


rural differences in the use of BCT. The largest and most comprehensive study to date, by Hill et al. collected detailed information on 4837 women through Australia diagnosed with breast cancer between April and September 1995.¹⁸ This study found the overall utilisation of BCT to be 48 per cent. Eighty-five per cent of the 4837 women had early disease at diagnosis—of these women, 53 per cent underwent BCT compared to 32 per cent of the women who had advanced disease at diagnosis.

More recent linked hospital and cancer registry data for NSW is currently being prepared and will be reported on in the near future.

ACKNOWLEDGEMENTS

We thank Dr Anne Kricker for her detailed comments on an earlier version of this paper. We also thank Professor Bruce Armstrong, Ms Marylon Coates, Ms Anne Cuddy and the staff of the NSW Central Cancer Registry who provided advice and made cancer registry data available; and Ms Helen Moore and Drs Lee Taylor and Louisa Jorm for their assistance with this project.

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USING LINKED DATA TO EXPLORE QUALITY OF CARE FOR BREAST CANCER

Anne Kricker

Senior Epidemiologist

National Breast Cancer Centre

Most women with early breast cancer have the option of surgery that conserves the breast or mastectomy. In 1990, a consensus statement of the United States National Institutes of Health concluded that breast conservation was appropriate for early breast cancer, and was preferable to total mastectomy because it provided equivalent survival while preserving the breast. This theme was taken up in Australia with the release of the *NHMRC Clinical practice guidelines for the management of early breast cancer* in October 1995. The proportion of women receiving breast conserving surgery thus became an indicator for monitoring the uptake of a new treatment

option for breast cancer. This article compares patterns of breast cancer surgery in NSW in 1992 and 1995; and describes features of the women, and the breast cancers that were associated with changes in mastectomy rates.

METHODS

Routinely collected administrative data has been used for linkage studies of breast cancer surgery in NSW women.^{1,2} For the present study, the NSW Department of Health used Automatch to link records of women with breast cancer in 1992 and 1995 in the NSW Cancer Registry with their treatment records in the NSW Inpatient Statistics Collection (ISC).

Some women whose records were linked had diagnostic breast procedures only (six per cent in 1992 and four per

cent in 1995) or no surgical procedures recorded (11 per cent in 1992 and nine per cent in 1995) and these women were not included in this study. Women who had any code indicating either mastectomy alone or mastectomy with breast conserving therapy were assigned to 'mastectomy'. The category of 'breast conserving therapy' (BCT) included women who had this surgery only although they may have had an additional diagnostic procedure.

We examined the relationship between type of surgery and women's ages, places of residence and the recorded size of the breast cancer. We also grouped hospitals into categories by their 'surgical volume' (low, medium, high) based on the total number of mastectomies and BCTs in each year.

QUALITY IN BREAST CANCER MANAGEMENT

There were 2,020 women with invasive breast cancer in 1992 and 2,883 in 1995 for whom cancer registry records were successfully linked to ISC records of BCT or mastectomy.

Breast conservation and mastectomy

Breast conservation alone was the surgical treatment procedure for 39 per cent of women in 1992 and 45 per cent of women in 1995. In both years most women had mastectomy (61 per cent in 1992; 55 per cent in 1995) and rural women were more likely to have mastectomy and less likely to have breast conservation than urban women. Three-quarters of the women with breast cancer in the linked records in 1995 lived in Sydney, Newcastle and Wollongong.

While BCT increased from 1992 to 1995, it was mainly in women with the smallest breast cancers (<1cm) (Table 12). In 1992 less than half (46 per cent) the women with the smallest breast cancers had BCT compared with almost two-thirds (61 per cent) in 1995. A higher proportion of women in urban areas (64 per cent) had BCT for the smallest cancers than women in rural areas (47 per cent) (Table 12).

Mastectomy was the more common surgery for larger breast cancers, and increased steadily with increasing

cancer size to around 80 per cent of urban women with 3+ cm breast cancers (Table 1). There was no similar trend in rural women, although they too had the greatest use of mastectomy (87 per cent of women) with the largest (3+ cm) cancers. Between 1992 and 1995 there was almost no change in the percentage of women who had mastectomy for the largest (3+ cm) cancers. On the other hand, mastectomy for the smallest (<1 cm) cancers fell from 50 per cent to 36 per cent in urban women and from 64 per cent to 47 per cent in rural women. Table 1 summarises the evidence that most of the shift from mastectomy to BCT occurred in the treatment of the smallest breast cancers.

As would be expected, urban hospitals performed more surgery for breast cancer in each year (up to 211 procedures in 1992 and 237 in 1995) than rural hospitals (up to 32 in 1992 and 67 in 1995) (Figure 7). Most women (65 per cent in each year) had surgery in a public hospital. While in 1992 only 10 per cent of women had surgery in urban hospitals performing the highest volume of breast cancer surgery (100+ procedures), this had increased substantially to 37 per cent in 1995. Despite this increase, more than half (55 per cent) of women in 1995 had their surgery in hospitals where no more than 60 mastectomies and BCTs were performed in the year.

Predictors of mastectomy

We examined urban or rural residence, cancer size in four categories, spread (*localised* to the breast, invading adjacent tissue or *regional* lymph nodes or *distant* metastases) and hospital volume of surgery for breast cancer (low, intermediate, high) as potential predictors of mastectomy.

The odds of mastectomy were two-fold higher in the presence of regional spread of the cancer at diagnosis than with localised cancer and higher still for the largest (3+ cm) compared with the smallest (<1 cm) cancers (Table 13). The higher mastectomy rates in rural NSW were independent of any differences in breast cancer size and spread at diagnosis (Table 13). In the multivariate models, mastectomy was, if

TABLE 12

PERCENTAGES OF URBAN AND RURAL WOMEN 40–69 YEARS OF AGE HAVING MASTECTOMY AND BCT BY BREAST CANCER SIZE, NSW, 1992 AND 1995

	1992				1995			
	Urban Mastectomy %	BCT only %	Rural Mastectomy %	BCT only %	Urban Mastectomy %	BCT only %	Rural Mastectomy %	BCT only %
Size:								
0–0.9 cm	50	50	70	30	36	64	53	47
1–1.9 cm	49	51	55	45	50	50	53	47
2.0–2.9 cm	62	38	63	37	64	36	50	50
3.0+ cm	81	19	87	13	79	21	87	13
All sizes	60	40	65	35	54	46	58	43

Note: Breast cancer size was recorded only for women aged 40–69 years in 1992 and for women diagnosed April–September in 1995

TABLE 13

ASSOCIATION OF MASTECTOMY WITH URBAN OR RURAL RESIDENCE, CANCER SPREAD, CANCER SIZE AND HOSPITAL VOLUME OF SURGICAL PROCEDURES IN WOMEN 40–69 YEARS OF AGE DIAGNOSED WITH INVASIVE BREAST CANCER, NSW, 1992 AND 1995

	1992 (N=1085)			1995 (N=799)		
	OR (adjusted)*	95%CI		OR (adjusted*)	95% CI	
Residence:						
Urban	1.0			1.0		
Rural	1.3	1.0 1.9		1.3	0.9 1.9	
		<i>p</i> -value	0.09		<i>p</i> -value	0.3
Extent of cancer:						
Localised	1.0			1.0		
Regional	2.0	1.5 2.7		2.0	1.4 2.7	
Metastatic	0.8	0.3 2.3		1.1	0.2 6.8	
		<i>p</i> -value	<0.001		<i>p</i> -value	<0.001
Size (cm):						
0 to 0.9	1.0			1.0		
1.0 to 1.9	0.7	0.5 1.1		1.4	1.0 2.1	
2.0 to 2.9	1.1	0.7 1.7		1.8	1.1 2.9	
3 +	3.1	1.8 5.3		5.6	2.9 10.7	
		<i>p</i> -value	<0.001		<i>p</i> -value	<0.001
Hospital volume:						
1–10 procedures	1.0			1.0		
11–20 procedures	1.5	0.9 2.6		1.3	0.6 2.5	
21+ procedures	0.9	0.6 1.4		1.3	0.7 2.1	
		<i>p</i> -value	0.04		<i>p</i> -value	0.7

* Adjusted for age, socioeconomic status of area of residence, and histopathological type of breast cancer (ductal, lobular, special types).

anything, most prevalent in hospitals in which moderate numbers of breast procedures were done rather than few or many.

COMMENT

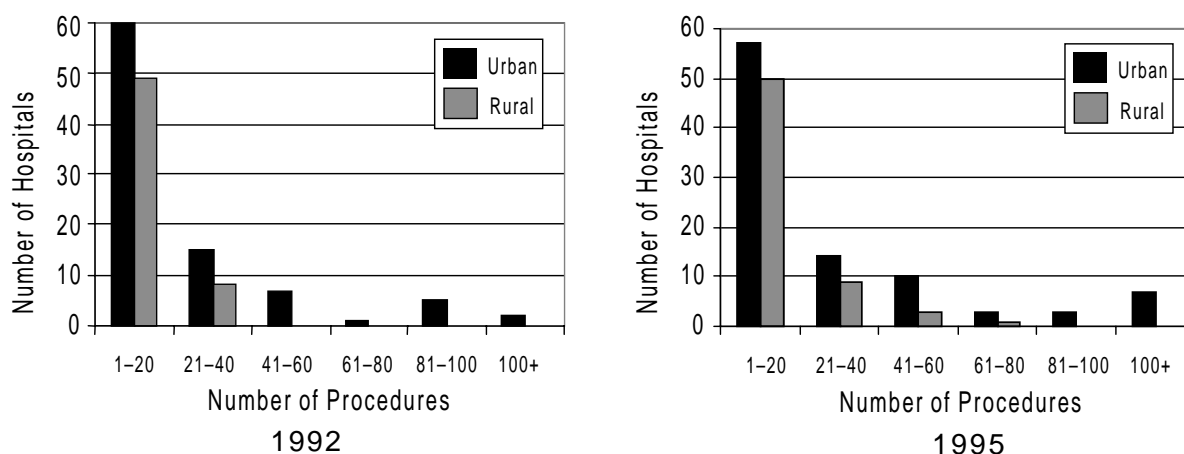
Our study used a linkage of two sets of routinely collected, computerised health records. The increase in NSW in BCT from 1992 (39 per cent) to 1995 (45 per cent) was consistent with increases observed in earlier periods in Australia,^{3,4} and similar to the BCT

rate in Victoria in 1990,⁵ and Australia in 1995.⁶ We concluded that BCT in NSW in 1995 was in line with current Australian practice.

Although more women had BCT in 1995 than 1992 in NSW, the increase was confined to women with small, localised breast cancers. The trend for mastectomy to increase with increasing cancer size was observed mainly in urban women. The greater use of BCT in urban women may suggest that practice had changed more in the urban setting by 1995.

FIGURE 7

NUMBERS OF MASTECTOMIES AND BREAST CONSERVATION PROCEDURES CARRIED OUT IN URBAN AND RURAL HOSPITALS, NSW, 1992 AND 1995



More than half (55 per cent) the NSW women with breast cancer in 1995 had surgery in hospitals that had a maximum of 60 mastectomies and BCTs in the year, that is, an average of less than one procedure a week. Most rural women had their surgery in lower volume hospitals; only one rural hospital had a surgical volume of 60 mastectomies and BCTs in 1995. While BCT in each of the high volume urban hospitals in 1995 was mostly close to the state average (45 per cent), rural hospitals varied substantially from 30–70 per cent. Approximately four per cent of rural women, however, had surgery in an urban hospital, a shift in place of treatment that may have contributed to low BCT rates in selected rural hospitals.


Our data tells us about the proportions of women who had BCT and mastectomy for breast cancer in NSW and some of the variations in these proportions. They do not tell us about reasons for the choice of the type of surgery. We know that screening increased the diagnosis of small cancers and that there was a greater use of BCT for the smallest cancers. In addition, rural residents are known to have less access to specialist medical care,⁷ a situation perhaps reflected in the lower uptake of BCT in those rural women for whom radiotherapy would be a recommended accompaniment.

ACKNOWLEDGEMENT

I thank Ms Kim Lim and Dr Tim Churches of the Epidemiology and Surveillance Branch, NSW Department of Health, who prepared the linked data set and provided advice.

One factor we were unable to take into account is the womens' own choices about their surgery. About one-quarter of women with early breast cancer diagnosed in Australia in 1995 were reported by surgeons to have chosen non-conservative surgery for reasons such as concerns about recurrence or treatment by radiotherapy, which were sometimes age- or residence-related.⁶

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NSW PUBLIC HEALTH BULLETIN

The *NSW Public Health Bulletin* is a publication of the NSW Department of Health.

The editor is Dr Lynne Madden, Manager, Public Health Training and Development Unit.

Dr Michael Giffin is managing editor.

The *Bulletin* aims to provide its readers with population health data and information to support effective public health action.

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