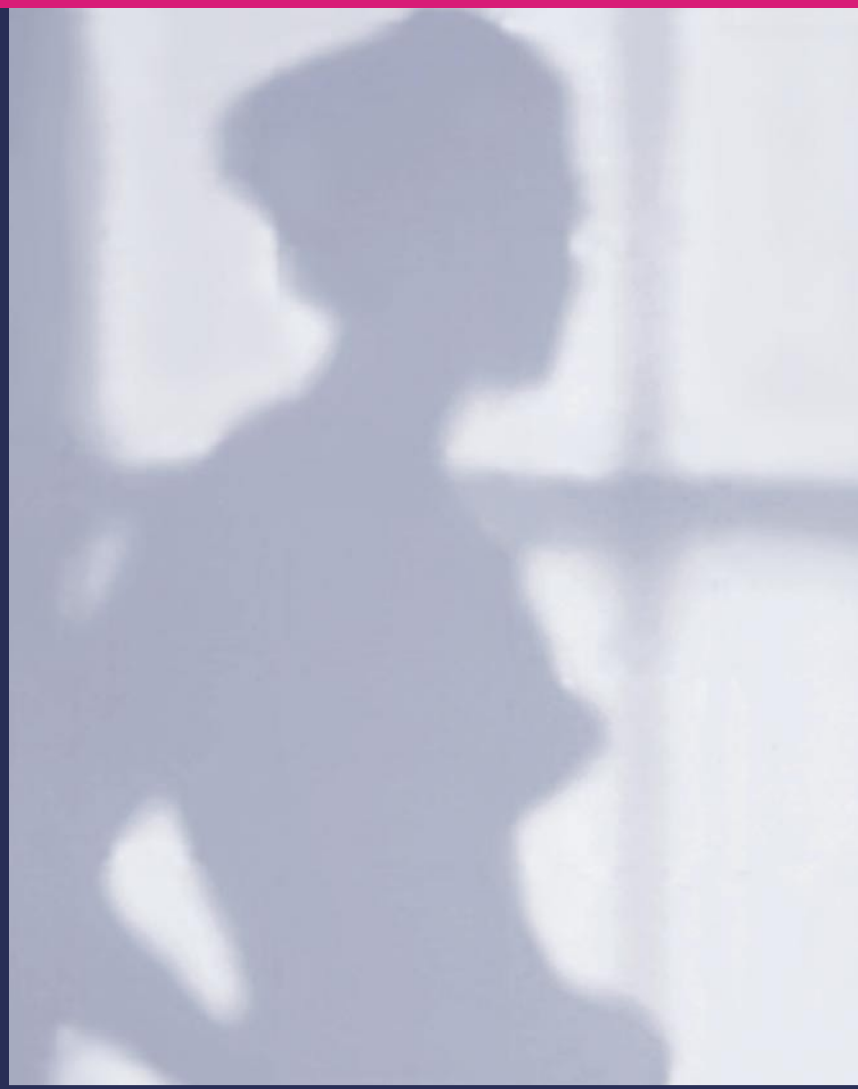
National Breast & Ovarian Cancer Centre and Royal Australasian College of Surgeons

The National Breast Cancer Audit

Public Health Monitoring Report on 2008 Data

August 2010



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On behalf of:
The Section of Breast Surgery
and
The Royal Australasian College of Surgeons

National Breast and Ovarian Cancer Centre and Royal Australasian College of Surgeons

National Breast Cancer Audit

Public Health Monitoring Series
2008 Data

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Acknowledgments

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The following people were involved in the development of this report:

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Overview

A total of 6,080 Australian women with early invasive breast cancer diagnosed in 2008 were treated by breast surgeons participating in the National Breast Cancer Audit (NBCA), the majority of whom were full members of the Breast Section of the Royal Australasian College of Surgeons. Information on their cancers and cancer management was collected using procedures described in earlier reports.[1-4] Information on cancers diagnosed in 2008 is presented in this report by age at diagnosis and private health insurance status.

A previous analysis of survival from breast cancer in approximately 32,000 women diagnosed with early breast cancer in 1998-2005, who were included in the NBCA, indicated that women aged 80 years or more had a five-year survival of 84% compared with a corresponding 94% survival for younger women.[1] Survivals in younger women differed over a narrow range from 91% for women under 40 years to 95% for 60-69 year olds, with all survivals markedly exceeding the 84% survival figure for women aged 80 years or more.[1]

Australian data for breast cancers of all sizes diagnosed in 2000-06 showed a similar pattern, with the highest five-year relative survival of 92% applying to 60-69 year old women and the lowest of 76% to those aged 80 years and over.[5] Possible reasons for lower survivals in women aged 80 years or more were thought to be: diagnosis at a more advanced stage; less extensive treatment; and higher levels of co-morbidity.[5] However, in the absence of data on staging and treatment, the potential effects of these characteristics on survival outcomes could not be evaluated.

In this monitoring report, breast cancer and breast cancer management characteristics of women aged 80 years or more with early breast cancer, who were included in the NBCA, are compared with corresponding cancer characteristics for younger women to determine whether the former were more likely to have more advanced staging parameters (e.g., larger cancers and more evidence of vascular invasion and nodal involvement) or other negative prognostic characteristics (e.g., higher grades or more hormone receptor negative cancers) that might account for a survival deficit. In addition, the proportions of these older women receiving surgical and adjuvant therapies are compared with corresponding proportions for younger women to determine whether they received less extensive treatment.

Interest has also been expressed by treatment providers and consumers in the potential for differences in cancer and clinical management characteristics to occur by private health insurance status. Such differences might occur due to socio-economic factors or differences in access to care. Australian data for breast cancers of all sizes show higher five-year relative survivals in higher socio-economic groups and in more accessible major city areas where private health insurance coverage is known to be higher.[5-7]

In this report, cancer and cancer management characteristics of women diagnosed in 2008 who were included in the NBCA are compared according to private health insurance status. The aim is to determine whether women without this insurance had poorer prognostic characteristics and received less extensive treatment.

The analyses are limited to describing broad differences in prognostic and treatment characteristics for public health monitoring purposes and to show differences that may warrant further in-depth study.

Methods

Prognostic indicators were compared in two sets of analyses. The first comparison was by age (i.e., women aged 80 years or more versus younger women) and the second by private health insurance status (private patient/public patient). Pearson chi-square tests were used, substituting the likelihood ratio test when cell sizes were small.[8,9] In addition, indicators measured on an ordinal or continuous scale were analysed using the Mann-Whitney U test.[8,9] Because insurance status varied by age, multiple logistic regression was also used to determine if differences in prognostic indicators and treatment by insurance status existed after adjusting for age at diagnosis (expressed as five dummy variables, i.e., 40-49, 50-59, 60-69, 70-79, and 80+ years respectively, using under 40 years as the reference category).[8,9]

Results and Comments

By age

(Table 1; Figure 1)

Prognostic characteristics

Of the 6,080 women, 457 were aged 80 years or more at diagnosis. As seen in younger women, most of their cancers were ductal as opposed to lobular or other histology types, although the proportion so classified was lower at 73% compared with 81% for younger women. Previous Australian clinical data have also shown ductal lesions to be less common in the older age groups and when adjusting for age at diagnosis, cancer stage, grade and hormone receptor status, to have lower survivals than most other types of breast cancers.[5,10] This difference would be expected to predispose to higher survivals in older than younger women.

Other favourable prognostic characteristics in older women included a lower prevalence of cancers with a HER-2 positive receptor status (9%) than in younger women (15%). HER-2 positive breast cancers are generally observed to be more aggressive than HER-2 negative lesions.[11] Also a higher proportion of older women with single rather than multiple breast cancer lesions was suggested (86% compared with 82%). Since single lesions are generally associated with less nodal involvement,[12] it is plausible that this would predispose to more favourable outcomes in older women.

By comparison, older women tended to have larger cancers, which are known to be associated with lower survivals.[1] In women aged 80 years or more, 58% had tumour diameters of 20mm or larger compared with a corresponding 45% for younger women.

There were many prognostic characteristics where older women did not vary significantly ($p>0.10$) from those under 80 years of age, however, including the proportion whose cancers were high grade (33% Vs 33%), who showed evidence of nodal involvement (37% Vs 38%), who were oestrogen receptor negative (16% Vs 19%), who were progesterone receptor negative (33% Vs 31%), and who had vascular invasion (30% Vs 30%).

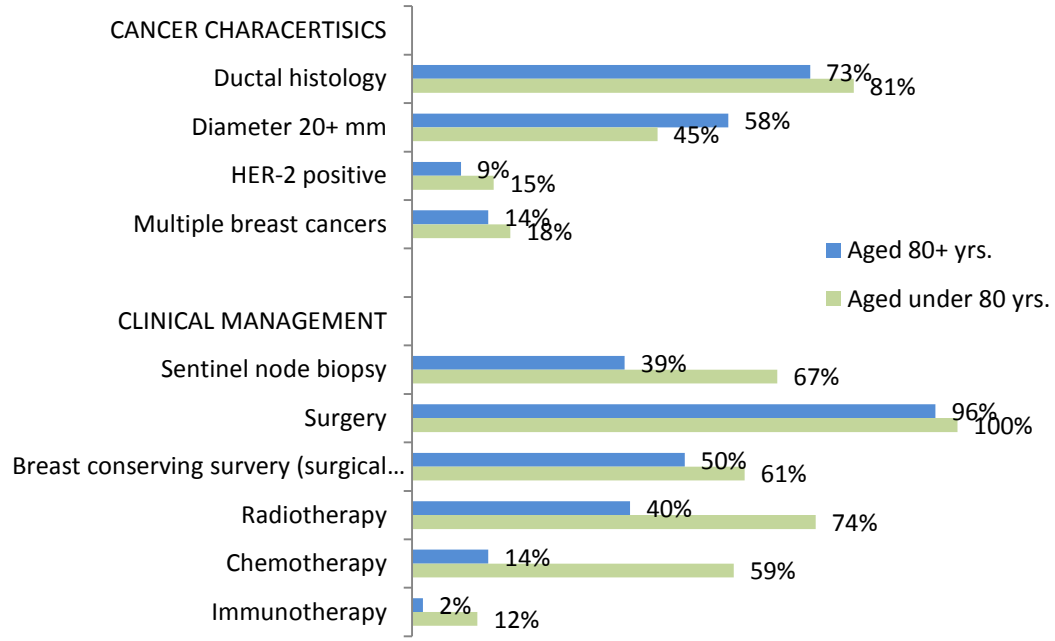
Management characteristics

Management practices varied with age, with 39% of older women having a sentinel node biopsy compared with a corresponding 67% of younger women. All women under 80 years of age received surgery compared with 96% of older women. Among women treated surgically, 50% of older cases had breast conserving surgery compared with 61% of women less than 80 years of age. Similar differences by age have been observed in previous Australian data.[10]

In addition, compared with younger women, those aged 80 years or more were less likely to receive radiotherapy (40% Vs 74%), chemotherapy (14% Vs 59%), and immunotherapy (2% Vs 12%). Previous Australian data also show less radiotherapy and chemotherapy in older patients.[10,13] However there was no significant difference by age (p>0.10) in the present study in the percentage of women aged 80 years or more and the percentage of younger women treated with tamoxifen (39% Vs 39%) or aromatase inhibitor (44% Vs 44%).

The proportion of mastectomy cases recorded to have received immediate reconstruction also varied with age, with no women aged 80 years or more recorded as receiving this management compared with 12% of younger women.

Figure 1: Characteristics of invasive breast cancers and their clinical management by age at diagnosis: NBCA 2008



By private health insurance status

(Table 2; Figure 2)

Prognostic characteristics

Of the 5,708 women with a recorded insurance status, 3,706 had private insurance. The proportion with private insurance generally increased with age, such that the relative odds of having private insurance was 1.41 for women aged 80 years or more when compared with the reference category of women under 40 years (p=0.023).

Fewer of the women with private insurance (43%) had tumour diameters of 20mm or larger than applying for public patients (50%). This difference was confirmed in the multiple logistic regression analysis after age adjustment. Compared with cancers of less than 10mm diameter as the reference category, the relative odds of having private insurance was 0.79 when diameters were 20-29mm (p=0.009), 0.64 when diameters were 30-39mm (p<0.001) and 0.65 when they were 40mm or more (p<0.001).

Women with private insurance were less likely to have high-grade cancers (32% Vs 35%). After age adjustment, and using low grade as the reference category, the relative odds of private health insurance was 0.85 (p=0.043) for women with a high grade cancer.

In addition, those with private insurance were less likely to have oestrogen receptor negative cancers (18% Vs 20%). After age adjustment, the relative odds of private health insurance were 0.86 (p=0.035) for women with oestrogen receptor negative lesions.

These differences in diameter, grade and oestrogen recptor status likely would have predisposed to higher survivals in women with private health insurance.[1] Conversely, women with private insurance were more likely to have multiple breast cancers (19% Vs 16%), which may have been associated with larger tumours and poorer outcomes.[11] After age adjustment, the relative odds of private health insurance was 1.19 (p=0.046) for women with multiple compared with single cancers.

There were many prognostic indicators that did nor differ significantly (p>0.10) between patients with and without private insurance, including ductal histology type (81% Vs 81%), positive nodal status (37% Vs 39%), progesterone receptor negative (31% Vs 31%), HER-2 positive receptor status (15% Vs 15%), and vascular invasion (30% Vs 30%).

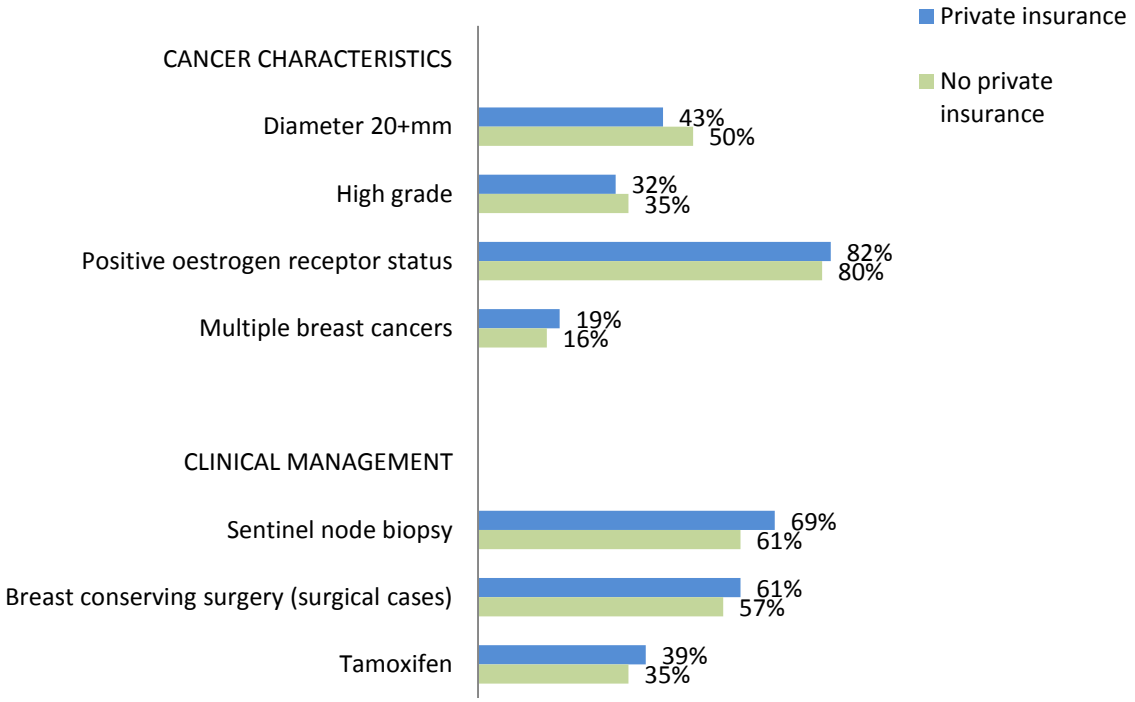
Management characteristics

There were also differences in management practices by insurance status, in that 69% of women with private insurance had a sentinel node biopsy compared with a corresponding 61% of public patients. After age adjustment, the relative odds of private health insurance was 1.43 (p<0.001) for women who had a sentinel node biopsy.

While virtually all patients (99%) had surgery, irrespective of health insurance status, surgical cases with private insurance were more likely to receive breast conserving surgery (61% Vs 57%). After age adjustment, the relative odds of private insurance was 1.20 (p=0.001) in women who received conservative surgical management.

Meanwhile, compared with public patients, those with private insurance were more likely to receive tamoxifen (39% Vs 35%). After age adjustment, the relative odds of private insurance was 1.24 (p<0.001) in women who received tamoxifen.

Figure 2: Characteristics of invasive breast cancers and their clinical managment by private health insurance status; NBCA 2008



There were many management practices where patients with private insurance and public patients did not vary significantly (p>0.10), including treatment with radiotherapy (71% Vs 72%), chemotherapy (55% Vs 57%), aromatase inhibitor (43% Vs 41%), immunotherapy (11% Vs 11%) and ovarian ablation (2% Vs 3%).

The proportion of mastectomy cases recorded as receiving immediate reconstruction was 13% for private patients and 6% for public patients. This difference was confirmed in the multiple logistic regression analysis after age adjustment, with the relative odds of private insurance being 2.61 (p<0.001) in women who received breast reconstruction.

Discussion

Comparisons by age

Australian data, including NBCA data, show comparatively low survivals for female breast cancer patients diagnosed when aged 80 years or more.[1,5] Data in the present study indicate that these patients tend to have larger cancers at diagnosis and are less likely to receive surgical treatment, radiotherapy, chemotherapy or immunotherapy.

It is likely that these older patients often receive less comprehensive treatment due to raised levels of co-morbidity and frailty, but data on these characteristics are not available for investigation through the NBCA database. The use of privacy-protecting data linkage systems to create de-identified data for this purpose should be investigated. Research into

means of best treating older patients with multiple chronic ailments will become increasingly important as the population ages and a higher proportion of patients fall into this category.

Sentinel node biopsies were less common in patients aged 80 years or more than in younger patients, as was breast conserving surgery. It is likely that the larger cancers encountered in older women would often have presented contra-indications for these procedures. It is also possible that mastectomies were preferred to breast conserving surgery on some occasions because of a reduced need to tax older and more frail patients with multiple follow-up visits for adjuvant treatments such as radiotherapy. Also cosmetic advantages of breast conserving surgery may have been regarded as less important to by some of these older women. Again, data on these aspects are not available through the NBCA and special studies will be needed to explore them.

Comparisons by private health insurance status

Australian data show greater population coverage with private health insurance in upper socio-economic areas and more accessible major city areas where survivals from female breast cancer are comparatively high.[6,7] The present data show that patients with private health insurance tended to have smaller tumours of lower grade that tended more to be hormone receptor positive. These differences were more apparent after adjusting for age and likely would have been conducive to higher survivals.[1]

Differences in exposure to surgery and adjuvant therapies existed, which were also more apparent after age adjustment. There was a difference in surgical type, with more patients with private insurance having conservative surgical management rather than a mastectomy. Potentially their smaller tumour sizes would have been more conducive to this treatment. Also, patients with private health insurance were more likely to have tamoxifen. Breast reconstruction was recorded more frequently for private than public patients. The extent to which this reflects personal preference, resource availability and other factors is not clear and requires further study.

Conclusion

This report shows differences in cancer and cancer management practices by age and health insurance status. There is a need for further data infrastructure development to better understand factors that influence heath-service effectiveness across the community and assist efforts to optimize clinical outcomes.

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Table 1: Percentage distribution of female-breast cancer and clinical management characteristics in patients aged 80 years or more, compared with younger patients: National Breast Cancer Audit, 2008 diagnoses*

Characteristics	Age at diagnosis (yrs.) Under 80 (n=5,623)	80+ (n=457)	P value *
Histology:			
Ductal (n=4,784)	81	73	$X^2_{(2)}$ p<0.001
Lobular (n=631)	10	13	
Other (n=522)	8	14	
Total (n=5,937)	100	100	
Diameter (mm):			
Under 10 (n=1,015)	18	11	
10-14 (n=1,156)	20	12	MW p<0.001
15-19 (n=1,062)	18	19	
20-29 (n=1,376)	23	28	$X^2_{(5)}$ p<0.001
30-39 (n=615)	10	17	
40+ (n=710)	12	13	
Total (n=5,934)	100	100	
HER-2 status:			
Positive (n=843)	15	9	
Negative (n=4,775)	85	91	$X^2_{(1)}$ p<0.001
Total (n=5,618)	100	100	
Number of invasive cancers:			
1 (n=3,528)	82	86	MW p=0.060
2 (n=366)	9	7	
3+ (n=400)	10	7	$X^2_{(2)}$ p=0.166
Total (n=4,294)	100	100	
Sentinel node biopsy reported:			
Yes (n=n=3,919)	67	39	$X^2_{(1)}$ p<0.001
No (n=2,161)	33	61	
Total (n=6,080)	100	100	
Surgery:			
Yes (n=6,043)	100	96	$X^2_{(LR)}$ p<0.001
No (n=37)	0	4	
Total (n=6,080)	100	100	
Surgery type:			
Breast conserving (n=3,555)	61	50	$X^2_{(1)}$ p<0.001
Mastectomy (n=2,352)	39	50	
Total (n=5,907)	100	100	
Radiotherapy:			
Yes (n=4,161)	74	40	$X^2_{(1)}$ p<0.001
No (n=1,664)	26	60	
Total (n=5,825)	100	100	
Chemotherapy:			
Yes (n=3,327)	59	14	$X^2_{(1)}$ p<0.001
No or not yet (n=2,547)	41	86	
Total (n=5,874)	100	100	
Immunotherapy:			
Yes (n=612)	12	2	$X^2_{(1)}$ p<0.001
No (n=4,765)	88	98	
Total (n=5,377)	100	100	
Reconstruction (mastectomy cases):			
Yes (n=251)	12	0	$X^2_{(LR)}$ p<0.001
No (n=2,101)	88	100	
Total (n=2,352)	100	100	

* MW = Mann-Whitney; X^2(df)=Pearson chi-square: $x^2_{(LR)}$=Likelihood ratio chi-square

Table 2: Percentage distribution of female-breast cancer and clinical management characteristics according to private health insurance status: National Breast Cancer Audit, 2008 diagnoses*

Characteristics	Private health insurance status: Yes (n=3,706)	No (n=2,002)	P value *
Diameter (mm):			
Under 10 (n=937)	18	15	
10-14 (n=1,085)	20	18	
15-19 (n=1,017)	19	17	MWp<0.001
20-29 (n=1,284)	23	24	$X^2_{(5)}$ p<0.001
30-39 (n=585)	9	12	
40+ (n=664)	11	14	
Total (n=5,572)	100	100	
Grade:			
Low (n=1,164)	22	20	MWp=0.017
Intermediate (n=2,539)	47	45	$X^2_{(2)}$ p=0.046
High (n=1,811)	32	35	
Total (n=5,514)	100	100	
Oestrogen receptor status:			
Positive (n=4,514)	82	80	$X^2_{(1)}$ p=0.022
Negative (n=1,031)	18	20	
Total (n=5,545)	100	100	
Number of invasive cancers:			
1 (n=3,271)	81	84	MWp=0.063
2 (n=348)	10	7	$X^2_{(2)}$ p=0.043
3 (n=360)	9	9	
Total (n=3,979)	100	100	
Sentinal node biopsy reported:			
Yes (n=3,776)	69	61	$X^2_{(1)}$ p<0.001
No (n=1,932)	31	39	
Total (n=5,708)	100	100	
Surgery type:			
Breast conserving (n=3,367)	61	57	$X^2_{(1)}$ p=0.002
Mastectomy (n=2,257)	39	43	
Total (n=5,624)	100	100	
Tamoxifen:			
Yes (n=2,043)	39	35	$X^2_{(1)}$ p=0.002
No or not yet (n=3,382)	61	65	
Total (n=5,425)	100	100	
Reconstruction (mastectomy cases):			
Yes (n=234)	13	6	$X^2_{(1)}$ p<0.001
No (n=2,023)	87	94	
Total (n=2,257)	100	100	

* MW = Mann-Whitney; X^2(df)=Pearson chi-square