural–urban status				
Rural	179	63.1	63.3	52.0–76.8
Urban	632	63.1	64.5	58.1–71.5

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3]Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

* Suppressed due to low number of cases.

Table 16: Patients with HER2-positive stage I–III breast cancer with a tumour >1 cm or node-positive who received chemotherapy and trastuzumab, by district health board of residence, 2020–2021

		Proportion	
	Number of females with HER2-positive stage I–III breast cancer[1]	**Received chemotherapy and trastuzumab (%)**	**Confidence interval (95%)**
District health board of residence			
Auckland	60	63.3	50.7–74.4
Bay of Plenty	52	61.5	48.0–73.5
Canterbury	95	54.7	44.7–64.4
Capital & Coast	40	65.0	49.5–77.9
Counties Manukau	95	75.8	66.3–83.3
Hawke's Bay	36	63.9	47.6–77.5
Hutt Valley	26	61.5	42.5–77.6
Lakes	22	72.7	51.8–86.8
MidCentral	22	72.7	51.8–86.8
Nelson Marlborough	34	58.8	42.2–73.6
Northland	38	63.2	47.3–76.6
South Canterbury	*	*	*
Southern	70	68.6	57.0–78.2
Tairāwhiti	6	100.0	61.0–100
Taranaki	23	73.9	53.5–87.5
Waikato	76	50.0	39.0–61.0
Wairarapa	*	*	*
Waitematā	77	61.0	49.9–71.2
West Coast	*	*	*
Whanganui	14	78.6	52.4–92.4

[1] Excludes people registered with cancer from death certificates only.

* Suppressed due to low number of cases.

QPI 13: Neoadjuvant chemotherapy

Table 17: Proportion of patients with stage II or III breast cancer who were either triple-negative or HER2-positive and received neoadjuvant chemotherapy, including neoadjuvant trastuzumab, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females with stage II or III breast cancer who received chemotherapy[1]	Received neoadjuvant chemotherapy, including trastuzumab (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	694	52.9	51.2	45.7–57.2
Year of diagnosis				
2020	348	46.8	44.6	37.5–53.0
2021	346	59.0	57.8	49.-–67.2
Age group (years)				
Less than 45	144	70.8	-	-
45–54	214	58.9	-	-
55–69	221	49.8	-	-
70–79	87	31.0	-	-
80 plus	*	*	-	-
Sex				
Female	693	53.0	51.3	45.8–57.3
Male	*	*	*	*
Ethnicity				
Māori	118	49.2	47.1	34.9–62.8
Pacific peoples	78	50.0	46.0	30.6–70.1
Asian	67	61.2	40.5	26.4–90.9
European/other	431	53.1	53.6	46.6–61.5
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	110	51.8	46.5	33.6–65.2
Quintile 2	127	49.6	48.5	36.2–66.3
Quintile 3	136	57.4	53.8	41.6–69.3
Quintile 4	151	51.7	48.5	37.6–62.3
Quintile 5 – most deprived	170	53.5	53.6	42.-–67.3

			Age-standardised proportion	
	Number of females with stage II or III breast cancer who received chemotherapy[1]	Received neoadjuvant chemotherapy, including trastuzumab (%)[2]	%	Confidence interval (95%)
Rural–urban status				
Rural	155	54.2	53.5	42.1–67.6
Urban	539	52.5	50.1	44.1–57.0

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3]Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

* Suppressed due to low number of cases.

Table 18: Patients with stage II or III breast cancer who were either triple-negative or HER2-positive and received neoadjuvant chemotherapy, including neoadjuvant trastuzumab, by district health board of residence, 2020–2021

		Proportion	
	Number of females with stage II or III breast cancer who received chemotherapy[1]	Received neoadjuvant chemotherapy, including trastuzumab (%)	Confidence interval (95%)
District health board of residence			
Auckland	50	64.0	50.1–75.9
Bay of Plenty	34	58.8	42.2–73.6
Canterbury	62	64.5	52.1–75.3
Capital & Coast	34	55.9	39.5–71.1
Counties Manukau	83	33.7	24.5–44.4
Hawke's Bay	38	52.6	37.3–67.5
Hutt Valley	20	60.0	38.7–78.1
Lakes	22	36.4	19.7–57.0
MidCentral	33	54.5	38.0–70.2
Nelson Marlborough	30	60.0	42.3–75.4
Northland	36	72.2	56.0–84.2
South Canterbury	*	*	*
Southern	72	50.0	38.7–61.3
Tairāwhiti	*	*	*
Taranaki	15	80.0	54.8–93.0
Waikato	59	55.9	43.3–67.8
Wairarapa	*	*	*
Waitematā	69	40.6	29.8–52.4
West Coast	*	*	*
Whanganui	*	*	*

[1] Excludes people registered with cancer from death certificates only.

* Suppressed due to low number of cases.

QPI 14(a): Adjuvant endocrine therapy adherence at six months

Table 19: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at six months, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females with endocrine-sensitive stage I–III breast cancer who completed six months of endocrine therapy[1]	Adherent to endocrine therapy at six months (%)[2]	%	Confidence interval (95%)
All cases				
Total	2,593	75.8	75.5	72.1–79.0
Year of diagnosis				
2020	1,330	76.5	76.2	71.4–81.2
2021	1,263	75.0	74.9	70.0–80.1
Age group (years)				
Less than 45	258	70.5	-	-
45–54	621	73.3	-	-
55–69	1,130	77.6	-	-
70–79	428	77.1	-	-
80 plus	156	77.6	-	-
Sex				
Female	2,593	75.8	75.5	72.1–79.0
Ethnicity				
Māori	453	68.4	68.6	61.1–76.8
Pacific peoples	193	64.2	63.3	51.6–78.7
Asian	200	85.0	85.5	72.4–100.0
European/other	1,747	77.9	78.0	73.6–82.6
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	442	77.1	77.9	69.6–87.5
Quintile 2	441	74.8	75.3	67.1–84.2
Quintile 3	500	76.6	76.5	68.4–86.2
Quintile 4	619	76.7	75.9	68.9–83.7
Quintile 5 – most deprived	590	73.7	73.5	66.6–81.0

			Age-standardised proportion	
	Number of females with endocrine-sensitive stage I–III breast cancer who completed six months of endocrine therapy[1]	Adherent to endocrine therapy at six months (%)[2]	%	Confidence interval (95%)
Rural–urban status				
Rural	561	75.4	75.1	67.6–84.2
Urban	2,031	75.9	75.5	71.7–79.5

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3]Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

Table 20: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at six months, by district health board of residence, 2020–2021

		Proportion	
	Number of females with endocrine-sensitive stage I–III breast cancer who completed six months of endocrine therapy[1]	Adherent to adjuvant endocrine therapy at six months (%)	Confidence interval (95%)
District health board of residence			
Auckland	154	74.7	67.3–80.9
Bay of Plenty	226	72.6	66.4–78.0
Canterbury	174	77.0	70.2–82.6
Capital & Coast	141	74.5	66.7–80.9
Counties Manukau	286	79.4	74.3–83.7
Hawke's Bay	142	76.1	68.4–82.3
Hutt Valley	98	69.4	59.7–77.6
Lakes	89	75.3	65.4–83.1
MidCentral	136	83.1	75.9–88.5
Nelson Marlborough	119	71.4	62.7–78.8
Northland	123	74.0	65.6–80.9
South Canterbury	36	80.6	65.0–90.2
Southern	191	78.5	72.2–83.8
Tairāwhiti	35	80.0	64.1–90.0
Taranaki	84	75.0	64.8-83.0
Waikato	204	75.0	68.6–80.4
Wairarapa	27	66.7	47.8–81.4
Waitematā	247	76.1	70.4–81.0
West Coast	22	59.1	38.7–76.7
Whanganui	59	78.0	65.9–86.6

[1] Excludes people registered with cancer from death certificates only.

QPI 14(b): Adjuvant endocrine therapy adherence at 12 months

Table 21: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at 12 months, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females with endocrine-sensitive stage I–III breast cancer who completed 12 months of endocrine therapy[1]	Adherent to adjuvant endocrine therapy at 12 months (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	2,167	67.0	65.6	62.2–69.3
Year of diagnosis				
2020	1,317	67.7	66.4	61.9–71.1
2021	850	66.0	64.8	59.2–71.2
Age group (years)				
Less than 45	195	58.5	-	-
45–54	485	57.5	-	-
55–69	973	70.2	-	-
70–79	377	73.7	-	-
80 plus	137	71.5	-	-
Sex				
Female	2,167	67.0	65.6	62.2–69.3
Ethnicity				
Māori	385	56.6	56.3	49.0–64.6
Pacific peoples	158	55.7	57.9	45.1–74.6
Asian	164	68.9	68.7	56.1–84.9
European/other	1,460	70.8	69.4	64.9–75.4
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	350	69.1	70.2	61.2–80.5
Quintile 2	376	64.6	63.7	55.6–73.6
Quintile 3	413	68.0	66.8	58.1–78.8
Quintile 4	526	70.3	68.4	61.3–77.1
Quintile 5 – most deprived	501	63.1	61.2	54.4–68.7

			Age-standardised proportion	
	Number of females with endocrine-sensitive stage I–III breast cancer who completed 12 months of endocrine therapy[1]	Adherent to adjuvant endocrine therapy at 12 months (%)[2]	%	Confidence interval (95%)
Rural–urban status				
Rural	468	64.7	63.9	56.4–72.3
Urban	1,694	67.8	66.5	62.6–70.7

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3]Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

Table 22: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at 12 months, by district health board of residence, 2020–2021

		Proportion	
	Number of females with endocrine-sensitive stage I–III breast cancer who completed 12 months of endocrine therapy[1]	Adherent to adjuvant endocrine therapy at 12 months (%)	Confidence interval (95%)
District health board of residence			
Auckland	121	65.3	56.5–73.2
Bay of Plenty	193	63.2	56.2–69.7
Canterbury	126	71.4	63.0–78.6
Capital & Coast	117	60.7	51.6–69.1
Counties Manukau	235	65.1	58.8-70.9
Hawke's Bay	118	67.8	58.9-75.6
Hutt Valley	82	68.3	57.6-77.4
Lakes	79	67.1	56.1-76.4
MidCentral	110	74.5	65.7-81.8
Nelson Marlborough	93	60.2	50.1-69.6
Northland	99	58.6	48.7-67.8
South Canterbury	30	60.0	42.3-75.4
Southern	168	73.8	66.7-79.9
Tairāwhiti	33	57.6	40.8-72.8
Taranaki	72	84.7	74.7-91.2
Waikato	190	63.7	56.6-70.2
Wairarapa	23	65.2	44.9-81.2
Waitematā	211	69.7	63.2-75.5
West Coast	16	62.5	38.6-81.5
Whanganui	51	72.5	59.1-82.9

[1] Excludes people registered with cancer from death certificates only.

QPI 14(c): Adjuvant endocrine therapy adherence at 24 months

Table 23: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at 24 months, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females with endocrine-sensitive stage I–III breast cancer who completed 24 months of endocrine therapy[1]	Adherent to adjuvant endocrine therapy at 24 months (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	746	63.9	61.2	55.2–68.6
Year of diagnosis				
2020	746	63.9	61.2	55.2–68.6
Age group (years)				
Less than 45	51	51.0	-	-
45–54	149	60.4	-	-
55–69	329	63.8	-	-
70–79	157	72.0	-	-
80 plus	60	63.3	-	-
Sex				
Female	746	63.9	61.2	55.2–68.6
Ethnicity				
Māori	124	54.8	54.4	41.8–70.4
Pacific peoples	46	50.0	54.0	31.0–91.9
Asian	53	62.3	63.8	41.5–99.6
European/other	523	67.5	66.2	58.3–75.7
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	120	70.0	69.2	53.9–88.9
Quintile 2	125	61.6	60.2	46.4–78.2
Quintile 3	137	62.8	59.9	46.2–80.6
Quintile 4	192	60.9	58.2	47.4–71.5
Quintile 5 – most deprived	172	65.7	60.9	49.2–75.3

			Age-standardised proportion	
	Number of females with endocrine-sensitive stage I–III breast cancer who completed 24 months of endocrine therapy[1]	Adherent to adjuvant endocrine therapy at 24 months (%)[2]	%	Confidence interval (95%)
Rural–urban status				
Rural	177	66.1	64.7	52.1–80.8
Urban	569	63.3	60.0	53.4–68.2

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3]Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

Table 24: Proportion of females with endocrine-sensitive stage I–III breast cancer still being dispensed endocrine therapy at 24 months, by district health board of residence, 2020–2021

		Proportion	
	Number of females with endocrine-sensitive stage I–III breast cancer who completed 24 months of endocrine therapy[1]	Adherent to adjuvant endocrine therapy at 24 months (%)	Confidence interval (95%)
District health board of residence			
Auckland	32	59.4	42.3–74.5
Bay of Plenty	62	64.5	52.1–75.3
Canterbury	33	66.7	49.6–80.2
Capital & Coast	43	44.2	30.4–58.9
Counties Manukau	85	51.8	41.3–62.1
Hawke's Bay	50	74.0	60.4–84.1
Hutt Valley	21	47.6	28.3–67.6
Lakes	36	55.6	39.6–70.5
MidCentral	47	72.3	58.2–83.1
Nelson Marlborough	26	53.8	35.5–71.2
Northland	31	58.1	40.8–73.6
South Canterbury	8	87.5	52.9–97.8
Southern	64	81.2	70.0–88.9
Tairāwhiti	16	62.5	38.6–81.5
Taranaki	19	78.9	56.7–91.5
Waikato	61	59.0	46.5–70.5
Wairarapa	*	*	*
Waitematā	77	72.7	61.9–81.4
West Coast	*	*	*
Whanganui	23	78.3	58.1–90.3

[1] Excludes people registered with cancer from death certificates only.

* Suppressed due to low number of cases.

QPI 23: Timely diagnosis

Table 25: People diagnosed with breast cancer within 28 days,[1] by route to diagnosis, year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

	BreastScreen Aotearoa-detected				Non-BreastScreen Aotearoa image detected				Symptomatic			
			Age-standardised proportion				Age-standardised proportion				Age-standardised proportion	
	Females diagnosed with breast cancer[2]	% diagnosed within 28 days of referral[3]	%	Confidence interval (95%)	People diagnosed with breast cancer[2]	% diagnosed within 28 days of referral[3]	%	Confidence interval (95%)	People diagnosed with breast cancer[2]	% diagnosed within 28 days of referral[3]	%	Confidence interval (95%)
All cases[4]												
Total	3,081	82.8	82.0	77.9–86.6	992	89.6	88.8	81.7–97.4	4,316	71.8	71.6	68.6–74.8
Year of diagnosis												
2020	1,488	84.4	84.6	78.5–91.9	507	89.0	88.5	78.6–100.0	2,136	71.5	71.6	67.4–76.1
2021	1,593	81.3	79.3	74.0–85.9	485	90.3	88.8	79.0–99.6	2,180	72.0	71.7	67.4–76.3
Age group (years)												
Less than 45	-	-	-	-	76	85.5	-	-	792	68.6	-	-
45–54	1,014	82.1	-	-	164	86.0	-	-	815	71.3	-	-
55–69	2,067	83.1	-	-	298	92.3	-	-	1,001	72.5	-	-
70–79	-	-	-	-	357	88.8	-	-	984	72.6	-	-
80 plus	-	-	-	-	97	93.8	-	-	724	73.6	-	-
Sex												
Female	3,081	82.8	82.0	77.9–86.6	985	89.5	88.8	81.7–97.4	4,252	71.9	71.9	68.8–75.0
Male	-	-	-	-	7	100.0	100.0†	21.5–100.0	64	59.4	59.3	35.2–98.7

	BreastScreen Aotearoa-detected				Non-BreastScreen Aotearoa image detected				Symptomatic			
			Age-standardised proportion				Age-standardised proportion				Age-standardised proportion	
	Females diagnosed with breast cancer[2]	% diagnosed within 28 days of referral[3]	%	Confidence interval (95%)	People diagnosed with breast cancer[2]	% diagnosed within 28 days of referral[3]	%	Confidence interval (95%)	People diagnosed with breast cancer[2]	% diagnosed within 28 days of referral[3]	%	Confidence interval (95%)
Ethnicity												
Māori	523	77.2	76.6	67.3–89.9	73	82.2	80.1	60.3–100.0	569	74.0	74.7	67.0–83.2
Pacific peoples	199	83.4	83.2	70.8–97.3	18	100.0	100.0	50.6–100.0	269	74.7	75.6	63.8–89.7
Asian	281	80.8	80.9	70.6–92.4	52	86.5	89.6	62.5–100.0	382	71.7	71.5	61.8–82.5
European/other	2,078	84.4	83.5	78.7–89.1	849	90.2	89.5	81.7–98.1	3,096	71.1	70.5	66.8–74.3
Deprivation quintile (NZDep2018)												
Quintile 1 – least deprived	642	86.4	80.5	73.9–100.0	281	92.9	93.1	80.0–100.0	854	70.6	73.0	66.2–80.3
Quintile 2	603	85.4	86.2	76.7–98.6	226	92.5	93.2	78.0–100.0	857	71.5	69.7	63.2–76.8
Quintile 3	631	83.8	83.2	76.2–90.8	216	90.3	89.6	74.3–100.0	868	73.5	74.7	67.4–82.8
Quintile 4	617	82.7	82.0	73.9–92.1	160	85.0	79.4	63.4–100.0	885	69.3	67.2	60.7–74.3
Quintile 5 – most deprived	588	75.2	74.9	67.0–84.7	107	80.4	77.6	57.3–100.0	849	73.9	73.6	67.0–80.7

	BreastScreen Aotearoa-detected				Non-BreastScreen Aotearoa image detected				Symptomatic			
			Age-standardised proportion				Age-standardised proportion				Age-standardised proportion	
	Females diagnosed with breast cancer[2]	% diagnosed within 28 days of referral[3]	%	Confidence interval (95%)	People diagnosed with breast cancer[2]	% diagnosed within 28 days of referral[3]	%	Confidence interval (95%)	People diagnosed with breast cancer[2]	% diagnosed within 28 days of referral[3]	%	Confidence interval (95%)
Rural–urban status												
Rural	664	79.7	79.4	71.1–90.0	167	83.2	79.3	61.9–100.0	918	70.0	69.8	63.4–76.8
Urban	2,417	83.7	82.5	77.9–88.0	823	90.9	90.5	82.8–99.8	3,396	72.2	72.0	68.6–75.6

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] The definition of 28 days by route to diagnosis is as follows:

a. BreastScreen Aotearoa-detected breast cancer – from the date of the outcome of the screening mammogram to the date of the diagnostic biopsy (including cytological procedure).
b. Non-BreastScreen Aotearoa image-detected breast cancer – from the date of the initial abnormal imaging to the date of the diagnostic biopsy (including cytological procedure).
c. Symptomatically – from the date of the receipt of the specialist referral to the date of the diagnostic biopsy (including cytological procedure).

[2] Excludes people registered with cancer from death certificates only.

[3] Non-age-standardised data.

[4] Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

[†] The reliability of this data is questionable due to a high relative standard error.

Table 26: People diagnosed with breast cancer within 28 days,[1] by route to diagnosis and district health board of residence, 2020–2021

	Non-BreastScreen Aotearoa image detected			Non-BreastScreen Aotearoa image detected			Symptomatic		
		Proportion			Proportion			Proportion	
	Females diagnosed with breast cancer[1]	% diagnosed within 28 days of referral	95% confidence intervals	People diagnosed with breast cancer[2]	% diagnosed within 28 days of referral	95% confidence intervals	People diagnosed with breast cancer[1]	% diagnosed with within 28 days of referral	95% confidence intervals
District health board of residence									
Auckland	194	85.6	79.9–89.8	171	95.3	91.0–97.6	352	79.5	75.0–83.4
Bay of Plenty	188	83.0	77.0–87.7	68	92.6	83.9–96.8	248	49.2	43.0–55.4
Canterbury	400	85.5	81.7–88.6	100	98.0	93.0–99.4	517	47.4	43.1–51.7
Capital & Coast	214	89.3	84.4–92.7	56	96.4	87.9–99.0	277	92.4	88.7–95.0
Counties Manukau	314	84.1	79.6–87.7	93	95.7	89.5–98.3	395	86.8	83.1–89.8
Hawke's Bay	133	78.9	71.3–85.0	15	100.0	79.6–100	194	97.9	94.8–99.2
Hutt Valley	114	91.2	84.6–95.2	23	95.7	79.0–99.2	134	91.8	85.9–95.4
Lakes	70	88.6	79.0–94.1	14	85.7	60.1–96.0	119	64.7	55.8–72.7
MidCentral	115	80.0	71.8–86.3	14	92.9	68.5–98.7	165	92.7	87.7–95.8
Nelson Marlborough	128	89.1	82.5–93.4	35	82.9	67.3–91.9	156	24.4	18.3–31.7
Northland	171	81.3	74.8–86.4	28	75.0	56.6–87.3	204	75.5	69.2–80.9
South Canterbury	45	84.4	71.2–92.3	19	100.0	83.2–100	60	85.0	73.9–91.9
Southern	220	80.0	74.2–84.8	58	79.3	67.2–87.7	291	79.7	74.7–83.9
Tairāwhiti	26	57.7	38.9–74.5	9	88.9	56.5–98.0	52	63.5	49.9–75.2
Taranaki	82	58.5	47.7–68.6	31	71.0	53.4–83.9	127	90.6	84.2–94.5
Waikato	240	76.7	70.9–81.6	55	63.6	50.4–75.1	407	69.0	64.4–73.3

	Non-BreastScreen Aotearoa image detected			Non-BreastScreen Aotearoa image detected			Symptomatic		
		Proportion			Proportion			Proportion	
	Females diagnosed with breast cancer[1]	% diagnosed within 28 days of referral	95% confidence intervals	People diagnosed with breast cancer[2]	% diagnosed within 28 days of referral	95% confidence intervals	People diagnosed with breast cancer[1]	% diagnosed with within 28 days of referral	95% confidence intervals
Wairarapa	38	81.6	66.6–90.8	12	91.7	64.6–98.5	37	86.5	72.0–94.1
Waitematā	298	86.9	82.6–90.3	180	88.3	82.8–92.2	476	67.4	63.1–71.5
West Coast	31	67.7	50.1–81.4	*	*	*	*	*	*
Whanganui	60	73.3	61.0–82.9	7	100.0	64.6-100	80	57.5	46.6–67.7

[1] The definition of 28 days by route to diagnosis is as follows:

a. BreastScreen Aotearoa-detected breast cancer – from the date of the outcome of the screening mammogram to the date of the diagnostic biopsy (including cytological procedure).

b. Non-BreastScreen Aotearoa image-detected breast cancer – from the date of the initial abnormal imaging to the date of the diagnostic biopsy (including cytological procedure).

c. Symptomatically – from the date of the receipt of the specialist referral to the date of the diagnostic biopsy (including cytological procedure).

[2] Excludes people registered with cancer from death certificates only.

* Suppressed due to low number of cases.

QPI 24(a): Time to surgery (six weeks)

Table 27: Females treated with surgery (excluding females having neoadjuvant chemotherapy or neoadjuvant endocrine therapy) within six weeks of the decision to treat with breast surgery (excluding females whose first surgery was a mastectomy with immediate reconstruction), by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females who received surgery without immediate breast reconstruction[1]	Received surgery without immediate breast reconstruction within six weeks of decision to treat (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	5,003	88.9	89.2	86.5–92.1
Year of diagnosis				
2020	2,494	89.2	89.6	85.7–93.8
2021	2,509	88.6	88.9	85.0–93.0
Age group (years)				
Less than 45	351	89.7	-	-
45–54	1,132	88.7	-	-
55–69	2,215	89.7	-	-
70–79	899	89.3	-	-
80 plus	406	83.3	-	-
Sex				
Female	5,003	88.9	89.2	86.5–92.1
Ethnicity				
Māori	844	86.8	86.9	80.7–93.7
Pacific peoples	337	90.8	90.4	80.3–100.0
Asian	411	89.1	89.3	80.2–99.4
European/other	3,411	89.2	89.7	86.1–93.6

			Age-standardised proportion	
	Number of females who received surgery without immediate breast reconstruction[1]	Received surgery without immediate breast reconstruction within six weeks of decision to treat (%)[2]	%	Confidence interval (95%)
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	859	89.5	89.5	82.9–96.8
Quintile 2	890	89.8	90.2	83.5–98.4
Quintile 3	1,042	87.3	87.7	81.5–94.7
Quintile 4	1,110	89.7	89.9	84.1–96.3
Quintile 5 – most deprived	1,099	88.4	88.6	82.9–94.9
Rural–urban status				
Rural	1,110	87.5	87.6	81.6–94.3
Urban	3,891	89.3	89.7	86.5–92.9

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3] Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

Table 28: Females treated with surgery (excluding females having neoadjuvant chemotherapy or neoadjuvant endocrine therapy) within six weeks of the decision to treat with breast surgery (excluding females whose first surgery was a mastectomy with immediate reconstruction), by district health board of residence, 2020–2021

		Proportion	
	Number of females who received surgery without immediate breast reconstruction[1]	Received surgery without immediate breast reconstruction within six weeks of decision to treat (%)	Confidence interval (95%)
District health board of residence			
Auckland	277	94.2	90.8–96.4
Bay of Plenty	343	93.6	90.5–95.7
Canterbury	479	84.8	81.3–87.7
Capital & Coast	319	82.1	77.6–85.9
Counties Manukau	545	92.3	89.7–94.2
Hawke's Bay	253	91.7	87.6–94.5
Hutt Valley	166	94.6	90.0–97.1
Lakes	138	84.8	77.9–89.8
MidCentral	230	95.2	91.6–97.3
Nelson Marlborough	209	90.9	86.2–94.1
Northland	245	70.2	64.2–75.6
South Canterbury	86	94.2	87.1–97.5
Southern	359	88.0	84.3–91.0
Tairāwhiti	67	94.0	85.6–97.7
Taranaki	150	94.0	89.0–96.8
Waikato	402	84.3	80.5–87.6
Wairarapa	51	96.1	86.8–98.9
Waitematā	524	89.7	86.8–92.0
West Coast	42	95.2	84.2–98.7
Whanganui	118	91.5	85.1–95.3

[1] Excludes people registered with cancer from death certificates only.

QPI 24(b): Time to surgery (eight weeks)

Table 29: Females treated with surgery (excluding females having neoadjuvant chemotherapy or neoadjuvant endocrine therapy) within eight weeks of the decision to treat with breast surgery and undergoing mastectomy with immediate reconstruction as their first surgery, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females who received surgery with immediate breast reconstruction[1]	Received surgery with immediate breast reconstruction within 8 weeks of decision to treat (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	216	83.8	89.0	60.5–100
Year of diagnosis				
2020	104	83.7	92.0†	41.7–100
2021	112	83.9	85.3	52.1–100
Age group (years)				
Less than 45	69	91.3	-	-
45–54	84	82.1	-	-
55–69	56	76.8	-	-
70–79	*	*	*	*
80 plus	*	*	*	*
Sex				
Female	216	83.8	89.0	60.5–100
Ethnicity				
Māori	33	81.8	69.2	40.0–100
Pacific peoples	10	100.0	100.0†	38.7–100
Asian	23	82.6	91.0†	43.8–100
European/other	150	83.3	90.1	60.1–100

			Age-standardised proportion	
	Number of females who received surgery with immediate breast reconstruction[1]	Received surgery with immediate breast reconstruction within 8 weeks of decision to treat (%)[2]	%	Confidence interval (95%)
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	48	79.2	84.4	42.7–100
Quintile 2	47	87.2	94.4	48.5–100
Quintile 3	44	79.5	85.8†	29.3–100
Quintile 4	43	90.7	94.5†	40.6–100
Quintile 5 – most deprived	34	82.4	79.1	49.7–100
Rural–urban status				
Rural	73	83.6	84.2	46.8–100
Urban	128	84.4	91.8	61.8–100
Unknown	15	80.0	-	-

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3] Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

* Suppressed due to low number of cases.

† The reliability of this data is questionable due to a high relative standard error.

Table 30: Females treated with surgery (excluding females having neoadjuvant chemotherapy or neoadjuvant endocrine therapy) within eight weeks of the decision to treat with breast surgery and undergoing mastectomy with immediate reconstruction as their first surgery, by district health board of residence, 2020-2021

		Proportion	
	Number of females who received surgery with immediate breast reconstruction[1]	Received surgery with immediate breast reconstruction within 8 weeks of decision to treat (%)	Confidence interval (95%)
District health board of residence			
Auckland	25	76.0	56.6–88.5
Bay of Plenty	20	95.0	76.4–99.1
Canterbury	33	93.9	80.4–98.3
Capital & Coast	16	87.5	64.0–96.5
Counties Manukau	21	81.0	60.0–92.3
Hawke's Bay	*	*	*
Hutt Valley	*	*	*
Lakes	8	87.5	52.9–97.8
MidCentral	*	*	*
Nelson Marlborough	*	*	*
Northland	*	*	*
Southern	*	*	*
Tairāwhiti	*	*	*
Taranaki	*	*	*
Waikato	17	70.6	46.9–86.7
Wairarapa	*	*	*
Waitematā	36	83.3	68.1–92.1
West Coast	*	*	*
Whanganui	*	*	*

[1] Excludes people registered with cancer from death certificates only.

* Suppressed due to low number of cases.

QPI 26(a): Access to radiation therapy

Table 31: Patients with invasive cancer who started adjuvant radiation therapy within eight weeks of surgery, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females who had breast cancer surgery who received radiation therapy[1]	Received adjuvant radiation therapy within eight weeks of surgery (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	2,340	25.5	26.0	23.9–28.4
Year of diagnosis				
2020	1,089	29.6	29.7	26.3–33.5
2021	1,251	22.0	22.7	20.0–25.8
Age group (years)				
Less than 45	168	29.8	-	-
45–54	522	26.8	-	-
55–69	1,096	24.9	-	-
70–79	417	25.2	-	-
80 plus	137	21.2	-	-
Sex				
Female	2,328	25.6	26.1	23.9–28.4
Male	*	*	*	*
Ethnicity				
Māori	408	22.1	23.1	18.3–29.1
Pacific peoples	141	23.4	25.1	16.6–38.0
Asian	162	21.0	21.5	14.7–30.9
European/other	1,629	27.0	27.7	24.9–30.8
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	401	33.7	34.7	28.9–41.6
Quintile 2	412	25.0	25.1	20.3–31.7
Quintile 3	501	27.7	28.2	23.5–33.7
Quintile 4	523	23.3	23.8	19.5–29.0
Quintile 5 – most deprived	503	19.5	19.4	15.5–24.5

			Age-standardised proportion	
	Number of females who had breast cancer surgery who received radiation therapy[1]	Received adjuvant radiation therapy within eight weeks of surgery (%)[2]	%	Confidence interval (95%)
Rural–urban status				
Rural	556	20.7	20.5	16.7–26.2
Urban	1,784	27.0	27.6	25.1–30.3

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3] Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

* Suppressed due to low number of cases.

Table 32: Patients with invasive cancer who started adjuvant radiation therapy within eight weeks of surgery, by district health board of residence, 2020–2021

		Proportion	
	Number of females who had breast cancer surgery who received radiation therapy[1]	Received adjuvant radiation therapy within eight weeks of surgery (%)	Confidence interval (95%)
District health board of residence			
Auckland	114	23.7	16.8–32.3
Bay of Plenty	176	23.3	17.7–30.1
Canterbury	192	11.5	7.7–16.7
Capital & Coast	191	48.7	41.7–55.7
Counties Manukau	171	14.0	9.6–20.0
Hawke's Bay	145	35.2	27.9–43.2
Hutt Valley	98	48.0	38.3–57.7
Lakes	60	10.0	4.7–20.1
MidCentral	135	56.3	47.9–64.4
Nelson Marlborough	85	16.5	10.1–25.8
Northland	100	10.0	5.5–17.4
South Canterbury	29	20.7	9.8–38.4
Southern	183	25.1	19.4–31.9
Tairāwhiti	*	*	*
Taranaki	64	28.1	18.6–40.1
Waikato	255	9.0	6.1–13.2
Wairarapa	32	53.1	36.4–69.1
Waitematā	212	24.5	19.2–30.7
West Coast	*	*	*
Whanganui	50	36.0	24.1–49.9

[1] Excludes people registered with cancer from death certificates only.

* Suppressed due to low number of cases.

QPI 26(b): Access to radiation therapy

Table 33: Patients with invasive cancer who started adjuvant radiation therapy within six weeks of completing adjuvant chemotherapy, by year of diagnosis, sex, age group, ethnicity, deprivation quintile (NZDep2018) and rural–urban status, 2020–2021

			Age-standardised proportion	
	Number of females who received adjuvant radiation after completing adjuvant chemotherapy[1]	Received adjuvant radiation therapy within six weeks of adjuvant chemotherapy (%)[2]	%	Confidence interval (95%)
All cases[3]				
Total	981	70.3	71.4	62.5–87.6
Year of diagnosis				
2020	474	71.3	70.9	63.2–79.3
2021	507	69.4	70.6	60.6–87.9
Age group (years)				
Less than 45	189	67.2	-	-
45–54	303	71.9	-	-
55–69	412	71.4	-	-
70–79	76	65.8	-	-
80 plus	*	*	*	*
Sex				
Female	975	70.3	71.2	62.3–87.5
Male	*	*	*	*
Ethnicity				
Māori	174	73.6	75.8	60.4–100.0
Pacific peoples	81	69.1	68.4	49.4–99.4
Asian	95	69.5	71.2	53.5–95.4
European/other	631	69.7	70.6	61.0–87.4

			Age-standardised proportion	
	Number of females who received adjuvant radiation after completing adjuvant chemotherapy[1]	Received adjuvant radiation therapy within six weeks of adjuvant chemotherapy (%)[2]	%	Confidence interval (95%)
Deprivation quintile (NZDep2018)				
Quintile 1 – least deprived	189	76.2	75.9	63.3–91.7
Quintile 2	189	68.8	68.4	56.9–82.0
Quintile 3	194	66.5	68.2	55.2–88.5
Quintile 4	207	70.0	70.0	58.1–85.1
Quintile 5 – most deprived	202	70.3	70.0	58.3–83.7
Rural–urban status				
Rural	212	67.9	68.8	56.0–88.9
Urban	769	71.0	71.0	65.0–77.5

Source: Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register.

Note: Confidence intervals are presented to indicate potential variation over time. Overlapping confidence intervals do not indicate an absence of differences between compared groups.

[1] Excludes people registered with cancer from death certificates only.

[2] Non-age-standardised data.

[3]Total numbers are different to the sum of the sub-categories due to the exclusion of unknown or missing data.

* Suppressed due to low number of cases.

Table 34: Patients with invasive cancer who started adjuvant radiation therapy within six weeks of completing adjuvant chemotherapy, by district health board of residence, 2020–2021

		Proportion	
	Number of females who received adjuvant radiation after completing adjuvant chemotherapy[1]	Received adjuvant radiation therapy within six weeks of adjuvant chemotherapy (%)	Confidence interval (95%)
District health board of residence			
Auckland	68	77.9	66.7–86.2
Bay of Plenty	89	83.1	74.0–89.5
Canterbury	92	51.1	41.0–61.1
Capital & Coast	54	72.2	59.1–82.4
Counties Manukau	109	81.7	73.4–87.8
Hawke's Bay	45	64.4	49.8–76.8
Hutt Valley	23	56.5	36.8–74.4
Lakes	35	48.6	33.0–64.4
MidCentral	40	65.0	49.5–77.9
Nelson Marlborough	35	77.1	61.0–87.9
Northland	39	59.0	43.4–72.9
South Canterbury	*	*	*
Southern	81	74.1	63.6–82.4
Tairāwhiti	11	72.7	43.4–90.3
Taranaki	40	90.0	76.9–96.0
Waikato	84	63.1	52.4–72.6
Wairarapa	*	*	*
Waitematā	104	76.0	66.9–83.2
West Coast	*	*	*
Whanganui	18	72.2	49.1–87.5

[1] Excludes people registered with cancer from death certificates only.

* Suppressed due to low number of cases.

APPENDIX D: DATA INCLUSIONS AND EXCLUSIONS

	Case eligibility criteria (denominator)								Number of cases	
Quality performance indicator	**Diagnosis type**	**Stage**	**Male included**	**Clinically node-positive**	**Tumour size**	**Triple negative**	**HER2 positive**	**Adjuvant endocrine**	**Numerator**	**Denominator**
QPI 1: Route to detection	Invasive and DCIS	0, I, II, III, IV	Yes	-	-	-	-	-	BSA detected: 3,041 Non-BSA image detected: 981 Symptomatic: 4,264	8,296
QPI 2: Histological grading	Invasive	Not mentioned	Yes	-	-	-	-	-	2,425	7,364
QPI 5: Breast-conserving surgery	Invasive and DCIS	Not mentioned	No	-	-	-	-	-	3,187	5,758
QPI 6: Immediate reconstruction at the time of mastectomy	Invasive and DCIS	Not mentioned	No	-	-	-	-	-	314	2,567
QPI 11: Chemotherapy with or without trastuzumab	Invasive	I, II, III	Yes		>1 cm				Triple-negative: 234 HER2-positive: 512	Triple-negative: 417 HER2-positive: 811
QPI 13: Neoadjuvant chemotherapy	Invasive	II, III	Yes		>2 cm				367	694
QPI 14: Adjuvant endocrine therapy adherence	Invasive	I, II, III	No	-	-	-	-		6 months: 1,965 12 months: 1,452 24 months: 477	6 months: 2,593 12 months: 2,167 24 months: 746

	Case eligibility criteria (denominator)								Number of cases	
Quality performance indicator	**Diagnosis type**	**Stage**	**Male included**	**Clinically node-positive**	**Tumour size**	**Triple negative**	**HER2 positive**	**Adjuvant endocrine**	**Numerator**	**Denominator**
QPI 23: Timely diagnosis	Invasive and DCIS	Not mentioned	Yes	-	-	-	-	-	BSA detected: 2,551 Non-BSA image detected: 889 Symptomatic: 3,097	BSA detected: 3,081 Non-BSA image detected: 992 Symptomatic: 4,316
QPI 24: Time to surgery	Invasive and DCIS	Not mentioned	No	-	-	-	-	If more than 3 months	6 weeks: 4,447 8 weeks: 181	6 weeks: 5,019 8 weeks: 216
QPI 26: Access to radiation therapy	Invasive	Not mentioned	Yes	-	-	-	-		8 weeks of surgery: 597 6 weeks of adjuvant chemotherapy: 690	8 weeks of surgery: 2,340 6 weeks of adjuvant chemotherapy: 981

BSA = BreastScreen Aotearoa

DCIS = ductal carcinoma in situ

APPENDIX E: ABOUT TE RĒHITA

Te Rēhita Mate Ūtaetae – Breast Cancer Foundation National Register (Te Rēhita) is a database of over 45,000 people who have been diagnosed with invasive and pre-invasive breast cancer between 2000 and 2023.

On 1 January 2020, Te Rēhita became a national registry to which all DHBs submitted data. Approximately 4,000 new patient registrations are added each year; the opt-out rate is less than 1%.

Te Rēhita collects data from a broad range of sources to identify new diagnoses and local and distant recurrences and to ensure data quality and completeness. Sources include the New Zealand Cancer Registry (NZCR), other national collections, local hospital lists (eg, from multidisciplinary team meetings, faster cancer treatment data, oncology and palliative care), the New Zealand ePrescription Service, BreastScreen Aotearoa, private providers, general practitioners and other sources. This helps to ensure that all cases are collected. Further to this, Te Rēhita completes a yearly audit of cases against the NZCR and the national mortality collections to ensure that all patient data has been captured. Because of its robust data collection and audit processes, Te Aho o Te Kahu is certain Te Rēhita is an appropriate data source to use to calculate the breast cancer quality performance indicators.

Under the terms of Te Rēhita's governance, the Breast Cancer New Zealand National Register Trust regularly completes an audit of NZCR cases against Te Rēhita. Generally, it finds about 200 (~5%) cases that Te Rēhita does not have that are on the NZCR, and vice versa. All NZCR cases that are not in Te Rēhita are then entered. Data from Te Rēhita can only be used for the purpose of improving equity, diagnosis, treatment, standards of care and outcomes of breast cancer.

APPENDIX F: WORKING GROUP MEMBERS

In 2023/2024, the National Breast Cancer (Quality Performance Indicator) Working Group members were as follows.

Co-chairs

- Ian Campbell, professor/oncoplastic breast and general surgeon, University of Auckland
- Sarah Barton, medical oncologist, Health New Zealand – Te Whatu Ora Capital, Coast and Hutt Valley

Members

- Adele Gautier, research and strategic programmes manager, Breast Cancer Foundation New Zealand
- Alex Brown, oncoplastic breast and specialist general surgeon, Health New Zealand – Te Whatu Ora Capital, Coast and Hutt Valley
- Alison Foster, breast physician, Health New Zealand – Te Whatu Ora Capital, Coast and Hutt Valley, Bowen Hospital, Wakefield Hospital
- Cheryl MacDonald, clinical nurse specialist breast care, Health New Zealand – Te Whatu Ora Te Pae Hauora o Ruahine o Tararua MidCentral
- Christine Sapwell, consumer representative
- Eletha Taylor, oncoplastic breast and general surgeon, Health New Zealand – Te Whatu Ora Te Toka Tumai Auckland
- Fay Sowerby, consumer representative
- Gavin Harris, anatomical pathologist, Canterbury Health Laboratories
- Helen Nott, oncology physiotherapy and lymphoedema therapist, Activate Physiotherapy
- Karen Spells, nurse practitioner, Te Pūriri o Te Ora, Health New Zealand – Te Whatu Ora Te Toka Tumai Auckland
- Madeline Wall, breast radiologist and clinical director, Health New Zealand – Te Whatu Ora Capital, Coast and Hutt Valley
- Marion Kuper, medical oncologist, Health New Zealand – Te Whatu Ora Waikato – Te Manawa Taki
- Melissa James, radiation oncologist, Health New Zealand – Te Whatu Ora Waitaha Canterbury
- Melissa Warren, nurse consultant, Breast Cancer Foundation New Zealand
- Natalie James, nurse lead and support programme manager, Breast Cancer Foundation New Zealand
- Nina Bevin, general practitioner, Westmere Medical Centre, Auckland
- Sheridan Wilson, medical oncologist, Te Pūriri o Te Ora, Health New Zealand – Te Whatu Ora Te Toka Tumai Auckland
- Susan Brooks, radiation oncologist, Health New Zealand – Te Whatu Ora Te Toka Tumai Auckland

APPENDIX G: REFERENCES

Al-Ghazal S, Fallowfield L, Blamey R. 2000. Comparison of psychological aspects and patient satisfaction following breast conserving surgery, simple mastectomy and breast reconstruction. *European Journal of Cancer* 36(15): 1938–43.

American Joint Committee on Cancer. 2018. *AJCC Cancer Staging Manual* (Vol 4). New York: Springer.

An D, Choi J, Lee, J, et al. 2022. Time to surgery and survival in breast cancer. *BMC Surgery* 22(1): 388.

Anders CK, Fan C, Parker JS, et al. 2011. Breast carcinomas arising at a young age: unique biology or a surrogate for aggressive intrinsic subtypes? *Journal of Clinical Oncology* 29(1): e18–e20.

Antoniou AC, Spurdle AB, Sinilnikova OM, et al. 2008. Common breast cancer-predisposition alleles are associated with breast cancer risk in BRCA1 and BRCA2 mutation carriers. *American Journal of Human Genetics* 82(4): 937–48.

Atkinson J, Salmond C, Crampton P. 2015. *NZDep2013 Index of Deprivation*. Wellington: Department of Public Health, University of Otago.

Barton MB, Jacob S, Shafiq J, et al. 2014. Estimating the demand for radiotherapy from the evidence: a review of changes from 2003 to 2012. *Radiotherapy and Oncology* 112(1): 140–4.

Biganzoli L, Battisti NML, Wildiers H, et al. 2021. Updated recommendations regarding the management of older patients with breast cancer: a joint paper from the European Society of Breast Cancer Specialists (EUSOMA) and the International Society of Geriatric Oncology (SIOG). *The Lancet Oncology* 22(7): e327–e340.

Breast Cancer Foundation New Zealand. 2022. *30,000 voices: Informing a better future for breast cancer in Aotearoa New Zealand*. Auckland: Breast Cancer Foundation New Zealand.

BreastNet NZ. 2024. Breast Screening. URL: www.breastnet.nz/topic/breast-screening (accessed 9 January 2025).

BreastScreen Aotearoa. 2012. *Interval cancers in BreastScreen Aotearoa*. URL: www.tewhatuora.govt.nz/assets/For-the-health-sector/NSU/Publications/Interval-Cancers-in-BreastScreen-Aotearoa-1999-2007-pdf-950-KB.pdf (accessed 9 January 2025).

Bright EE, Finkelstein LB, Nealis MS, et al. 2023. A systematic review and meta-analysis of interventions to promote adjuvant endocrine therapy adherence among breast cancer survivors. *Journal of Clinical Oncology* 41(28): 4548–61.

Brown LC, Luen SJ, Molania R, et al. 2023. Evaluation of PAM50 intrinsic subtypes and risk of recurrence (ROR) scores in premenopausal women with early-stage HR+ breast cancer: A secondary analysis of the SOFT trial. *Journal of Clinical Oncology* 41.

Campbell I, Lao C, Blackmore T, et al. 2018. Surgical treatment of early stage breast cancer in the Auckland and Waikato regions of New Zealand. *ANZ Journal of Surgery* 88(12): 1263–8.

Cao L, Xu C, Cai G, et al. 2021. How does the interval between completion of adjuvant chemotherapy and initiation of radiotherapy impact clinical outcomes in operable breast cancer patients? *Annals of Surgical Oncology* 28(4): 2155–68.

Chen W, Lv X, Xu X, et al. 2018. Meta-analysis for psychological impact of breast reconstruction in patients with breast cancer. *Breast Cancer* 25(4): 464–9.

Cohen SY, Stoll CR, Anandarajah A, et al. 2023. Modifiable risk factors in women at high risk of breast cancer: a systematic review. *Breast Cancer Research* 25(1): 45.

Cortazar P, Zhang L, Untch M, et al. 2014. Pathological complete response and long-term clinical benefit in breast cancer: the CTNeoBC pooled analysis. *The Lancet* 384(9938): 164–72.

Craigs CL, Bennett MI, Hurlow A, et al. 2018. Older age is associated with less cancer treatment: a longitudinal study of English cancer patients. *Age and Ageing* 47(6): 833–40.

Davis KJ, Campbell C, Costelloe R, et al. 2024. Causes of Unwarranted Variation and Disparity in Breast Cancer Management in Regional and Rural Area. *The Breast Journal*, 2024(1).

de Munck L, Siesling S, Fracheboud J, et al. 2020. Impact of mammographic screening and advanced cancer definition on the percentage of advanced-stage cancers in a steady-state breast screening programme in the Netherlands. *British Journal of Cancer* 123(7): 1191–7.

Department of the Prime Minister and Cabinet. 2023. Timeline of significant COVID-19 events. URL: www.dpmc.govt.nz/sites/default/files/2023-10/pr-timeline-significant-events-activities.pdf (accessed 15 January 2025).

Doherty C, Pearce S, Baxter N, et al. 2020. Trends in immediate breast reconstruction and radiation after mastectomy: a population study. *The Breast Journal* 26(3): 446–53.

Duffy SW, Vulkan D, Cuckle H, et al. 2020. Effect of mammographic screening from age 40 years on breast cancer mortality (UK Age trial): final results of a randomised, controlled trial. *The Lancet Oncology* 21(9): 1165–72.

EBCTCG. 1998. Tamoxifen for early breast cancer: an overview of the randomised trials. *The Lancet* 351(9114): 1451–67.

EBCTCG. 2005. Effects of chemotherapy and hormonal therapy for early breast cancer on recurrence and 15-year survival: an overview of the randomised trials. *The Lancet* 365(9472): 1687–1717.

Engstrøm MJ, Opdahl S, Hagen AI, et al. 2013. Molecular subtypes, histopathological grade and survival in a historic cohort of breast cancer patients. *Breast Cancer Research and Treatment* 140: 463–73.

European Coordination Committee of the Radiological Electromedical and Healthcare IT Industry. 2019. *Radiotherapy Age Profile & Density*. Brussels: European Coordination Committee of the Radiological Electromedical and Healthcare IT Industry.

Fay MP, Feuer EJ. 1997. Confidence intervals for directly standardized rates: a method based on the gamma distribution. *Statistics in Medicine* 16(7): 791–801.

Figueiredo JC, Ennis M, Knight JA, et al. 2007. Influence of young age at diagnosis and family history of breast or ovarian cancer on breast cancer outcomes in a population-based cohort study. *Breast Cancer Research and Treatment* 105: 69–80.

Gilligan MA, Kneusel RT, Hoffmann RG, et al. 2002. Persistent differences in sociodemographic determinants of breast conserving treatment despite overall increased adoption. Medical care, 40(3), 181-189.

Gu J, Groot G, Boden C, et al. 2018. Review of factors influencing women's choice of mastectomy versus breast conserving therapy in early stage breast cancer: a systematic review. *Clinical Breast Cancer* 18(4): e539–e554.

Hanna TP, King WD, Thibodeau S, et al. 2020. Mortality due to cancer treatment delay: systematic review and meta-analysis. *BMJ* 371.

Hanson SE, Lei X, Roubaud MS, et al. 2022. Long-term quality of life in patients with breast cancer after breast conservation vs mastectomy and reconstruction. *JAMA Surgery* 157(6): e220631.

Hayes T, Coleman B, Locke M. 2022. Volcanic disruption: the impact of Whakaari White Island on the provision of elective surgical care in Counties Manukau. *ANZ Journal of Surgery* 92(1–2): 167–71.

Haynes R, Pearce J, Barnett R. 2008. Cancer survival in New Zealand: ethnic, social and geographical inequalities. *Social Science & Medicine* 67(6): 928–37.

Health New Zealand - Te Whatu Ora. 2024a. National Travel Assistance. URL: https://info.health.nz/services-support/national-travel-assistance (accessed 13 January 2025).

Health New Zealand - Te Whatu Ora. 2024b. About breast screening. URL: https://info.health.nz/keeping-healthy/cancer-screening/breast-screening/about-breast-screening (accessed 5 March 2025).

Health New Zealand - Te Whatu Ora. 2025. BreastScreen Aotearoa Coverage Report. URL: https://tewhatuora.shinyapps.io/nsu-bsa-coverage/ (accessed 16 April 2025).

Hershman DL, Shao T, Kushi LH, et al. 2011. Early discontinuation and non-adherence to adjuvant hormonal therapy are associated with increased mortality in women with breast cancer. *Breast Cancer Research and Treatment* 126: 529–37.

Hoffmann AS, Hennigs A, Feisst M, et al. 2023. Impact of age on indication for chemotherapy in early breast cancer patients: results from 104 German institutions from 2008 to 2017. *Archives of Gynecology and Obstetrics* 308(1): 219–29.

Huang J, Barbera L, Brouwers M, et al. 2003. Does delay in starting treatment affect the outcomes of radiotherapy? A systematic review. *Journal of Clinical Oncology* 21(3): 555–63.

Jeevan R, Cromwell D, Trivella M, et al. 2012. Reoperation rates after breast conserving surgery for breast cancer among women in England: retrospective study of hospital episode statistics. *BMJ* 345: e4505.

Jiang S, Bennett DL, Rosner BA, et al. 2023. Longitudinal analysis of change in mammographic density in each breast and its association with breast cancer risk. *JAMA Oncology* 9(6): 808–14.

Kim MK, Kim T, Moon HG, et al. 2015. Effect of cosmetic outcome on quality of life after breast cancer surgery. *European Journal of Surgical Oncology* 41(3): 426–32.

Korde LA, Somerfield MR, Carey LA, et al. 2021. Neoadjuvant chemotherapy, endocrine therapy, and targeted therapy for breast cancer: ASCO guideline. *Journal of Clinical Oncology* 39(13): 1485–1505.

Kou K, Cameron J, Youl P, et al. 2023. Severity and risk factors of interval breast cancer in Queensland, Australia: a population-based study. *Breast Cancer* 30(3): 466–77.

Kreling B, Figueiredo MI, Sheppard VL, et al. 2006. A qualitative study of factors affecting chemotherapy use in older women with breast cancer: barriers, promoters, and implications for intervention. *Psycho-Oncology* 15(12): 1065–76.

Lawrenson R, Lao C, Jacobson G, et al. 2019. Outcomes in different ethnic groups of New Zealand patients with screen-detected vs. non-screen-detected breast cancer. *Journal of Medical Screening* 26(4): 197–203.

Lethaby A, Mason B, Holdaway I, et al. 1992. Age and ethnicity as prognostic factors influencing overall survival in breast cancer patients in the Auckland region. Auckland Breast Cancer Study Group. *New Zealand Medical Journal* 105(947): 485–8.

Li X, Zhang Y, Meisel J, et al. 2018. Validation of the newly proposed American Joint Committee on Cancer (AJCC) breast cancer prognostic staging group and proposing a new staging system using the National Cancer Database. *Breast Cancer Research and Treatment* 171: 303–13.

Loibl S, André F, Bachelot T, et al. 2024. Early breast cancer: ESMO Clinical Practice Guideline for diagnosis, treatment and follow-up. *Annals of Oncology* 35(2): 159–82.

Matthew A. 2018. Global survey of clinical oncology workforce. *Journal of Global Oncology* 4: 1–12.

Miles A, Asbridge JE. 2019. The NHS Long Term Plan (2019) – is it person-centered? *European Journal for Person Centered Healthcare* 7(1): 1–11.

Ministry of Health. 2019. *Wai 2575 Māori Health Trends Report*. Wellington: Ministry of Health.

Ministry of Health. 2021. *Breast Reconstruction: National guidelines for best practice*. Wellington: Ministry of Health.

Ministry of Health. 2023. Equity. URL: www.health.govt.nz/strategies-initiatives/programmes-and-initiatives/equity (accessed 15 January 2025).

Murphy CC, Bartholomew LK, Carpentier MY, et al. 2012. Adherence to adjuvant hormonal therapy among breast cancer survivors in clinical practice: a systematic review. *Breast Cancer Research and Treatment* 134: 459–78.

Murphy JO, El-Tamer M. 2013. Is breast reconstruction a quality measure for breast cancer treatment? *Breast Cancer Management* 2(5): 349–52.

National Health Service. 2024a. *Best Practice Timed Diagnostic Cancer Pathways*. London: National Health Service.

National Health Service. 2024b. Predict breast cancer. URL: https://breast.predict.cam/ (accessed 14 January 2025).

New Zealand Cancer Society. 2022. Stages and grades of breast cancer. URL: www.cancer.org.nz/cancer/types-of-cancer/breast-cancer/staging-and-grading-of-breast-cancer/ (accessed 8 January 2025).

Ng ET, Ang RZ, Tran BX, et al. 2019. Comparing quality of life in breast cancer patients who underwent mastectomy versus breast-conserving surgery: a meta-analysis. *International Journal of Environmental Research and Public Health* 16(24).

Niraula S, Biswanger N, Hu P, et al. 2020. Incidence, characteristics, and outcomes of interval breast cancers compared with screening-detected breast cancers. *JAMA Network Open* 3(9): e2018179–e2018179.

Rothman KJ. 2012. *Epidemiology: An introduction*. Oxford: Oxford University Press.

Royal Australian and New Zealand College of Radiologists. 2023. *Facilities Survey Report: Insights and Trends from 2010–2020*. Wellington: Royal Australian and New Zealand College of Radiologists.

Seely JM. 2023. Progress and remaining gaps in the early detection and treatment of breast cancer. *Current Oncology* 30(3): 3201–5.

Seneviratne S, Campbell I, Scott N, et al. 2014. Ethnic differences in timely adjuvant chemotherapy and radiation therapy for breast cancer in New Zealand: a cohort study. *BMC Cancer* 14(1): 1–9.

Seneviratne S, Campbell I, Scott N, et al. 2015. Adherence to adjuvant endocrine therapy: is it a factor for ethnic differences in breast cancer outcomes in New Zealand? *The Breast* 24(1): 62–67.

Seneviratne S, Lawrenson R, Harvey V, et al. 2016. Stage of breast cancer at diagnosis in New Zealand: impacts of socio-demographic factors, breast cancer screening and biology. *BMC Cancer* 16(1): 1–9.

Shafi S, Parwani AV. 2023. Artificial intelligence in diagnostic pathology. *Diagn Pathol* 18, 109.

Stats NZ. 2019. Applying confidentiality rules to 2018 Census data and summary of changes since 2013. URL: www.stats.govt.nz/methods/applying-confidentiality-rules-to-2018-census-data-and-summary-of-changes-since-2013%20 (accessed 14 January 2025).

Stats NZ. 2021. Information about the standard for gender, sex, and variations of sex characteristics. URL: www.stats.govt.nz/methods/information-about-the-standard-for-gender-sex-and-variations-of-sex-characteristics%20 (accessed 14 January 2025).

Te Aho o Te Kahu. 2021. Cancer Care and COVID-19. URL: https://teaho.govt.nz/index.php/our-work/covid-19/cancer-care-and-covid-19 (accessed 14 January 2025).

Te Aho o Te Kahu. 2022a. He Matere Ratonga Mate Pukupuku Cancer Services Planning: A vision for cancer treatment in the reformed health system. Wellington: Te Aho o Te Kahu.

Te Aho o Te Kahu. 2022b. Pūrongo Ārai Mate Pukupuku: Cancer Prevention Report. Wellington: Te Aho o Te Kahu.

Te Aho o Te Kahu. 2023. Rongohia Te Reo, Whaua He Oranga: The voices of whānau Māori affected by cancer. Wellington: Te Aho o Te Kahu.

Te Aho o Te Kahu. 2025a. Breast Cancer Quality Performance Indicators. URL: https://teaho.govt.nz/index.php?cID=549 (accessed 8 January 2025).

Te Aho o Te Kahu. 2025b. Breast Cancer Technical Specifications. URL: https://teaho.govt.nz/index.php?cID=549 (accessed 26 March 2025).

Tin Tin S, Elwood JM, Brown C, et al. 2018. Ethnic disparities in breast cancer survival in New Zealand: which factors contribute? *BMC Cancer* 18(1): 1–10.

Trapani, D. 2023. Adjuvant chemotherapy in older women with early breast cancer. *Journal of Clinical Oncology* 41(9): 1652–8.

Twaddle S, Qureshi S. 2005. Scottish intercollegiate guidelines network. *Evidence-Based Healthcare and Public Health* 6(9): 405–9.

van Dooijeweert C, van Diest PJ, Willems SM, et al. 2020. Significant inter-and intra-laboratory variation in grading of invasive breast cancer: a nationwide study of 33,043 patients in the Netherlands. *International Journal of Cancer* 146(3): 769–80.

VanEenwyk J. 2012. *Guidelines for Using Confidence Intervals for Public Health Assessment*. Washington: Washington State Department of Health.

Waikato District Health Board. 2022. *Waikato District Health Board (WDHB) Incident Response Analysis*. URL: www.tewhatuora.govt.nz/assets/Publications/Proactive-releases/WDHB-Final-Report-2.0-redacted.pdf (accessed 8 January 2025).

Yeong SW, Lee SW, Ong SC. 2023. Cost-Effectiveness of breast cancer early detection program in low-and middle-income countries: a systematic review. *Value in Health Regional Issues* 35: 57–68.

Yussof I, Tahir NAM, Hatah E, et al. 2022. Factors influencing five-year adherence to adjuvant endocrine therapy in breast cancer patients: a systematic review. *The Breast* 62: 22–35.