

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/259875590>

Increasing breast reconstruction rates by offering more women a choice

Article in ANZ Journal of Surgery · January 2014

Impact Factor: 1.12 · DOI: 10.1111/ans.12471 · Source: PubMed

CITATIONS

7

READS

40

7 authors, including:



[April Wong](#)

Melanoma Institute Australia

8 PUBLICATIONS 81 CITATIONS

SEE PROFILE



[Kathy Flitcroft](#)

Melanoma Institute Australia

7 PUBLICATIONS 10 CITATIONS

SEE PROFILE

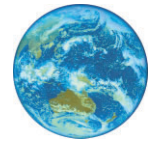


[Andrew J Spillane](#)

University of Sydney

124 PUBLICATIONS 1,597 CITATIONS

SEE PROFILE



Increasing breast reconstruction rates by offering more women a choice

April Wong,*†‡ Kylie Snook,*†§ Meagan Brennan,*†¶ Kathy Flitcroft,* Monica Tucker,* Daniel Hiercz¶¶ and Andrew Spillane*†‡¶¶

*Breast and Surgical Oncology Centre, The Poche Centre, Sydney, New South Wales, Australia

†Department of Surgery, Mater Hospital, Sydney, New South Wales, Australia

‡Department of Surgery, Royal North Shore Hospital, Sydney, New South Wales, Australia

§Department of Surgery, Hornsby Ku-ring-gai Hospital, Sydney, New South Wales, Australia and

¶Sydney Medical School, The University of Sydney, Sydney, New South Wales, Australia

Key words

breast implant, breast neoplasm, breast surgery, mastectomy, reconstructive surgical procedure.

Correspondence

Dr April Wong, Breast and Surgical Oncology Centre, The Poche Centre, 40 Rocklands Road, North Sydney, NSW 2060, Australia. Email: aprilwong80@gmail.com

A. Wong MBChB, MS, FRACS; **K. Snook** BMed, FRACS; **M. Brennan** BMed, FRACGP, FASBP; **K. Flitcroft** PhD, MA (Govt), BBS, Grad Cert Hlth Pol; **M. Tucker** RN, Grad Cert Oncology, Grad Dip Counseling; **D. Hiercz** BSci, MSci; **A. Spillane** BMedSci, MBBS, FRACS, MD.

This study was presented at the Royal Australasian College of Surgeons Annual Scientific Congress in May 2012.

Accepted for publication 11 October 2013

doi: 10.1111/ans.12471

Introduction

Breast cancer is the most common cancer among Australian women with one in eight women diagnosed with breast cancer before the age of 85.¹ Approximately 40% of patients will undergo mastectomy as part of the surgical treatment of their breast cancer.² Breast reconstruction (BR) may be performed as an immediate (IBR) or delayed (DBR) procedure, using breast implants, autologous tissue or a combination of the two. Current clinical guidelines worldwide recommend that BR be offered to all suitable women requiring or choosing mastectomy.³⁻⁵

Rates of BR

A 2013 systematic review showed international BR rates range widely from 4.9% to 81.2%.⁶ In 2009, rates in the United States were

Abstract

Background: Breast reconstruction (BR) following mastectomy for breast cancer is safe and has high rates of patient satisfaction, yet only around 12% of Australian women undergo BR. This study presents BR rates and outcomes from a specialist practice that discusses reconstruction options with all women medically suitable for BR.

Methods: Retrospective clinical study of all women that had undergone therapeutic mastectomy between 2009 and 2011. Patient, tumour and adjuvant therapy factors, and surgical complication rates, were compared between BR and no BR (NBR) patients.

Results: Of the 331 women who had mastectomy for cancer, 136 (41%) had BR, with the vast majority (132, 97%) opting for immediate BR (IBR). Factors significantly associated with BR were young age, pure ductal carcinoma in-situ (DCIS), menopausal status and private health insurance. The main reasons for NBR were patient choice (88/195, 45%) and surgeon's perception of high-risk tumours (63/195, 32%). At mean follow-up of 15.6 months, five patients had developed local or distant recurrence (2 BR, 3 NBR). IBR did not cause significant delays in commencement of adjuvant therapy, and the BR group had a lower rate of surgical complications.

Discussion: A BR rate of 41%, over three times the national average, was achieved when BR was discussed with all patients. This significant gain in BR rate was not accompanied by a commensurate increase in adverse outcomes, providing evidence that expanding the indications for BR to women who were previously not considered eligible is a valid option.

around 25%⁷ and a systematic audit of practice in the United Kingdom reported increasing BR rates from 10% to 25% over the last decade, with around 21% of women undergoing immediate BR (IBR).⁸ In comparison, the rate of BR in Australia – between 9% and 12% – has remained almost static.²

Benefits of BR

Mastectomy can have a negative impact on body image and sexual function.⁹ IBR has been shown to decrease negative emotional and psychological consequences of mastectomy, thereby reducing anxiety, improving self-esteem and enhancing the quality of life of these patients,¹⁰ although some studies have found no difference in psychological outcomes between patients who had BR and those who didn't.¹¹ The majority of patients who have undergone reconstructive surgery are satisfied with their BR.^{10,12} Recent Australian

surveys of breast cancer patients and breast care nurses, have shown that 74% of women were highly satisfied with their BR¹² and up to 50% of women may accept BR if it was offered.⁶ BR has also been shown to be oncologically safe in the majority of cases. A meta-analysis found that BR in women of all tumour stages did not compromise loco-regional control or distant disease relapse.⁹

The aim of this study was to compare patient, tumour and adjuvant therapy factors, as well as surgical complication rates, between BR and NBR patients.

Methods

A retrospective clinical review was conducted assessing all cases of therapeutic mastectomy performed by two surgeons in a multidisciplinary breast cancer treatment centre between 2009 and 2011. All patients had all forms of reconstruction discussed and the final choice of the type of reconstruction was made by the patient in consultation with the surgeon(s). If patients were considering autologous reconstruction, or they wanted a plastic surgeon to do the implant reconstruction, they are offered referral to plastic surgical colleagues. Patients anticipated to require post-mastectomy radiotherapy (PMRT) were encouraged to have a temporary expander implant during the cancer treatment phase and to defer the decision about definitive reconstruction. If reasons for NBR were not documented, surgeons would retrospectively report the reason for the patient not having BR.

Data on patient demographics and tumour factors were retrieved from the BreastSurgANZ Quality Audit database and compared for women opting to have BR and NBR. Reconstructive surgical data and complications were retrieved from patient records. Both breast surgeons performed immediate two-stage implant BR, and one also offered latissimus dorsi reconstruction. All transverse rectus abdominis muscle (TRAM) flap reconstructions were referred to, and performed by, plastic/reconstructive surgeons.

Statistical analysis was performed using R statistical package (version 2.14.2; R Foundation, Vienna, Austria). Tests used included Welch's *t*-test, chi-square test and binomial regression modelling.

Results

There were 715 new breast cancer patients during the 3-year period. Of the 331 (46.3%) patients who had mastectomy, 136 (41.1%) patients underwent BR and most were immediate procedures ($n = 132$, 97%). The majority of patients had unilateral breast cancer, with 13 cases of bilateral breast cancer (5 BR, 8 NBR). Patient demographic and tumour factors are summarized in Table 1.

IBR with the initial placement of a tissue expander, as part of two-stage implant reconstruction, was the most frequent procedure ($n = 109$, 77%). Autologous reconstruction was performed in 32 patients. Twenty-nine (21%) patients had TRAM reconstructions of which 20 (14%) were immediate and nine (7%) were delayed procedures. Five of these nine patients had an initial insertion of an expander. Three (2%) patients had latissimus dorsi with expander reconstruction. There were 87 patients who had expanders and second-stage permanent implant placement. Seven patients were still waiting for surgery to insert their permanent implants and

another seven patients had not decided on either autologous or implant prosthesis to complete their reconstruction. One patient declined further surgery. Two patients required removal of their expanders due to infection and decided not to have further reconstruction.

Most patients had unilateral BR regardless of type of reconstruction (76 expander/implant, 18 TRAM, three latissimus dorsi). Overall, 44 patients had bilateral BR including 33 patients with expanders/implants and 11 patients with TRAM reconstruction.

Patient and tumour factors associated with BR are shown in Table 1. Multivariate analysis found the factors most strongly associated with BR were younger age (Fig. 1a) and the size of the invasive tumour (Fig. 1b).

In the NBR group, the main reason for not undergoing BR was patient choice (88 patients, 45%), followed by the surgeon's perception of a 'high-risk' tumour (63 patients, 32%). Thirteen patients were considered medically unfit for BR, with five patients having a combination of 'high-risk' tumour factors and lack of fitness. Of the 22 (11%) undecided patients, 15 patients (68%) were actively considering DBR.

A small group of patients had systemic neoadjuvant chemotherapy treatment (4 BR, 13 NBR) and one NBR patient had neoadjuvant endocrine treatment. Adjuvant treatment comparisons between the groups are shown in Table 2. Surgical complications are shown in Table 3. Uncomplicated seromas were excluded from the analysis as aspirations are performed by community nurses in the outpatient setting and this data was not available. In a sub-analysis of patients who had adjuvant therapy, the overall complication rate for patients who had adjuvant radiotherapy (0 BR, 3 NBR) or chemotherapy (10 BR, 8 NBR) or both (6 BR, 11 NBR), were similar between the two groups (overall complication rate of 12% BR, 11% NBR, $P = 0.83$). Reasons for unplanned return to theatre are also shown in Table 3.

The majority of patients who had complications did not have a delay in commencing their PMRT or adjuvant chemotherapy treatment. One patient had a 3-week delay in commencing chemotherapy as a result of a wound infection, while another had a delay in both chemotherapy and PMRT treatment from an infected expander associated with nipple ischaemia. Two patients had their chemotherapy treatment shortened, one due to a recurrent chest wall infection, treated conservatively with oral antibiotics. Another patient developed neutropenic enterocolitis unrelated to the implant. The mean follow-up was 15.6 months (range 0.6–40.3 months). Five patients developed local or distant recurrences ($n = 2$ BR, $n = 3$ NBR).

Discussion

Our results provide evidence that IBR does not necessarily delay the delivery of adjuvant therapy and that surgical complications are not necessarily greater for women who choose BR over NBR. In the literature, a higher rate of reconstruction is reported in urban, teaching hospitals, private hospitals and in 'high-volume' breast cancer centres where the rate of reconstruction ranged from 17% to 50%.^{6,7} Many factors influence the uptake of BR. This discussion will focus on the four factors most relevant to our findings.

Table 1 Patient demographics and tumour factors

	Breast reconstruction (BR) <i>n</i> = 136 (41%)	No breast reconstruction (NBR) <i>n</i> = 195 (59%)	<i>P</i> -value
Age (years)	—	—	<0.01
Mean	50	64	—
Range	25–79	31–94	—
Menopausal status	—	—	<0.01
Peri	13	15	—
Post	50 (37)	153 (79)	—
Insurance	—	—	<0.05
Private	122 (89)	158 (81)	—
Public	14 (11)	37 (19)	—
Laterality	—	—	0.09
Left	73 (54)	91 (47)	—
Right	58 (43)	96 (49)	—
Bilateral	5 (3)	8 (4)	—
Total tumours	<i>n</i> = 141	<i>n</i> = 203	—
Tumour type	—	—	—
Invasive	114 (81)	189 (93)	0.33
IDC	88 (77)	131 (69)	—
ILC	17 (15)	38 (20)	—
Other	9 (8)	20 (11)	—
Grade	—	—	0.75
1	10 (9)	13 (7)	—
2	46 (40)	83 (44)	—
3	54 (47)	89 (47)	—
Unknown†	4 (4)	4 (2)	—
Multicentricity	—	—	0.75
One	67 (59)	118 (63)	—
More than one	43 (38)	68 (36)	—
Unknown†	4 (3)	3 (1)	—
Lymphovascular invasion	—	—	0.23
Absent	53 (47)	101 (53)	—
Present	57 (50)	79 (42)	—
Unknown†	4 (3)	9 (5)	—
Stage	—	—	0.33
1	32 (28)	49 (26)	—
2	33 (29)	47 (25)	—
3	47 (41)	89 (47)	—
Unknown†	2 (2)	4 (2)	—
<i>In situ</i>	27 (19)	14 (7)	<0.01
Grade	—	—	0.4
Low	1 (4)	0	—
Intermediate	9 (33)	3 (21)	—
High	17 (63)	11 (79)	—
Invasive size (mm)	—	—	0.09
Mean	30.7	36.9	—
Range	0–160	0–200	—
<i>In situ</i> size (mm)	—	—	0.13
Mean	32.8	36.6	—
Range	0–110	3–150	—
Oestrogen receptor (ER)	—	—	0.34
Positive	118 (84)	163 (80)	—
Negative	21 (15)	40 (20)	—
Unknown†	2 (1)	0	—
Progesterone receptor (PR)	—	—	0.45
Positive	113 (80)	157 (77)	—
Negative	26 (19)	46 (23)	—
Unknown†	2 (1)	0	—
HER2‡ receptor	—	—	0.97
Positive	24 (17)	41 (20)	—
Negative	90 (64)	148 (73)	—
Not applicable	27 (19)	14 (7)	—
Triple negative (ER, PR, HER2 negative)	—	—	0.4
Yes	7 (5)	16 (8)	—
No	134 (95)	187 (92)	—

†Missing data. ‡HER2, human epidermal growth factor receptor 2. Percentages shown in parentheses.

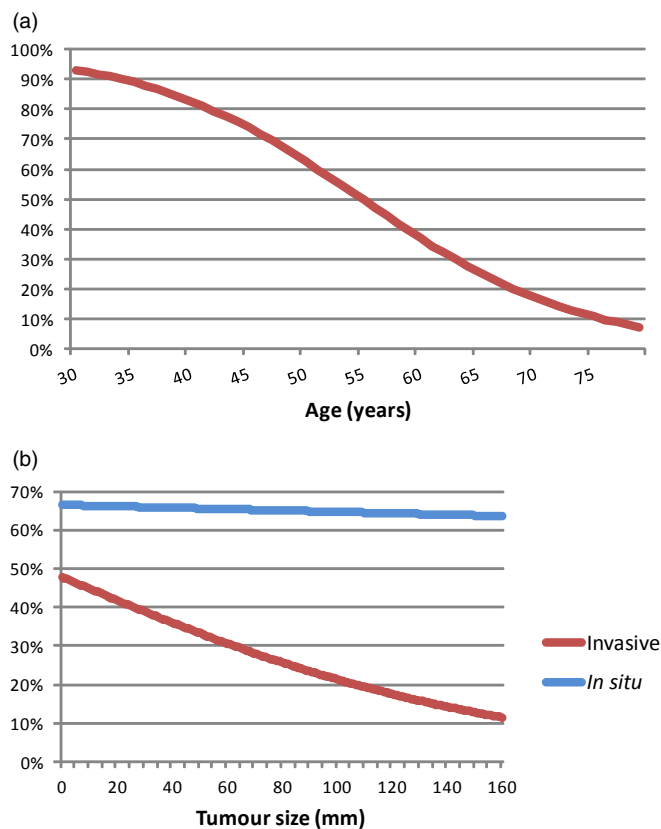


Fig. 1. (a) Odds of breast reconstruction by age. (b) Odds of breast reconstruction by tumour size.

Age

Many studies report that older patients are less likely to undergo BR.^{7,13} Some of these studies excluded women over 60 from their rate calculation and another found physicians were less likely to offer reconstruction to older women.^{14,15} In our practice, we offer BR to women regardless of age. The oldest patient that underwent BR in this study was 79 years of age.

Tumour factors

Increasing tumour stage is negatively associated with the likelihood of BR.^{7,13} It is unclear whether this is because patients' priorities change with the more advanced stage of disease or because physicians act more conservatively in this population group.¹³ We found the odds of reconstruction decreased as the size of invasive tumour increased (trending towards statistical significance).

Adjuvant radiotherapy and chemotherapy

Some surgeons view IBR as undesirable for women who require PMRT or systemic adjuvant therapy,¹³ often imposing a 2-year waiting period after mastectomy and then considering DBR only if no metastatic disease or local recurrence develops during the interval.¹⁶ Their concerns are focused on the perceived possibility of PMRT producing worse aesthetic outcomes on the reconstructed breast,¹⁷ and possible delays in starting adjuvant systemic therapy if IBR leads to complications such as infection.¹⁸ However, several

studies have shown the feasibility of IBR (implant or autologous) in women requiring both treatments.¹⁹ IBR can be performed without impairing the ability to detect local recurrence,²⁰ or causing significant delays in the delivery of adjuvant systemic therapy,²¹ and with acceptable rates of complications²¹ and high levels of patient satisfaction.¹⁹ Our study has produced further evidence for the efficacy of IBR, showing that the majority of IBR patients who had complications did not have a delay in commencing their chemotherapy or radiotherapy treatment. The rate of surgical complications was also comparable between the IBR and BR groups, in contrast to previous findings.¹⁹

Surgeons' attitudes to BR

A woman's decision to undergo BR is strongly influenced by the surgeon's attitudes towards reconstructive surgery.^{22,23} A US study by Alderman and colleagues reported that patients' knowledge of BR options significantly increased their willingness to consider a mastectomy.²³ They found that only 33% of patients had a discussion about BR with their surgeon and 40% of patients without BR felt that they were inadequately informed about their reconstructive options during the surgical decision-making process for their cancer.²³

Other studies reported approximately 30% of surgeons did not provide BR information to patients or did not routinely refer eligible patients for BR.²² Of those who did discuss BR, half of them would only give information to selected women based on their age, marital status and risk of recurrence.²² Low referral from these surgeons was due to perceived barriers such as concern about the safety of BR, the age of the patient, a lack of surgeon knowledge about BR procedures, an inability to perform reconstructive procedures and the lack of a plastic surgeon referral service.^{22,23} A 2012 survey of more than 700 Breast Cancer Network Australia members found 10% of women who had a mastectomy had never discussed BR with their surgeons and were not offered it.²⁴ Not all breast or general surgeons have the expertise to perform oncoplastic reconstructive surgery, but surgeons should be aware of the options and discuss them with their patients, referring them to other surgeons if necessary.

Limitations

Our results contain small amounts of missing data and the retrospective nature of this study may have led to potential recall bias from surgeons about reasons why patients did not have reconstruction (<10 cases). The short follow-up period could also be a limitation because of the lack of time for patients to present with longer term complications such as capsular contraction. We did not assess the reasons why our patients chose BR. A woman's decision whether to undergo BR is a complex one, affected by psychological profile, the current systems of care where they are being treated, the interaction with their health professionals and their consulting styles.²⁵ These results are from a specialized breast cancer centre, which discusses the full range of reconstruction options, including no reconstruction, with all eligible patients. We acknowledge that this is not the situation in all practices in Australia and New Zealand for a variety of complex reasons; however, we have demonstrated what is possible if IBR is given increased priority.

Table 2 Adjuvant treatment between reconstruction and non-reconstruction groups

Adjuvant treatment	Breast reconstruction (BR) <i>n</i> = 136	No breast reconstruction (NBR) <i>n</i> = 195	<i>P</i> -value
Radiotherapy	—	—	0.07
Yes	44 (32)	83 (42)	—
No	92 (67)	111 (57)	—
Unknown†	0	1 (1)	—
Chemotherapy	—	—	0.83
Yes	87 (64)	120 (62)	—
No	49 (36)	73 (37)	—
Unknown†	0	2 (1)	—
SERM	—	—	<0.01
Yes	52 (38)	46 (23)	—
No	71 (52)	134 (69)	—
Unknown†	13 (10)	15 (8)	—
Ovarian ablation	—	—	0.85
Yes	6 (4)	9 (4)	—
No	127 (93)	183 (94)	—
Unknown†	3 (3)	3 (2)	—
Aromatase inhibitor	—	—	0.02
Yes	39 (29)	82 (42)	—
No	84 (62)	98 (50)	—
Unknown†	13 (9)	15 (8)	—
HER2-directed therapy	—	—	0.85
Yes	25 (18)	33 (17)	—
No	110 (81)	160 (82)	—
Unknown†	1 (1)	2 (1)	—

†Missing data. Percentages shown in parentheses.

Table 3 Surgical complications in reconstruction and non-reconstruction groups

Complication†	Breast reconstruction (BR) <i>n</i> = 136	No breast reconstruction (NBR) <i>n</i> = 195	<i>P</i> -value
Infected seroma	0	7	—
Infection (cellulitis/abscess requiring intravenous antibiotics)	3	5	—
Implant 2	—	—	—
TRAM 1	—	—	—
Haematoma (requiring surgical drainage or aspiration)	3	6	—
Implant 2	—	—	—
TRAM 1	—	—	—
Skin flap necrosis (dressing alone)	3	10	—
Implant 3	—	—	—
Skin flap necrosis (surgery and dressings)	3	1	—
Implant 1	—	—	—
TRAM 2	—	—	—
Lymphoedema	0	4	—
Other – neuropathy	2	2	—
Implant 2	—	—	—
Other – blood transfusion	1	0	—
TRAM 1	—	—	—
Reconstruction-related complications‡	—	—	—
Capsular contracture	3‡	N/A	—
Implant rupture	0	N/A	—
Loss of implant	9	N/A	—
Infection 5	—	—	—
Haematoma 2	—	—	—
Capsular contracture 2	—	—	—
Nipple ischaemia	4	N/A	—
Revision of TRAM	1	N/A	—
Immediate expander/implant	13	N/A	—
Immediate TRAM	4	N/A	—
Expander + TRAM	0	N/A	—
Delayed TRAM	2	N/A	—
Total complications (excluding seroma)	20 (15%)	35 (18%)	0.41
Return to theatre	14	5	—
Loss of implant	9	N/A	—
Skin flap necrosis	3	1	—
Haematoma	1	4	—
Revision of TRAM	1	N/A	—

†Some patients may have more than one complication. ‡Only one had radiotherapy.

Conclusion

Currently, the rate of BR in Australia is low despite its proven benefits and strong worldwide recommendations in support of reconstruction. The surgeon's attitude towards offering BR is vital in order to give patients the opportunity to make informed decisions about the best management of their cancer at the time of diagnosis. This study has shown that it is possible to have a much higher BR rate – over three times the national average – if reconstruction is discussed with all medically eligible women at presentation. This significant gain in BR rate was not accompanied by a commensurate increase in adverse outcomes, providing evidence that expanding the indications for BR to women who were previously not considered eligible is a valid option.

Acknowledgements

This research was funded in part by the friends of The Mater Foundation, North Sydney, Australia and the Melanoma Institute of Australia, supporting Dr April Wong's surgical oncology fellowship in 2012.

References

1. Cancer Australia. *National Breast & Ovarian Cancer Centre*. [Cited 10 July 2012.] <http://canceraustralia.nbocc.org.au/breast-cancer/about-breast-cancer/breast-cancer-statistics>
2. Cancer Australia. *NBCA – NBOCC and RACS National Breast Cancer Audit Public Health Monitoring Series 2008 Data*. [Cited 10 July 2012.] <http://canceraustralia.gov.au/publications-resources/cancer-australia-publications/nbocc-and-racs-national-breast-cancer-audit-public-1>
3. National Institute for Health and Care Excellence (NICE) Guidelines. *Breast Cancer (Early & Locally Advanced) February 2009*. [Cited 2 April 2012.] <http://www.nice.org.uk/guidance/CG80>
4. National Comprehensive Cancer Network. *NCCN Guidelines Version 3. 2013. Breast Cancer*. [Cited 2 April 2012.] http://www.nccn.org/professionals/physician_gls/pdf/breast.pdf
5. Cancer Australia. *Clinical Practice Guidelines for the Management of Early Breast Cancer (2nd edn) 2001*. [Cited 2 April 2012.] <http://canceraustralia.gov.au/publications-resources/cancer-australia-publications/clinical-practice-guidelines-management-early>
6. Brennan ME, Spillane AJ. Uptake and predictors of post-mastectomy reconstruction in women with breast malignancy – systematic review. *Eur. J. Surg. Oncol.* 2013; **39**: 527–41.
7. Reuben BC, Manwaring J, Neumayer LA. Recent trends and predictors in immediate breast reconstruction after mastectomy in the United States. *Am. J. Surg.* 2009; **198**: 237–43.
8. National Mastectomy and Breast Reconstruction Audit (Report 2) 2009. *The Health & Social Care Information Centre*. [Cited 30 May 2013.] <http://www.hscic.gov.uk/article/2021/Website-Search?q=national+mastectomy+and+breast+reconstruction+audit&go=Go&area=both>
9. Gieni M, Avram R, Dickson L *et al.* Local breast cancer recurrence after mastectomy and immediate breast reconstruction for invasive cancer: a meta-analysis. *Breast* 2012; **21**: 230–6.
10. Wehrens K, Cuyper W, Boeckx W *et al.* Psychological profile of women seeking breast reconstruction and quality of life assessment after surgery. *Eur J Plast Surg.* 2005; **28**: 264–7.
11. Harcourt DM, Rumsey NJ, Amber NR, Cawthorn SJ, Reid CD, Maddox PR. The psychological effect of mastectomy with or without breast reconstruction: a prospective, multicenter study. *Plast. Reconstr. Surg.* 2003; **111**: 1060–8.
12. Breast Cancer Network Australia. *Breast Reconstruction Survey November 2010*. [Cited 2 April 2012.] <http://www.bcna.org.au/sites/default/files/breast-reconstruction-report.pdf>
13. Alderman AK, McMahon L Jr, Wilkins EG. The national utilization of immediate and early delayed breast reconstruction and the effect of sociodemographic factors. *Plast. Reconstr. Surg.* 2003; **111**: 695–703.
14. Chen JY, Malin J, Ganz PA *et al.* Variation in physician-patient discussion of breast reconstruction. *J. Gen. Intern. Med.* 2009; **24**: 99–104.
15. Desch CE, Penberthy LT, Hillner BE *et al.* A sociodemographic and economic comparison of breast reconstruction, mastectomy, and conservative surgery. *Surgery* 1999; **125**: 441–7.
16. McMasters KM, Hunt KK. Neoadjuvant chemotherapy, locally advanced breast cancer and quality of life. *J Clin Oncol* 1999; **17**: 441–4.
17. Benediktsson K, Perbeck L. Capsular contracture around saline-filled and textured subcutaneously placed implants in irradiated and non-irradiated breast cancer patients: five years of monitoring of a prospective trial. *J. Plast. Reconstr. Aesthet. Surg.* 2006; **59**: 27–34.
18. Vandergrift JL, Niland JC, Theriault RL *et al.* Time to adjuvant chemotherapy for breast cancer in national comprehensive cancer network institutions. *J. Natl Cancer Inst.* 2013; **105**: 104–12.
19. Nava MB, Pennati AE, Lozza L *et al.* Outcome of different timings of radiotherapy in implant-based breast reconstructions. *Plast. Reconstr. Surg.* 2011; **128**: 353–9.
20. Slavin SA, Love SM, Goldwyn RM. Recurrent breast cancer following immediate reconstruction with myocutaneous flaps. *Plast. Reconstr. Surg.* 1994; **93**: 1191–204, discussion 1205–7.
21. Mortenson MM, Schneider PD, Khatri VP *et al.* Immediate breast reconstruction after mastectomy increases wound complications: however, initiation of adjuvant chemotherapy is not delayed. *Arch. Surg.* 2004; **139**: 988–91.
22. Takahashi M, Kai I, Hisata M, Higashi Y. The association between breast surgeons' attitudes toward breast reconstruction and their reconstruction-related information-giving behaviors: a nationwide survey in Japan. *Plast. Reconstr. Surg.* 2006; **118**: 1507–14.
23. Alderman AK, Hawley ST, Waljee J, Mujahid M, Morrow M, Katz SJ. Understanding the impact of breast reconstruction on the surgical decision-making process for breast cancer. *Cancer* 2008; **112**: 489–94.
24. Breast Cancer Network Australia. *Issue of concern. Breast reconstruction. The Beacon*; Winter 2013. Issue 63:3.
25. Harcourt D, Rumsey N. Mastectomy patients' decision-making for or against immediate breast reconstruction. *Psychooncology* 2004; **13**: 106–15.