



## The epidemiology of breast cancer in Maori women in Aotearoa New Zealand: implications for screening and treatment

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### Abstract

**Aim** To describe the epidemiology of breast cancer in Maori and non-Maori women in New Zealand, and to identify the implications for breast cancer screening and treatment policy and practice.

**Methods** New Zealand Census Mortality Study (NZCMS)-adjusted age-specific incidence and mortality rates for breast cancer in total and sole Maori and non-Maori women were calculated using registration and mortality data obtained from New Zealand Health Information Service for 1996–2000.

**Results** Despite similar age-specific incidence rates of breast cancer in total Maori and non-Maori women under 50 years of age, total Maori women aged 25–59 years had higher age-specific mortality from breast cancer than non-Maori. A similar pattern is seen for sole Maori age-specific rates; however, the rates are even higher than total Maori rates.

**Discussion** Possible drivers of ethnic disparities in breast cancer mortality require investigation—particularly the role of access to breast cancer screening and treatment for Maori women compared to non-Maori. Specific initiatives are continually needed to ensure that Maori women are able to access breast cancer screening—otherwise ethnic inequalities in mortality will persist. The interaction between deprivation and ethnicity in breast cancer incidence and mortality analyses should be investigated in future analyses.

The aim of this paper is to describe the incidence and mortality of breast cancer in Maori and non-Maori women using New Zealand Census Mortality Study-adjusted estimates to assign ethnicity. The findings of this paper will help inform future policy development for breast cancer screening and treatment in New Zealand, with a particular emphasis on the identification and elimination of ethnic disparities between Maori and non-Maori. This emphasis is consistent with the Treaty of Waitangi, the indigenous rights of Maori and current Government policy.<sup>1–3</sup>

### Background

As is seen in many developed countries, breast cancer is the most common female cancer (apart from skin cancer) in New Zealand women, and the leading cause of female cancer deaths.<sup>4–6</sup> There is consistent evidence of Maori vs non-Maori disparities in breast cancer mortality. In New Zealand, Maori women comprise 15.5% of the female population. In 1997, the overall age-standardised mortality rate was higher for Maori women (33 per 100,000) than ‘European and Other’ women (22 per 100,000).<sup>4</sup>

Age-specific analyses show that the mortality rate for Maori females aged 55–69 years in 1997 was higher than that of ‘European and Other’ women (118 versus 88 per 100,000).<sup>4</sup> Recent New Zealand Census Mortality Study-adjusted estimates of ethnic-specific mortality found that (for 1996–1999) the Maori breast cancer mortality rate was nearly twice that of non-Maori non-Pacific women (36 versus 21 per 100,000).<sup>7</sup>

Estimates of the risk of developing breast cancer for Maori women in New Zealand are less consistent. Most analyses suggest that Maori women have a similar age-standardised incidence rate of breast cancer compared to other women in New Zealand.<sup>4,8–11</sup> However, some analyses suggest that Maori breast cancer incidence may be higher or lower than that of non-Maori, depending on the classification of ethnicity in numerator and denominator data and study sample size.<sup>4,8,12</sup>

The relationship between breast cancer incidence and mortality rates also varies by ethnicity internationally. In the United States, African-American women are noted to have a lower overall incidence of breast cancer than White women, but are disproportionately represented in breast cancer mortality statistics.<sup>13</sup> A ‘black/white crossover’ in age-specific incidence rates has been documented, where African American women have a greater risk of developing breast cancer than White women below the age of 40 years, but a lower risk over age 40 years.<sup>14</sup> The reasons for this pattern are not well understood, and hypotheses include variations in socioeconomic status, hormonal factors, genetics, nutrition, and healthcare access.<sup>15,16</sup>

## Methodology and Methods

This paper uses the methodological approach of Kaupapa Maori Research to analyse age-specific breast cancer incidence and mortality data for Maori and non-Maori women.<sup>17,18</sup> Numerator data on breast cancer incidence and mortality for the years 1996–2000 were obtained from national cancer registration information (ICD9-CM code 174 Female Breast)<sup>19</sup> and mortality information (ICD9-CM code 174 Malignant neoplasm of the female breast).<sup>20</sup>

Based on the results discussed in an accompanying paper, ethnicity was assigned as either total or sole Maori and non-Maori by applying the New Zealand CMS adjustor to both breast cancer registration and deaths data.<sup>18</sup> Denominator data were mean resident population estimates at the year ended 30 June (sourced from Statistics New Zealand estimates based on results from the 1996 and 2001 Censuses of Population and Dwellings).<sup>19–21</sup>

Denominator ethnicity was identified as non-Maori and either:

- Total Maori—comprising sole Maori (those who identify Maori as their only ethnicity) and mixed Maori (those who identify Maori as one of their multiple ethnic groups), or
- Sole Maori.

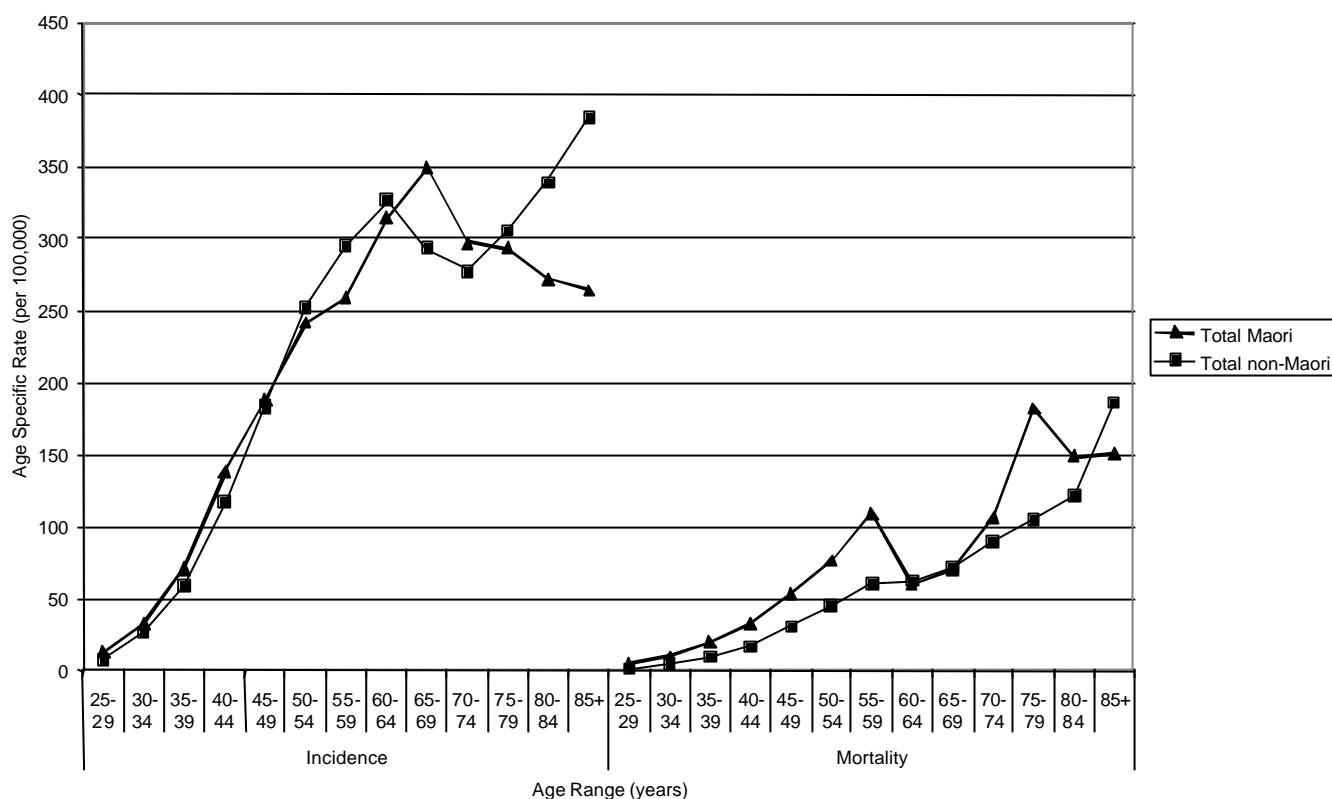
## Results

### Total Maori

A total of 10,424 women were identified from breast cancer registration data for the years 1996 to 2000. Of these women, 843 (8%) were identified as total Maori and 9,581 (92%) as non-Maori. A total of 2,560 women were identified from breast cancer mortality data for the years 1996–2000.

Of these women, 254 (10%) were identified as total Maori and 2,306 (90%) as non-Maori. Figure 1 presents the NZCMS adjusted age-specific breast cancer incidence and mortality rates for total Maori and non-Maori women in New Zealand.

**Figure 1. NZCMS-adjusted age-specific breast cancer incidence and mortality rates for total Maori and non-Maori women in New Zealand (1996–2000)**



The age-specific incidence rates of breast cancer are similar for Maori and non-Maori women, particularly in women aged under 55 years. Maori incidence rates drop below non-Maori rates between ages 55 and 64 years. Rates fluctuate from age 65 years, with the Maori incidence rate being greater than that of non-Maori from age 65 to 74 years, and then lower from age 75 years and over.

Breast cancer mortality rates are generally higher for Maori than non-Maori, particularly between ages 25 and 59 years. Of note, there is a drop in the Maori mortality rate between ages 60 and 69 years so that it is similar to that of non-Maori. Maori mortality then increases and is greater than non-Maori from age 70 to 84 years, peaking to approximately 180 deaths per 100,000 for ages 75 to 79 years, a rate not seen in non-Maori until age 85 years and over.

### Sole Maori

A total of 10,680 women were identified from NZCMS breast cancer registration data for the years 1996 to 2000. Of these women, 675 (6%) were identified as sole Maori and 10,005 (94%) as non-Maori. A total of 2,560 women were identified from NZCMS breast cancer mortality data for the years 1996–2000. Of these women, 254 (10%) were identified as sole Maori and 2,306 (90%) as non-Maori.

Figure 2 presents the NZCMS-adjusted age-specific breast cancer incidence and mortality rates for sole Maori and non-Maori women in New Zealand for the years 1996 to 2000. Women classified as sole Maori ethnicity have higher age-specific breast cancer incidence and mortality rates than women in the total Maori group.

NZCMS-adjusted sole Maori mortality peaks at just over 200 breast cancer deaths per 100,000 for women aged 75 to 79 years, slightly higher than the peak seen for NZCMS-adjusted total Maori women.

**Figure 2. NZCMS-adjusted age-specific breast cancer incidence and mortality rates for sole Maori and non-Maori women in New Zealand (1996–2000)**

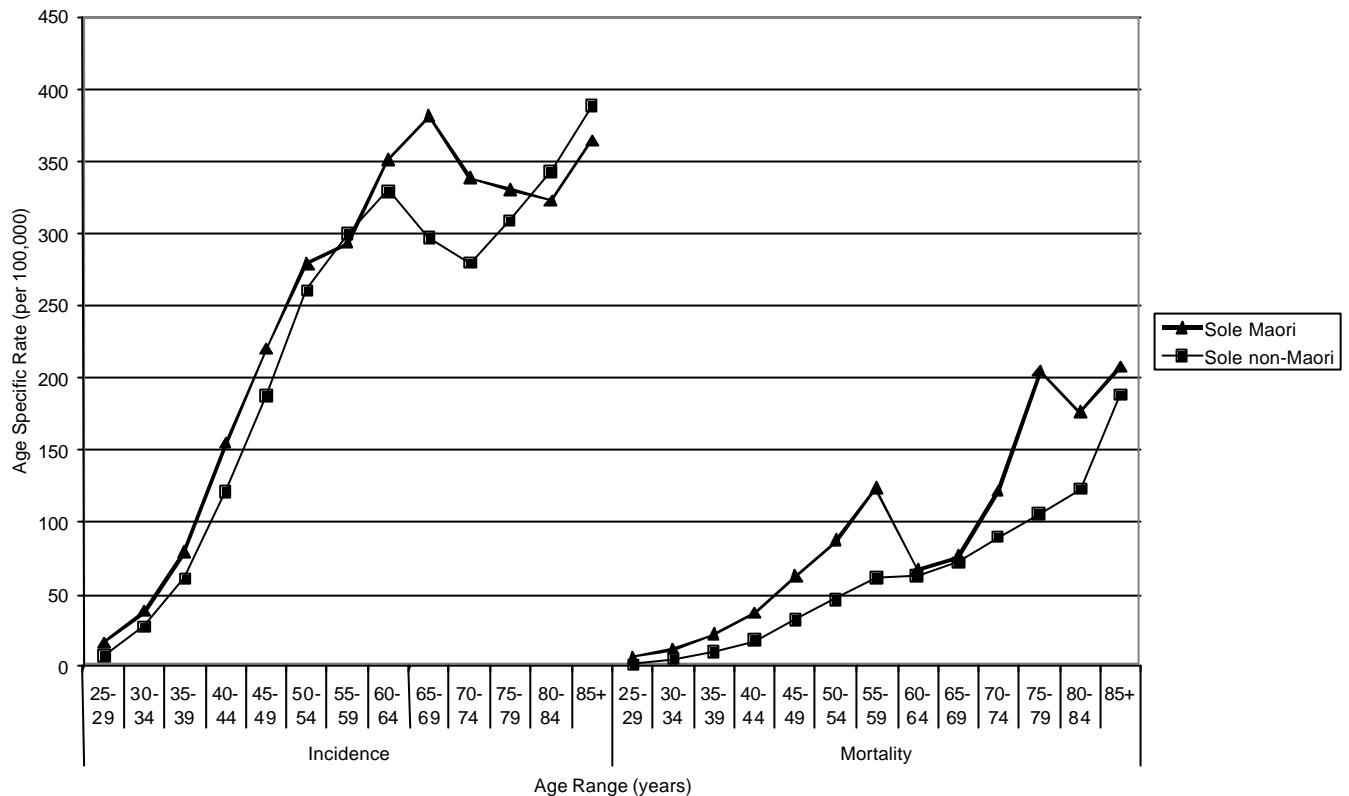
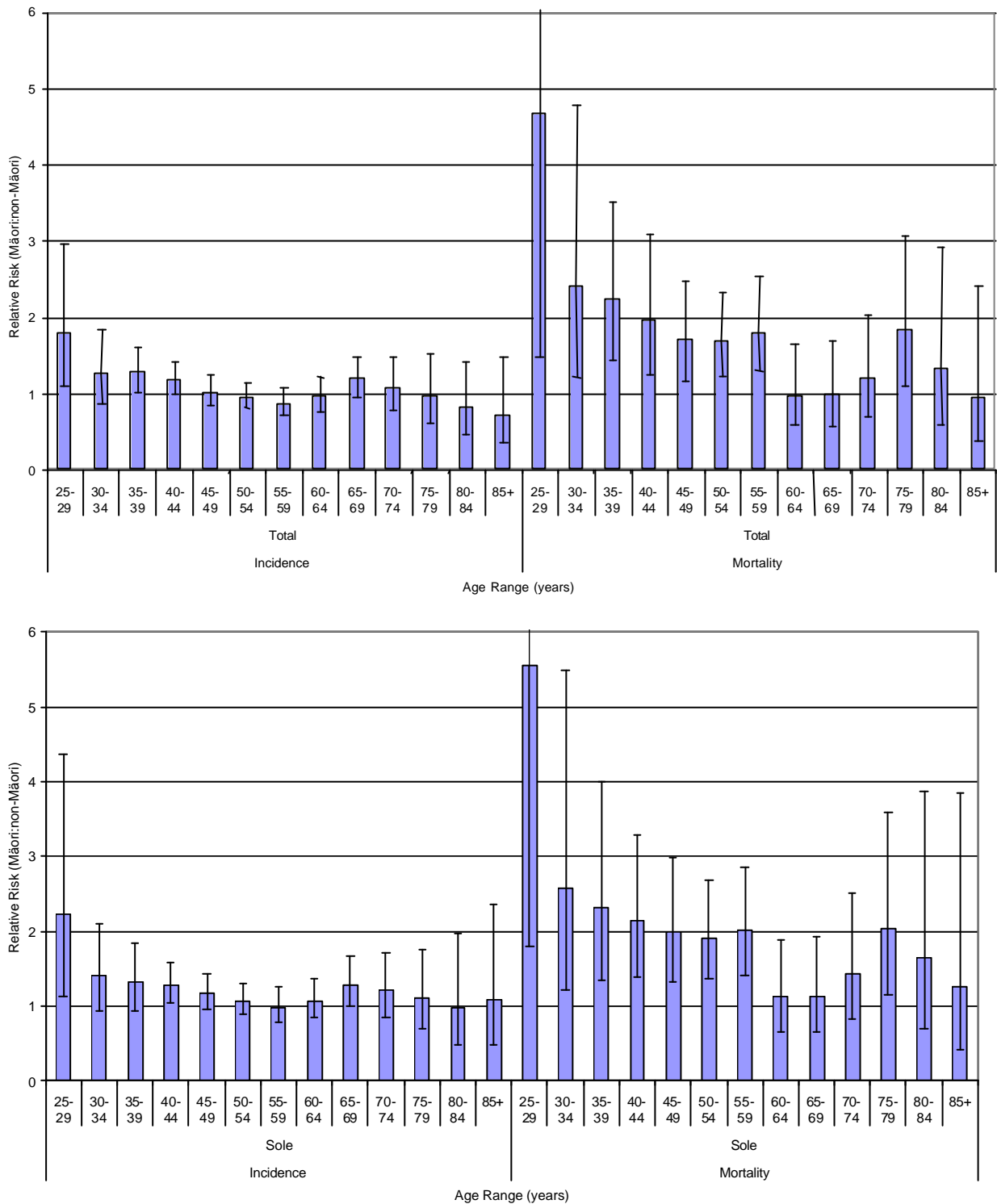


Figure 3 presents age-specific breast cancer incidence and mortality estimates as risk ratios for total and sole Maori and non-Maori women in New Zealand. Although incidence estimates suggest an elevated risk of breast cancer in total Maori women compared with non-Maori aged under 50 years, most of the confidence intervals for the 5-year age groups include one and therefore are not statistically significant at the 95% level of confidence. Only Maori women aged 25 to 29 years had a significantly higher risk of developing breast cancer than non-Maori women, but the numbers in this age group are small.

In contrast, the relative risk of death from breast cancer is generally greater for total Maori women than non-Maori, apart from the noted drop between ages 60 and 69 years and 80 years and over. Of note, the Maori vs non-Maori relative risk estimates for breast cancer mortality in women aged between 25 and 59 years are statistically significant, and therefore are unlikely to be due to chance.

**Figure 3. NZCMS-adjusted age-specific breast cancer incidence and mortality relative risk for total/sole Maori and non-Maori women in New Zealand (1996–2000)**



Overall the pattern found for sole Maori vs non-Maori risk ratios are similar to those for total Maori vs non-Maori risk ratios—i.e. ranging from 1.0–2.2 for sole incidence and 1.1–5.6 for sole mortality versus 0.7–1.8 for total incidence and 0.9–4.7 for total

mortality. Although the pattern is similar, the risk ratios for sole Maori are generally higher than those for total Maori.

### **Summary of key results**

This analysis found that, despite similar age-specific breast cancer incidence rates, total Maori women had higher age-specific mortality rates from breast cancer than non-Maori women, particularly below the age of 60 years. A similar pattern is seen for sole Maori age-specific rates, but the mortality rates are even higher than those for total Maori. Total Maori women aged 65 to 74 years and sole Maori women aged 60 to 79 years had non-significant higher incidence rates of breast cancer than non-Maori women.

### **Discussion**

This study represents the first time a Kaupapa Maori Research analysis of age-specific breast cancer incidence and mortality has been performed in New Zealand using NZCMS adjustment to compensate for ethnicity misclassification. Thus, the study provides better quality ethnicity data on which to base planning for breast cancer screening and treatment services than has been available previously.

A notable drop in mortality rates for both total and sole Maori women aged 60 to 69 years was observed. It is unclear why this drop in mortality occurs, but there are two possible explanations. First, there could be a 'cohort effect' for Maori women associated with reduced breast cancer mortality due to mortality from other causes, or better access to breast cancer screening and/or treatment services. Secondly, it may be due to a fluctuating mortality pattern in older age groups due to the relatively short study period and modest number of breast cancer events available for analysis. Therefore, further investigation is required.

Both total and sole Maori women aged 50 to 64 years have a lower breast cancer incidence rate than non-Maori women. This may be explained by the aggregation of 5 years' worth of data that includes 2 years in which BreastScreen Aotearoa was formally operating: 1998 and 1999. Coverage data show that non-Maori women were more likely to have been screened in this 2-year period than Maori women, producing a relatively higher incidence rate for non-Maori. It is possible that, in the absence of screening, non-Maori incidence rates between ages 50–64 years would have been similar to or below those for Maori women. This hypothesis could be investigated by comparing Maori vs non-Maori incidence rates for non-screen detected cancers only.

There are three broad explanations for the finding that Maori women have a similar risk of developing breast cancer but a greater risk of death from breast cancer than non-Maori women. Firstly, Maori women may have a biologically different disease that is more aggressive than non-Maori leading to a poorer prognosis. Secondly, Maori women may experience a greater delay in diagnosis of their breast cancer as a result of differential access to screening and/or primary health care. Thirdly, Maori women may experience poorer outcomes from breast cancer treatment associated with differential access to treatment, patterns of referral, and/or quality of care within the care pathway.

There is currently no conclusive evidence that ethnic differences in breast cancer mortality reflect biologically different disease processes occurring for Maori women in comparison to non-Maori.

There is evidence that late diagnosis occurs for Maori women. Armstrong and Borman reviewed cancer registry data between the years 1972 to 1992 and found that Maori women had higher rates of regional and metastatic stages than non-Maori women.<sup>9</sup> Lawes et al also reviewed cancer registry data from 1987 to 1994 and found that Maori women were diagnosed with a more advanced stage of breast cancer than 'Other' women.<sup>8</sup>

Lethaby et al found that (in the Auckland region between 1976 and 1985) Maori women were diagnosed with larger tumours and were more likely to have metastases at presentation than non-Maori women.<sup>22</sup> Interestingly, they note that a delay in seeking treatment for initial symptoms did not differ significantly by ethnicity in their study, implying that the delay was not in presentation but in diagnosis. Similar findings were found by Newman et al, who noted that Maori women were significantly more likely to be diagnosed with large tumours (31%), have 1–3 axillary lymph nodes involved (33%), and have metastases (14%) at time of presentation than European women (19%, 20%, and 11% respectively).<sup>23</sup>

Maori women are also less likely to receive breast cancer screening services. Between 1999 and 2001, BreastScreen Aotearoa data show that participation in breast cancer screening was significantly lower for Maori (39%) and Pacific (34%) women than for non-Maori/non-Pacific women (59%).<sup>24</sup>

There is no conclusive information on whether Maori women may be less likely to receive radiotherapy, chemotherapy and/or surgery necessary to effectively treat breast cancer once it has been diagnosed. Feek et al used NZHIS data to estimate five-year relative survival rates for breast cancer using 1996 to 1999 mortality data.<sup>25</sup> They found that only 64% of Maori women survived 5 years after diagnosis compared with 81% of 'Other' women. However, this analysis did not control for stage of diagnosis, nodal status, or tumour type, so it is not possible to determine whether the disparity in survival reflects differential access to treatment.

Lethaby et al reviewed breast cancer survival and controlled for stage of diagnosis and found that ethnicity was not an independent factor influencing survival. However, the authors acknowledge that the small sample size of Maori women included in their study meant that their findings were inconclusive.<sup>22</sup>

Investigating where and how ethnic differences may be occurring on the entire breast cancer care pathway is warranted.

### **Implications for screening**

The finding of Maori vs non-Maori disparities in age-specific breast cancer mortality supports the need to deliver accessible and appropriate breast cancer screening services to Maori women. Indeed, the successful screening of Maori women has the potential to produce even greater benefit for Maori women than non-Maori women, particularly for women under the age of 60 years.

This is particularly important with the recent announcement by the Ministry of Health of an extended age-range down to 45 and up to 69 years.<sup>26</sup> If screening in both the

original age range and the proposed extended age range of 45 to 69 years is not successful for Maori women, it is possible that Maori vs non-Maori inequalities may worsen. Given this context, on the basis of high health need, Maori women are clearly a priority group for access to breast cancer screening in New Zealand.

It is important to note that the presence of ethnic inequalities in screening programmes is not a unique problem to New Zealand and is a challenge that other countries are attempting to address.<sup>27,28</sup>

### **The role of deprivation**

To date, international incidence data and case-control studies have led to the typical portrayal of breast cancer as a disease of affluence.<sup>15</sup> However, there is increasing recognition that the incidence of breast cancer in poorer countries and among women of lower socioeconomic status is 'catching up'.<sup>15</sup> In New Zealand, Ministry of Health data suggest that breast cancer incidence increases with increasing deprivation.<sup>4</sup> This pattern is not reported for mortality, although this may be because few data were available for this analysis (1996/97).<sup>4</sup>

Given these findings, the relationship between breast cancer and socioeconomic status appears to be more complex than previously thought, and analysis of breast cancer epidemiology stratified for deprivation would be valuable. In addition, ethnic disparities in the distribution of deprivation are likely to be contributing to Maori disparities in breast cancer screening and treatment, and should be specifically investigated in future analyses. The possibility that ethnicity may have an independent effect on whether or not Maori women receive access to appropriate breast cancer screening and treatments warrants further investigation, especially as previous New Zealand studies have documented differential access to health services by ethnicity.<sup>29,30</sup>

### **Conclusion**

This study highlights the need to ensure that breast cancer screening is effectively delivered to Maori women so that ethnic inequalities are reduced rather than increased by the breast screening programme. The presence of age-specific disparities in breast cancer mortality between Maori and non-Maori (despite similar breast cancer incidence rates) is very concerning. Additional research is required urgently to understand these disparities, develop effective interventions, and therefore eliminate their existence.

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