# What is new in the surgical management and prevention of breast cancer?

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## Summary

- Breast cancer is the most common malignancy in Australian women. As most women now survive breast cancer, improving quality-of-life outcomes is increasingly important and major changes are occurring in breast surgery to meet this challenge.
- Use of neoadjuvant chemotherapy results in lower mastectomy rates, broader surgical options and less surgical morbidity.
- Oncoplastic breast surgery (OBS) facilitates less frequent need for mastectomy, better aesthetic outcomes and improved quality of life.
- Immediate breast reconstruction (IBR) improves quality of life and can be considered in a large proportion of women requiring mastectomy; however, Australia's rate of IBR is low compared with similar countries.
- Breast cancer risk reduction can be achieved with lifestyle modifications and, in women at high risk, chemoprevention with selective oestrogen receptor modulators or aromatase inhibitors. Bilateral prophylactic mastectomy is an option for *BRCA* gene mutation carriers or those women otherwise established to have a high level of risk.
- Contralateral prophylactic mastectomy (CPM) is increasingly performed at the time of initial breast cancer management, largely driven by patient preference. However, CPM does not improve survival and has similar rates of complications as therapeutic mastectomy. It should be cautiously considered, with full discussion of risks and benefits.
- Breast Surgeons of Australia and New Zealand (BreastSurgANZ) coordinates training of most new breast surgeons and is fostering a broader range of multidisciplinary oncology, OBS and IBR skills in its members. The BreastSurgANZ Quality Audit monitors the quality of care provided by members.
- Training breast surgeons now have access to a Graduate Certificate in Surgery (Breast Surgery) to broaden their knowledge base.


Breast cancer is the most common malignancy in Australian women. Cancer Australia predicted there would be 15 740 new cases and 3065 deaths from breast cancer in 2015.[1] Ideally, treatment is multidisciplinary, with cooperation between a range of medical, nursing and supportive care specialties combining to give each woman access to the best available individualised treatment. With refinements and developments in therapy and the reasonably widespread use of screening, breast cancer survival rates continue to steadily improve, with the overall 5-year survival now about 90%.[1] Recent incremental improvements in survival and reduced morbidity have resulted from refinement of therapies related to the understanding of breast cancer subtypes (luminal A, luminal B, human epidermal growth factor receptor 2 [HER2]-enriched, and triple negative)[2] and the more personalised application of adjuvant therapies to those most likely to benefit. Commercially available gene expression profiling tools add to that refinement and will hopefully soon become publicly funded in Australia.

As survival has improved, the focus of surgical management has rightly undergone a major evolution to recognise the importance of aesthetic and other quality-of-life outcomes, including less extensive axillary surgery and sentinel node biopsy for most patients. If the best treatment for breast cancer is thought of as a package of care, rather than a series of independent therapies, then understanding the multifaceted implications of each component allows for increased flexibility in delivery of care and a range of benefits for the patient. To facilitate flexibility in decision making, the maximum amount of information has to be available at the time of diagnosis. This means high-quality breast imaging, which may include tomosynthesis and breast magnetic resonance imaging, as well as core biopsy of the tumour, with tumour phenotype identification including an estimate of grade and oestrogen receptor (ER), progesterone receptor (PR) and HER2 immunohistochemistry. This information facilitates multidisciplinary discussion of all possible options before commencing any therapy.

In this article, I highlight areas that demonstrate the major changes occurring in breast surgery to meet the challenges presented in this environment of steady improvements in outcome.

## The role of the surgeon in multidisciplinary management

Cancer Australia recommends all breast cancer patients be managed by multidisciplinary teams, which includes presentation at a multidisciplinary meeting (MDM) at diagnosis and again at any major intersection of treatment.[3] The multidisciplinary input into individual cases helps to alleviate the biases that individual specialists may have. The members of the multidisciplinary team comprise representatives from the relevant medical, nursing and supportive care specialties, including radiological and histopathology specialists. Surgeons are the most common source of new patients presented at MDMs, as most patients newly diagnosed with breast cancer require surgery and those presenting with distant metastatic disease may come to a surgeon first. It is the surgeon's responsibility to present an accurate history and explain the planned or completed operative intervention, including margins and lymph node assessment.


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It is often the surgeon who is responsible for relaying the recommendations from the MDM back to the patient. Patients should be notified if there are any outlying opinions expressed in the MDM, even if there was general consensus.

## Neoadjuvant chemotherapy

Based on the various patient and tumour factors, it can be confidently predicted at presentation that some patients will need chemotherapy as part of their multidisciplinary treatment. Multiple randomised controlled trials assessed in several meta-analyses and a Cochrane review[4-6] have demonstrated equivalence in overall survival and locoregional control for neoadjuvant chemotherapy (NACT; chemotherapy before surgical treatment) compared with adjuvant chemotherapy, providing all planned therapies are used. The extent of tumour response to NACT is a very powerful indicator of prognosis, with patients who achieve a pathological complete response having the best prognosis.

Persistent anxiety that giving NACT prevents the oncologist from knowing the exact size, grade and lymph node status of the tumour has largely been overcome by improvements in breast imaging and information available from core biopsy at diagnosis to define phenotype based on grade, ER, PR and HER2 status. Despite having no proven survival advantage, NACT has benefits that lead to better aesthetic and quality-of-life outcomes for the patient. However, in Australia, the benefits of NACT are not being fully realised and it is underused.[7] Its potential benefits include:

- a higher rate of breast conservation surgery (BCS) and improved aesthetic outcomes for patients who are already suitable to receive BCS;
- lower rates of axillary lymph node (ALN) involvement and most likely lower rates of ALN dissection;
- time for genetic testing before deciding on BCS or possibly bilateral mastectomy if a *BRCA* gene mutation is identified;
- time for the woman to consider her surgical preferences, including contralateral surgery, and to seek multiple opinions;
- demonstration of the tumour's chemosensitivity to the drugs being given; and
- enrolment in clinical trials evaluating new drugs or new drug combinations, including trials specifically investigating the role of additional chemotherapy for patients with significant residual disease after receiving NACT.

## Oncoplastic breast surgery

Oncoplastic breast surgery (OBS) combines the principles of breast oncological surgery, to achieve adequate staging and local control of breast cancer, with aesthetic techniques, including some borrowed from plastic surgery. These involve a range of simple through to complex rearrangements of breast volume (volume displacement) or breast volume replacement, where adjacent or remote tissues are used for various types of flap reconstructions, to maintain breast shape. OBS techniques can increase the proportion of patients who can achieve BCS and improve its aesthetic results, lowering the need for patients to have a mastectomy. Some of the techniques, such as therapeutic mammoplasty, may lead to better aesthetic outcomes if a contralateral symmetry procedure is also performed, opening up the possibility of improving the patient's pre-operative aesthetic appearance without compromising cancer treatment. A range of OBS techniques that may be used are listed in the Box. Many breast surgeons who have embraced OBS concepts are also

### Examples of oncoplastic breast surgery procedures

| Description | Notes |
|---|---|
| **Volume displacement techniques** | |
| Dual plane mobilisation | Simple, done in most low-volume resection cases by mobilising the breast parenchyma off the subcutaneous and deep tissues, closing the defect and redraping the skin over it |
| Round block techniques | Circumareolar incision, wedge resection, then volume redistribution |
| Grisotti flap reconstruction | For central tumours where the NAC has to be removed |
| Batwing mastopexy | Simple technique for central upper-pole tumours; results in mammoplasty |
| Tennis racquet method | Simple sectorial resection, with repositioning of the NAC |
| Therapeutic mammoplasty | Range of techniques and pedicles ± secondary pedicles to resect tumour and perform reduction mammoplasty and reshaping; often requires contralateral procedure |
| **Volume replacement techniques** | |
| Latissimus dorsi miniflap; rarely free flaps (eg, TRAM, DIEP or SGAP flap) | Pedicled or free flap — importing muscle and/or overlying fatty tissues into the breast defect to reshape breast after significant volume resection (>15–25% of breast volume) |
| TDAP, LICAP, AICAP, SAAP or SEAP flap | All variations on the theme of importing local fatty tissues into the breast defect on random or pedicled flap |

AICAP = anterior intercostal artery perforator. DIEP = deep inferior epigastric artery perforator. LICAP = lateral intercostal artery perforator. NAC = nipple-areolar complex. SAAP = serratus anterior artery perforator. SEAP = superior epigastric artery perforator. SGAP = superior gluteal artery perforator. TDAP = thoracodorsal artery perforator. TRAM = transverse rectus abdominis myocutaneous. ◆

performing breast reconstruction (BR) as a natural extension of the broader range of aesthetic surgical skills.

## Immediate breast reconstruction

BR is recognised to improve both quality of life and recovery from the psychological trauma of a mastectomy. In New York, BR is a legislated right;[8] in the United Kingdom, the National Institute for Health and Care Excellence recommends it be made available when medically appropriate,[9] as does Cancer Australia.[10] Despite this, reported rates of BR in Australia (8%–12%) have remained low compared with similar countries, such as the UK (21%) and United States (up to 25%).[11-13] In the UK, structural reform regarding what constitutes a breast unit and advances in the training of new breast surgeons, in particular oncoplastic breast surgeons, has led to significant progressive improvements in the BR rate, as documented in the National Mastectomy and Breast Reconstruction Audit.[11] Plastic and reconstructive surgeons continue to be the main providers of BR services in Australia, particularly for highly specialised free flap reconstructions. However, with an expanding number of breast surgeons with training in OBS techniques, breast oncology surgeons are more often performing immediate BR (IBR), mostly using implant-based techniques. Increasingly, patients are having skin-sparing, skin-reducing or nipple-sparing (total skin-sparing) mastectomy and IBR with implants, performed as either a one-stage or two-stage procedure by the breast surgeon. The one-stage, direct-to-implant reconstruction techniques (rather than two-stage, with an initial expander implant, followed by a permanent implant at a second operation) are facilitated by the expanding range of acellular dermal matrices derived from porcine, bovine or cadaveric human sources or synthetic mesh materials. As a result of these changes, some Australian centres are now reporting rates of IBR over 40%.[14] As more breast surgeons become trained in these techniques, the expectation is that the national rate of BR will increase.

## Risk reduction and preventive treatments

Much information is available to inform patients (and their physicians) about their risk of breast cancer. Influences on risk include family history of breast or ovarian cancer, length of endogenous and exogenous hormonal exposures during life, prior breast biopsy samples showing atypia, breast density, alcohol use and body mass index (BMI). Women can be assigned a risk category using various risk calculation tools that are generally based on a combination of these factors. For example, Cancer Australia offers an online tool, Familial Risk Assessment — Breast and Ovarian Cancer (FRA-BOC), that categorises risk level as 1 (normal), 2 (moderately elevated) or 3 (significantly elevated) based on a woman's family history.[15]

The breast surgeon can instigate strategies to reduce a woman's risk of developing breast cancer. The full range of options, as outlined below, should be discussed with the patient.

### Lifestyle changes

Lifestyle changes to reduce risk of breast cancer are to reduce BMI, increase exercise, eat less fatty food and red meat, and consume less alcohol. Women, especially those at elevated risk, should limit prolonged exposure to exogenous hormones, especially combined hormone replacement therapy. It would be reasonable for every woman to get a breast cancer risk assessment, including mammographic breast density, around the age of 40 years and adjust lifestyle factors and frequency of screening accordingly.

### Systemic therapies

Tamoxifen and other selective ER modulator drugs (SERMs), such as raloxifene, can moderate breast cancer risk by about 50% if used for 5 years, and are often offered to women in FRA-BOC risk categories 2 and 3. The possible negative impacts of these drugs include exacerbation of menopausal side effects and a slightly higher risk of thromboembolic events and uterine cancer (especially with tamoxifen).[16] Aromatase inhibitor drugs are likely more effective than SERMs for prevention, but they only work in post-menopausal women and can have more pronounced menopausal symptoms, particularly arthralgia, and can worsen osteopenia.[17]

### Bilateral prophylactic mastectomy

Risk management in the setting of a proven *BRCA1* or *BRCA2* gene mutation is a special situation requiring a multidisciplinary approach that includes genetic and gynaecological oncology expertise. For these women, risk-reducing bilateral salpingo-oophorectomy halves breast cancer risk, as well as minimising ovarian or fallopian tube cancer risk, and is recommended at an appropriate age (based on each woman's individual circumstances). These women also receive greater benefits from risk-reducing medication and bilateral prophylactic mastectomy (BPM) than do non-mutation carriers.[18] Situations exist where BPM is performed on non-*BRCA* mutation carriers, usually when a high level of risk has been otherwise established and after full discussion of the real, rather than perceived, risk of developing breast cancer and the complications of the procedure. Many more women initially present for a discussion of BPM but never have it after consideration of these factors.

### Contralateral prophylactic mastectomy

Several studies have reported increased rates of contralateral prophylactic mastectomy (CPM) at the time of diagnosis with a unilateral breast malignancy.[19] This is largely driven by patient preference, as many patients request CPM. When it is explained that this additional procedure does not affect overall survival, that the rates of complications are just as high for the procedure in the normal breast as the diseased breast, and that any complications may lead to delay in receiving important cancer

therapy, most patients choose not to have, or at least to defer, the CPM. However, even when it is understood that CPM does not improve survival, it is still often requested. The reasons for this seem to be largely related to anxiety about the potential for having to go through treatment, especially chemotherapy, again, and the impact this will have on the patient's family and quality of life. There is also a realisation that many women will be offered a contralateral symmetry procedure (most often reduction mammoplasty) if IBR is performed, so the logical argument presented, usually by the patient, is that she may as well remove and reconstruct both breasts. This is especially the case where deep inferior epigastric artery perforator and transverse rectus abdominis myocutaneous flap reconstructions are the patient's preferred method of BR, as these flap reconstructions can only be performed once. Improvements in IBR, including those described above, have facilitated this increasing trend in CPM. The breast surgeon must fully inform patients of the potential negative impacts of CPM to try to moderate this demand and ensure that well informed decisions are made.

## The importance of auditing and measuring high-quality breast surgical cancer care

As has been highlighted, breast surgery is increasingly complicated and there is pressure on established breast surgeons to expand their skill base and provide many of the options discussed here. The only Australian organisation representing breast surgeons as a craft group is Breast Surgeons of Australia and New Zealand (BreastSurgANZ; http://www.breastsurganz.org). Since its formation in 2010, it has been compulsory for full members of BreastSurgANZ to audit all their cases of breast cancer by contributing de-identified data to the BreastSurgANZ Quality Audit. This invaluable quality assurance tool allows members to assess their rates for five key performance indicators (KPIs) on the audit portal (https://www.bqa.org.au). By meeting threshold recommendations for these KPIs, the surgeon provides evidence that he or she is offering the best available cancer care. BreastSurgANZ is now auditing compliance of its membership, checking that individual surgeons are auditing all their cases and assessing their rates for the KPIs. It is not unreasonable for referring doctors or patients to ask their breast surgeon if he or she is meeting these KPIs or participating in an equivalent audit if the surgeon is not a BreastSurgANZ member.

## Training breast surgeons in Australia and New Zealand

New breast surgeons are now mostly trained within a structure overseen by BreastSurgANZ. This requires 2 years of subspecialty training after attaining a Royal Australasian College of Surgeons Fellowship in General Surgery. Training increasingly aims to expose post-Fellowship trainees (PFTs) to at least two different breast units to enable them to see a broader range of techniques. In addition, PFTs are required to complete a log book, attend PFT training days, complete clinical ultrasound and communications courses, and participate in OBS Level 1 and Level 2 courses conducted by BreastSurgANZ or equivalent organisations overseas. Commencing this year, BreastSurgANZ and the University of Sydney have collaborated to develop a Graduate Certificate in Surgery (Breast Surgery).[20] This provides a knowledge curriculum to assist breast surgeons with meeting the challenges of contemporary breast surgical practice.

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