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Breast cancer detection in moderate- to high-risk women

Introduction

BREAST cancer is the number one cancer diagnosed in women across Australia.[1] Since 1991, the BreastScreen Australia program has had a major impact in moderating an increasing incidence trend for breast cancer and in contributing to falling mortality in women aged 50-75.[2] The Marmot review confirmed a 20% reduction in breast cancer mortality in women who had been screened.[3]

There is currently no proactive national screening program for asymptomatic women under 50 at moderate to high risk of breast cancer as a result of family history or germline mutation.[2] Thus, GPs are required to develop a suitable system to screen for breast cancer in this group of women, in collaboration with specialised services.

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Identifying asymptomatic at risk women under 50

FAMILY history is an important and well-established risk factor for breast cancer.[4] Women with a family history are 1.5-3.9 times more likely to develop the condition than those without, depending on the number and degree of relatedness of the family members affected.[4] As a result, the first step in risk assessment is to take a detailed history of cancers in the family, as well as other personal risk factors.[4]

National referral guidelines for breast cancer assessment and consideration of genetic testing can be found at eviQ Cancer Treatments Online. The Cancer Australia breast cancer risk calculator is a useful tool that can be utilised in general practice. Pink Hope has also developed an online assessment tool in conjunction with the Peter MacCallum Cancer Centre.

As shown in table 1, family history allows women to be stratified as low, moderate or high risk for breast cancer.[6] Overall, up to 4% of women are considered to be at moderate risk of developing breast cancer, with a risk of between one in four, and one in eight up to the age of 75 — that is 1.5-3 times the population average.[5]

In addition, up to 1% of women are considered to be at high risk of developing breast cancer. These women, under the age of 75, have a risk between one in two and one in four — more than three times the population average — although individual risk may be higher or lower for this group if genetic test results are known.[5]

While family history is a useful tool to estimate a woman's breast cancer risk, familial cancer centres have access to resources that can more accurately assess a woman's breast cancer risk.

All asymptomatic women with a family history defined as high risk in table 1 are eligible for referral to a familial cancer centre for further assessment and advice. Some women at moderate risk may also be eligible. See the national referral guidelines for breast cancer assessment and consideration of genetic testing at eviQ Cancer Treatments Online (see Online resources).

Table 1. Defining risk categories based on family history[5]

Moderate risk is defined as	Potentially high risk is defined as
One first-degree relative diagnosed with breast cancer before the age of 50* OR	Two first- or second-degree relatives on one side of the family diagnosed with breast or ovarian cancer, plus one or more of the following on the same side of the family: • Additional relative(s) with breast or ovarian cancer • Breast cancer diagnosed before 50 • Bilateral breast cancer • Breast and ovarian cancer in the same woman • Ashkenazi Jewish ancestry • Breast cancer in a male relative OR
Two first-degree relatives on the same side of the family diagnosed with breast cancer at any age* OR	One first- or second-degree relative diagnosed with breast cancer at 50 or younger, plus another first- or second-degree relative on the same side of the family with sarcoma (bone/soft tissue) at age 50 or younger OR
Two second-degree relatives on the same side of the family diagnosed with breast cancer, at least one under 50*	Family member with established presence of a high-risk breast cancer germline mutation

*Without the additional features of the potentially high-risk group

Taking an accurate family history[5]

- Consider relatives on each side of the family separately
- Ask about any primary cancer in all first- (parents, siblings, children) and second- (aunts, uncles, nieces, nephews, grandparents) degree relatives on both sides of the family
- Establish the site and age at diagnosis of the cancer(s)
- Confirm, if possible, reports of cancer in relatives — a person's knowledge of their family history may be inaccurate
- Ask about ancestry (irrespective of religious practice)
- Update the family history regularly — it may change with time

Key factors associated with increased risk of breast cancer[5]

- Two or more first- or second-degree relatives affected by breast or ovarian cancer
- Young age at cancer diagnosis in relatives
- Relatives affected by both breast and ovarian cancer
- Relatives with a known germline mutation, for example, *BRCA1*, *BRCA2*
- Relatives affected with bilateral breast cancer
- Male relative with breast cancer
- Ashkenazi Jewish ancestry

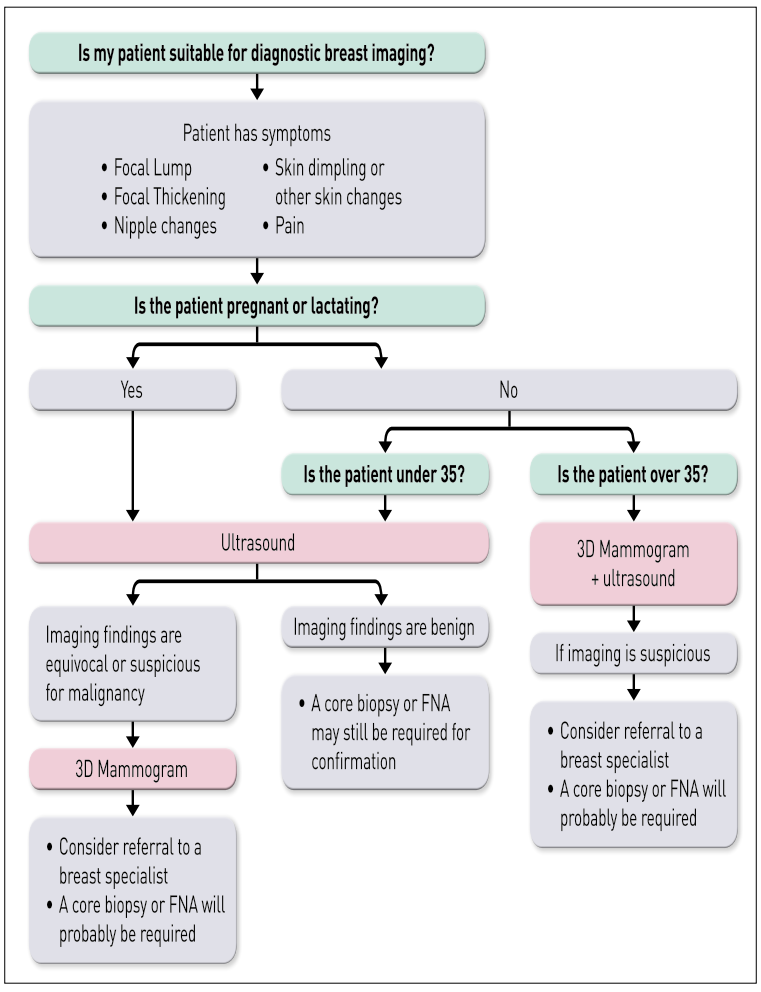

Figure 1. Diagnostic breast imaging guide for referring doctors.
Source: Diagnostic breast imaging guide for referring doctors, Imaging Associates

Imaging modalities

IMAGING modalities used to detect breast cancer in women under 50 include mammography, breast ultrasound and breast MRI.

3D mammography

At present, 2D mammography is used by the vast majority of BreastScreen Australia centres.[7] It has been considered the most effective population primary screening test for breast cancer in women aged 50-74.[7]

However, 2D mammography has some limitations: it can miss some breast cancers and may also produce false positives, as normal breast structures may overlap and appear as abnormal.

This may lead to further unnecessary investigation, such as biopsy, causing significant patient anxiety.[5,8,9]

Needle biopsies are usually well tolerated by most women, although discomfort, bruising and bleeding can occur.

However, any suspicious lesion detected with either 2D or 3D mammography should be considered for biopsy.

The addition of ultrasound is very useful here. As a rule of thumb, ultrasound-guided core biopsies are indicated whenever breast ultrasound confirms a solid lump in a woman over 40; fine-needle aspiration cytology should be considered in women with a solid lump if aged between 25 and 40, unless there are strong clinical or radiological features suspicious for malignancy.

In this case, a core biopsy should be performed in these younger women.

Further, suspicious microcalcifications or architectural distortions seen on mammography should ideally be assessed with stereotactic biopsy. However, 3D mammography has the potential to reduce the number of avoidable biopsies because it is better at visualising masses, distortions and asymmetrical densities.[8,10]

In order to help eliminate these detection challenges associated with 2D mammography, 3D mammography (breast tomosynthesis) has been developed.[7]

Studies have shown that 3D mammography has the following advantages over 2D mammography:

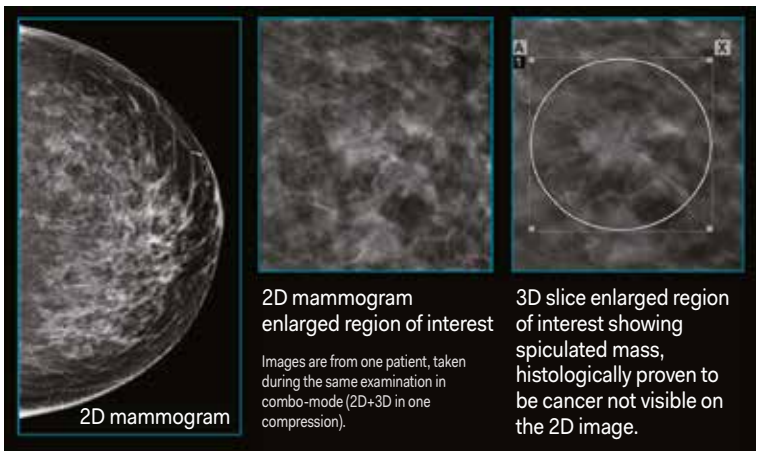

Figure 2. Example of 2D vs 3D mammography. A few slices from a 3D exam. Typically around 60 slices will be reconstructed from a 3D exam — each one around 1 mm thick. The number of slices from each 3D exam will vary depending on breast size and compression.

3D mammography is suitable for all patients, regardless of breast density.

- A 41% increase in invasive breast cancer detection[8]
- A 27% increase in all breast cancer detection[11]
- A 15-40% reduction in recall rates[8,9,11,12]
- Potential to reduce the number of avoidable biopsies[8]
- Ability to better visualise masses, distortions and asymmetric densities[10]
- Increased detection in women with dense breasts — that is, predominantly fibroglandular tissue, as is common in women under 50[10,12,13]

3D mammography is suitable for all patients regardless of breast density and allows the breast tissue to be examined in thin slices — typically 1mm thick — similar to a CT or MRI.[10,12-14]

The X-ray arm sweeps in an arc over the breast, taking a series of images at various angles over several seconds.[14]

These source images are then converted into a stack of thin slices to build a 3D image.[14] Very low X-ray energy is used during this examination, ensuring radiation exposure is well within the recommended guidelines (see table 2).[14,15]

Although all women could potentially benefit from a 3D mammogram, the following at-risk patient types may be more suitable for 3D mammography:

- Those with a strong family history of breast or ovarian cancers[4]
- Patients with dense breasts, for example, women under 50 not actively targeted by BreastScreen[10,12,13]
- Patients with any breast changes, signs or symptoms[4]
- Women with a previous diagnosis of breast disease or those requiring further assessment

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following a 2D mammogram[4]

Mammography (2D or 3D) is available under Medicare if there is a reason to suspect the presence of malignancy because of past breast malignancy in the patient or members of the patient's family, or if there are symptoms or indications of malignancy on examination.

Ultrasound

The sensitivity of mammography decreases with decreasing age because of an increased likelihood of the breast tissue being dense in younger women.[19,20] With the addition of ultrasound, sensitivity is improved in all ages, although this benefit is greater in women under 50.[19]

While this has led to a call for ultrasound to be used as an adjunct to mammography in screening for breast cancer in women under 50, no trials to date have demonstrated a proven mortality benefit.[19]

At present, the addition of bilateral survey breast ultrasound examination to annual mammography is not generally recommended for screening asymptomatic women.[19]

However, ultrasound is particularly useful for women with breast signs and/or symptoms who are under 35, pregnant or breastfeeding, as it does not involve radiation exposure and is not as limited as mammography in assessing these women, who typically have dense breasts.[19]

Given the limitations of both mammography and ultrasound, they are often used in a complementary capacity for patients aged 35-50 to give information in the evaluation of breast abnormalities.[19]

Contrast-enhanced breast MRI

Several large prospective trials have demonstrated the efficacy of contrast-enhanced MRI:[20,21]

- A very high sensitivity in breast cancer detection (up to 94%), compared with 40% for mammography alone.
- A specificity of up to 98%, matching mammography and/or ultrasound.
- An increase in the proportion of node-negative cancers detected compared with mammography alone (70-83%).

While trials have yet to be conducted to demonstrate a mortality benefit from increased detection of breast cancer with contrast-enhanced MRI in high-risk women, there is a projected 25% mortality benefit.[20,21] Thus, contrast-enhanced MRI provides high-risk women with a reasonable alternative risk-management strategy to surgery — that is, bilateral mastectomy.

The EVA trial also demonstrated that "in women at elevated familial risk, quality-assured MRI screening shifts the distribution of screen-detected breast cancers toward the pre-invasive stage".[2]

Bilateral breast MRI is funded by Medicare for screening asymptomatic high-risk women under 50 after referral by a specialist.

What happens during a breast MRI?

During a breast MRI, the patient lies prone on a padded specialised breast coil and the breasts are placed into holders in the coil. There may be some slight compression of the breasts in women with large breasts, but this is significantly less than mammography.[23]

MRI contrast (gadolinium) is injected via an IV cannula. Invasive breast cancer tends to show rapid initial enhancement, with washout in the delayed phase. Gadolinium is predominantly renally excreted — the patient requires adequate renal function — and is not radioactive.[23]

The patient is required to lie still and prone within the MRI scanner tunnel for about 30-45 minutes. The total examination time is about one hour.[23]

MRI-guided breast biopsy

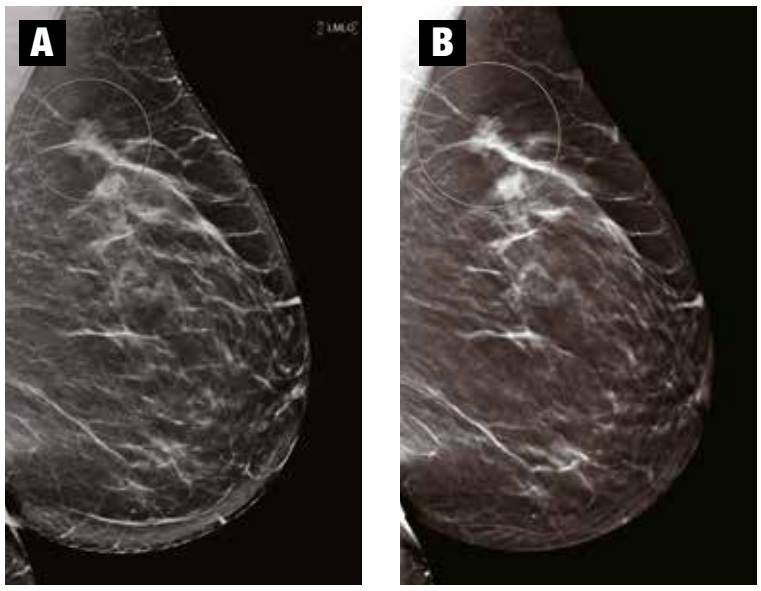
MRI-guided breast biopsy is a highly specialised procedure that is usually only performed when a breast lesion that requires biopsy can only be seen on MRI.

This procedure is relatively expensive and complex, and not many sites in Australia offer this service.

Table 2. Radiation doses used in mammography in perspective[15]

Source of exposure	Exposure
Ultrasound and MRI	0mSv
Nuclear fallout (from atmospheric tests in the 1950s and 1960s) per year	0.02mSv
One chest X-ray (two views)	0.06mSv
One return flight from Melbourne to London	0.11mSv
One full 2D mammogram[16]	0.7mSv
One full 2D and 3D mammogram*[17]	1mSv
Total natural radiation in Australia per year	1.5mSv
Cosmic radiation exposure of domestic airline pilot per year	2mSv
One standard CT scan to the chest	5mSv
There is no direct evidence of human health effects up to 10mSv	

*2D-image generating software has now been developed to replace the conventional 2D mammogram required for a combined 2D and 3D exam, thereby reducing the radiation dose.[12,14,18]



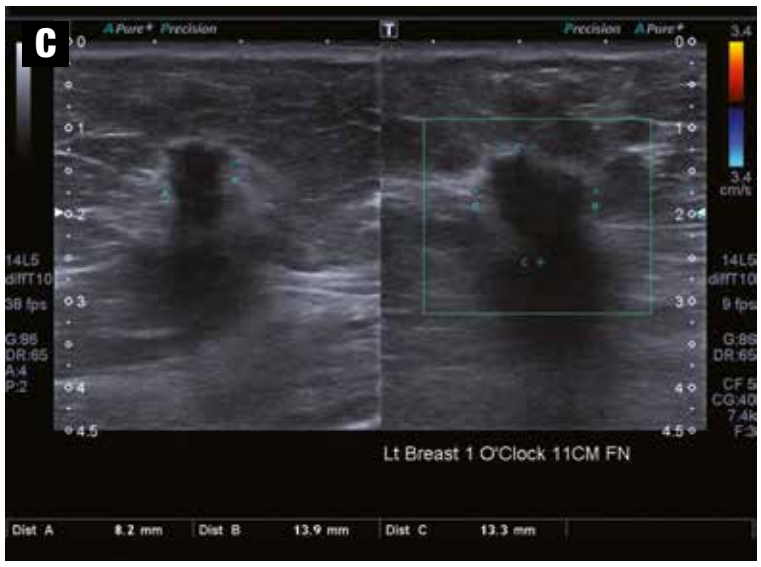


Figure 3a. 2D mammography of a breast lump. A left MLO 2D (C-View) mammogram in a 40-year-old woman with a left breast lump demonstrates a spiculated mass in the upper half of the breast (circled).

Figure 3b. The tomosynthesis (3D) slice which best illustrates this mass localises it to the upper outer quadrant, and better demonstrates the full extent of the radiating spicules (circled).

Figure 3c. Breast ultrasound Ultrasound of the left breast lump demonstrates a spiculated hypoechoic mass at 1 o'clock, 11cm from the nipple, corresponding with the mass seen on mammogram. This mass was biopsied under ultrasound guidance following an MRI; the pathology result confirmed a carcinoma.

Figure 4. MRI with breast implants.

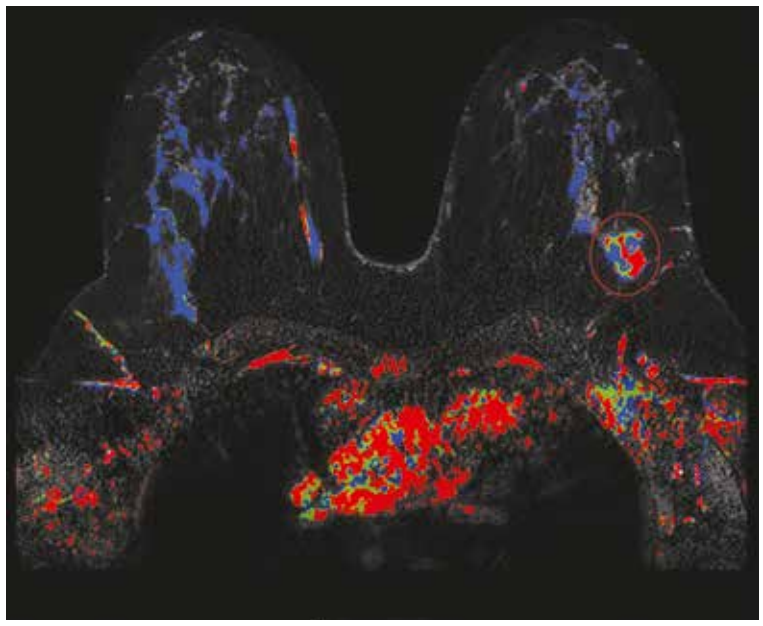


Figure 5. MRI with computer-aided detection colour mapping. An image from the post-contrast subtraction sequence from the breast MRI with computer aided detection colour mapping demonstrates a large enhancing mass in the left upper outer quadrant (circled), corresponding with the mass seen on mammogram and ultrasound. The red regions within this mass are regions of contrast washout, commonly seen in invasive carcinomas.

It is preferable to biopsy breast lesions under ultrasound guidance, as this is usually the quickest and easiest method.

The patient is positioned in the MRI unit in a similar fashion to a diagnostic breast MRI. IV contrast is usually required, and the biopsy is usually obtained with vacuum assistance. The duration of this procedure is around 30-60 minutes.

A breast biopsy is indicated for indeterminate, suspicious or malignant-appearing lesions.

Some breast surgeons prefer to examine the patient prior to biopsy, especially if the lesion appears suspicious or malignant. Biopsies are sometimes performed on benign-appearing lesions for confirmation, especially if they are large.

It is preferable to withhold blood thinners prior to breast biopsy — especially vacuum-assisted breast biopsy — but if they cannot be safely withheld for medical reasons, most breast biopsies can still proceed.

Other than bleeding, the risks include infection and reaction to the local anaesthetic; however, these are much less common than bleeding.

It is preferable to biopsy breast lesions under ultrasound guidance, as this is usually the quickest and easiest method. However, if the lesion is not visible under ultrasound, it can usually be biopsied using other imaging guidance.

If it is only visible on mammogram — for example, microcalcifications — it can be biopsied under stereotactic guidance. If it is only visible on 3D mammogram — for example, distortion — it can be biopsied under tomosynthesis guidance. If it is only visible on MRI, it can be biopsied under MRI guidance.

Core biopsy is usually preferred over fine-needle aspiration for solid breast lesions to allow for a more definitive pathological diagnosis and the ability to check hormone-receptor status if it is a breast cancer.

Interpreting radiology reports

Synoptic and standardised reporting systems have been introduced in radiology.

The aim is to standardise the information contained in reports and facilitate outcome monitoring, thereby improving communication among clinicians and other healthcare professionals.[24]

This includes categorising lesions according to levels of suspicion for breast cancer.[24]

A statement in the narrative report regarding the radiographic density of the breast may be useful in conveying a measure of the relative accuracy of the mammographic examination.[24]

For example, a dense breast may obscure underlying pathology on mammography, whereas breast cancer is usually more apparent in a predominantly fatty breast.[24]

Breast density may be reported as a percentage — for example, less than 25%, 25-50%, 50-75%, more than 75%, where more than 50% is considered dense.[24]

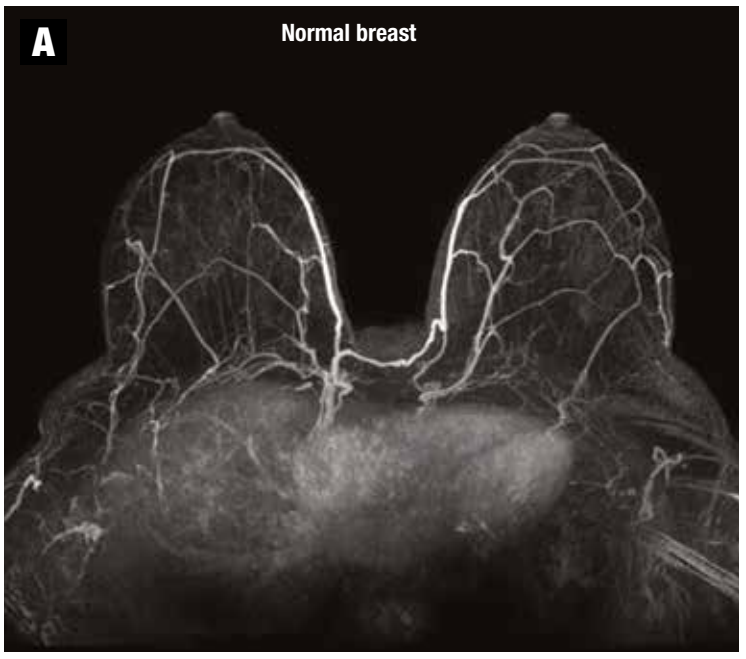


Figure 6a. Post-contrast maximum intensity projection of breast MRI. Normal breast.

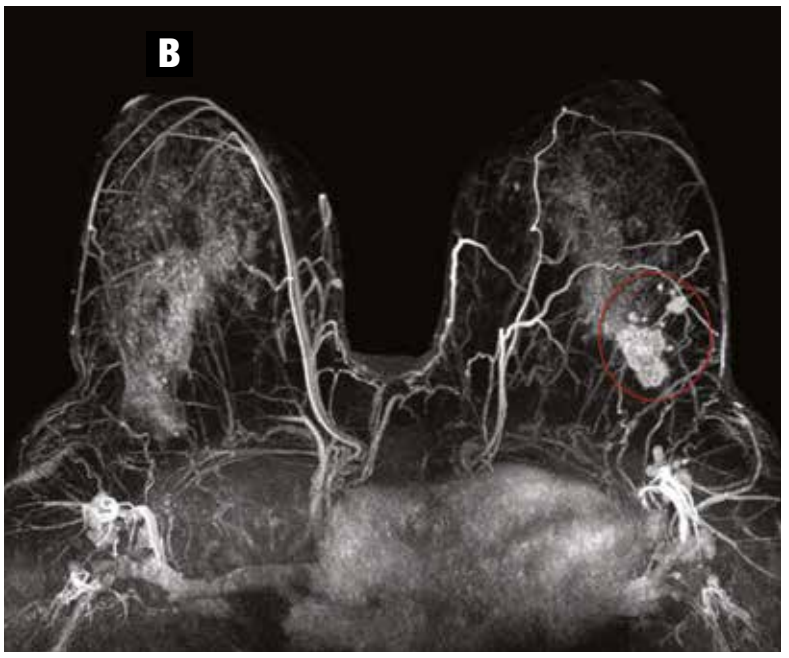


Figure 6b. Post-contrast maximum-intensity projection of breast MRI. A post-contrast MIP (Maximum Intensity Projection) image from the breast MRI shows the large enhancing mass in the left upper outer quadrant, but also shows two other smaller enhancing masses in the left upper outer quadrant and multiple enhancing foci throughout the left upper outer quadrant and at 6 o'clock (circled). When correlated with the other sequences, these other lesions had features consistent with further malignancy.

Pathology

BRCA1/*BRCA2* genetic testing

A NUMBER of genes have been identified that, when mutated in the germline, substantially influence the risk of breast cancer, including *BRCA1*, *BRCA2*, *TP53*, *PTEN* and *PALB2*.[4,5,25]

The risk of breast cancer for women carrying germline mutations in one of these genes is more than twofold greater than for women who do not carry any variant. For some mutations, the risk increases more than 10-fold.[4,5]

BRCA1 and *BRCA2* mutations have been identified as having the strongest association with breast cancer risk.[4,5] Females who carry a *BRCA1* or *BRCA2* gene mutation have a cumulative risk by age 70 of 55% for *BRCA1* and 47% for *BRCA2* mutations.[24]

For men, the cumulative risk of developing breast cancer by the age of 70 is 1.2% for *BRCA1* and 6.8% for *BRCA2*.[26] Females who carry a *BRCA1* or *BRCA2* gene mutation have a high risk of developing ovarian cancer, and men with these mutations have an increased risk for prostate cancer.[27-29]

It is important to note that germline mutations in high-risk genes are rare, and altogether, they account for only 5-10% of female breast cancers.[5] In unselected women — that is, no family history of breast cancer — who develop breast cancer before the age of 55, only 2% carry a *BRCA1* or *BRCA2* mutation.[27] In contrast, more than 14% of unselected women with ovarian cancer may carry a *BRCA1* or *BRCA2* mutation.[30]

Importantly, genetic testing should be offered with pre- and post-test counselling to discuss the limitations, potential benefits and possible consequences.[5] Family cancer clinics can provide the appropriate genetic counselling, as well as the following services for women at moderate to high risk:[4]

- Information about a person's risk of developing cancer.
- Give an estimate of the likelihood of carrying an inherited mutation in a cancer-predisposing gene, and identify the most optimal relative to test.
- Advice about possible strategies that might help reduce the risk of cancer.[4]
- Counselling and support.
- Discuss what medical checkups may be appropriate.

While genetic testing is not available under Medicare, state health departments cover the costs under certain criteria if ordered by a genetic specialist.

Genetic testing should be considered on the basis of the pre-test probability of identifying a heritable mutation, the false-negative rate of the test, the patient's choice, and available resources and technology.

Where feasible, genetic testing should first be offered to individuals in the family with the highest probability of a mutation.

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Indications for genetic testing
Germline *BRCA1* or *BRCA2* testing should be considered in the following instances:
1. A personal and/or family history of breast and/or ovarian cancer; from a population where a common founder mutation exists
2. In any of the following situations:
a) Using a validated mutation prediction tool (eg, BOADICEA, BRCAPRO or Manchester score)
i. Individuals with breast/ovarian cancer and a *BRCA1* or *BRCA2* mutation probability of 10% or more
ii. Individuals unaffected by breast/ovarian cancer who are obligate carriers, where the mutation probability in an affected first-degree relative is 10% or more
iii. Where local resources allow, and if there is no affected relative available for testing, consider testing an individual unaffected by breast/ovarian cancer who has a *BRCA1* or *BRCA2* mutation probability of 20% or more
b) Based on breast cancer characteristics
i. Individuals with triple negative breast cancer diagnosed before or at the age of 50 regardless of family history
ii. Individuals with triple negative breast cancer diagnosed at any age, where there is a family history of breast, non-mucinous epithelial ovarian, fallopian tube or primary peritoneal cancer in a close relative*
c) Based on ovarian cancer characteristics
i. Individuals with isolated, high-grade (grades 2 and 3), invasive, non-mucinous epithelial ovarian, fallopian tube or primary peritoneal cancer diagnosed before or at age 70
ii. Individuals with invasive, high-grade (grades 2 and 3), non-mucinous epithelial ovarian, fallopian tube or primary peritoneal cancer diagnosed at any age, when there is a family history of breast or ovarian cancer in a close relative*
3. Where there is limited family structure:
a) Individuals with breast cancer diagnosed before the age of 50
b) Individuals with isolated, high-grade (grades 2 and 3), invasive, non-mucinous epithelial ovarian, fallopian tube or primary peritoneal cancer diagnosed at any age
4. Individuals with a pathogenic somatic *BRCA1* or *BRCA2* mutation detected on tumour testing (mutation-specific testing only)
5. A familial *BRCA1* or *BRCA2* mutation identified
*Close relative = first- or second-degree relative

A multidisciplinary systems approach

WOMEN with an increased cancer risk are often advised to have breast cancer screening at a younger age and increased frequency compared with women who have the general-population risk for breast cancer. In addition, women at high risk of breast cancer may benefit from the inclusion of additional cancer screening tests, such as breast MRI.

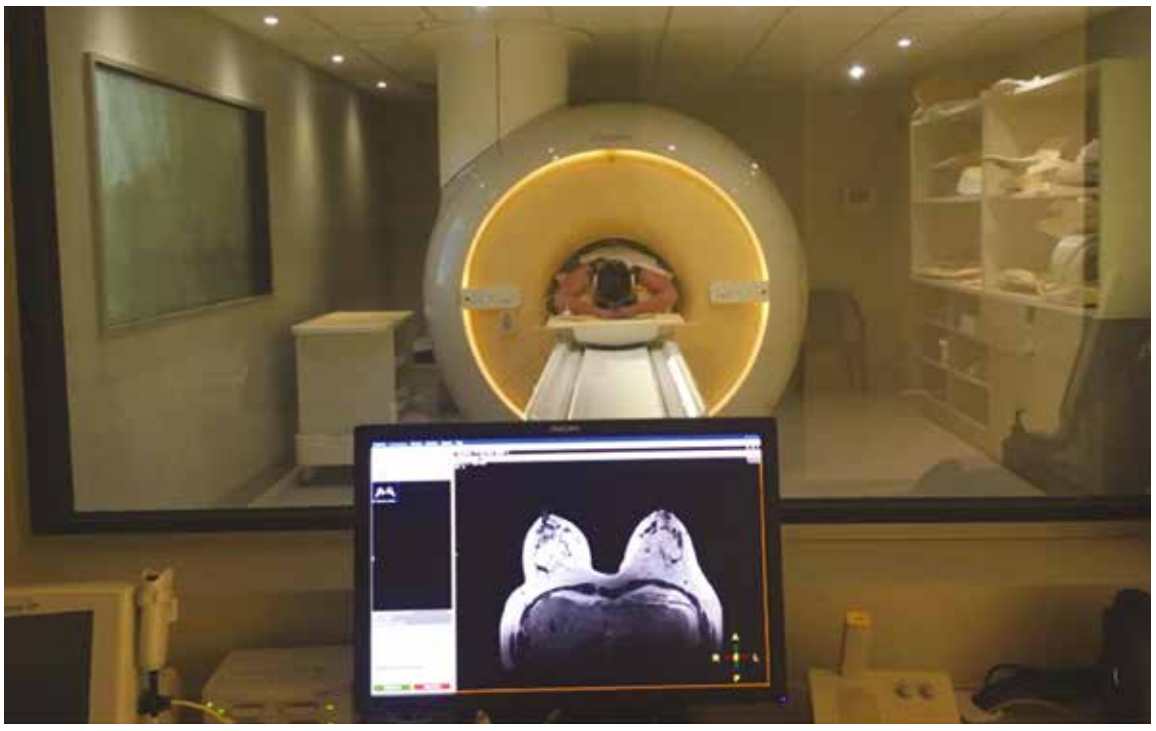
Genetic specialists in family cancer clinics can provide advice to high-risk women about the cancer risks and options for genetic testing for other relatives.

It is often appropriate to refer moderate- or high-risk women of any age to local specialists to aid with breast cancer screening. In particular, annual bilateral breast MRI is indicated and freely available after specialist referral to a local radiology practice providing breast MRI.

However, GPs can also refer any woman, at any age, for a breast MRI, as long as the woman understands that she will have to fund this procedure — that is, if she is not eligible for free, specialist-only breast MRI investigation.

Furthermore, 3D mammography can assist both referring GPs and specialists in selected women under 50, as stated earlier. Breast surgeons and genetic specialists have considerable expertise and experience and can aid GPs with providing an appropriate ongoing breast cancer screening system — for example, with annual assessment just after a birthday — for women of all ages, rather than just providing ad-hoc screening.

Therefore, GPs, radiologists, breast surgeons, genetics specialists and others can all contribute towards a modern multidisciplinary breast cancer screening system for women of any age at moderate to high risk for breast cancer.



Breast MRI.

Case studies

Case study one

LISA, aged 47, is a longstanding patient. She presents for a breast check. Her sister, aged 49, is currently undergoing treatment for breast cancer. Lisa has not found any abnormalities in her breasts, but claims they are always "lumpy".

She asks if she should undergo special testing because she is afraid she might get breast cancer after her sister's diagnosis. She wonders if she should have genetic testing for the sake of her two daughters.

There are no other family members with a history of breast cancer, but Lisa thinks her mother, who died from heart disease at 75, may have had a non-cancerous lump removed from her breast at some stage.

Lisa has two daughters, both of whom were breastfed for six months. She is otherwise well. She has a hormone-releasing IUD in situ for contraception and cycle control. She took the contraceptive pill for 10 years prior to her two pregnancies.

Lisa is on no other medications, is a non-smoker and consumes 20g of alcohol four times a week on average. She is of Anglo-Celtic background and a normal weight.

On examination, her breasts are soft but lumpy, especially in the axillary area. There are no asymmetrical or discrete lumps.

You advise Lisa that she now has a family history of breast cancer, which puts her in the moderate-risk category. Although there is no clinical evidence of breast cancer, some form of imaging would be beneficial to assess her breasts more thoroughly.

She agrees to undergo a 3D mammogram and breast ultrasound to assess the breasts as a starting point. Results are normal, no biopsy is required and Lisa agrees to have yearly follow-up scans.

Lisa is placed on the practice recall list for annual 3D mammograms and breast ultrasounds. You discuss the pros and cons of genetic testing for women in the moderate-risk group and explain that it may be better for her sister to explore genetic testing in the first instance. Lisa agrees to speak with her sister and decides to put off the testing for herself because of the cost and limitations.

Case study two

Janine, aged 32, is a new patient who has just moved to the area. Her mother has asked her to attend the practice because there is a strong family history of breast cancer and she is keen to organise

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She now has a family history of breast cancer, which puts her in the moderate-risk category.

Online resources

EviQ (requires registration and logon)
www.eviq.org.au
Includes the following resources

- Referral Guidelines for Breast Cancer Risk Assessment and Consideration of Genetic Testing and Risk Management Recommendations for Men and Women with High Risk Gene Mutations
- Eligibility for state-funded genetic testing for women asymptomatic and affected relatives
- Genetic Testing for Hereditable Mutations in the *BRCA1* and *BRCA2* Genes.

Cancer Australia risk calculator
bit.ly/2ckAzJV

Pink Hope
bit.ly/2aOBqQ9

Pink Hope and Peter MacCallum tool
bit.ly/2ap5pwU

Medicare rebate eligibility criteria for annual MRI breast scans
bit.ly/2aJSJAz

General genetics clinics
bit.ly/1S0RQ7b

National Breast and Ovarian Cancer Centre, advice about familial aspects of breast cancer and epithelial ovarian cancer, a guide for health professionals
bit.ly/2aVncLT

References

Available on request from howtotreat@cirrusmedia.com.au

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genetic testing for Janine.

Janine asks about screening and states that she is hoping to start a family, so she does not want any X-rays. She is also concerned about the effects that pregnancy might have on her risk of breast cancer.

Two of Janine's maternal aunts died of breast cancer aged 65 and 60, respectively. Her mother, the youngest, had ductal carcinoma in situ five years ago at the age of 55. Since treatment — lumpectomy and one course of radiotherapy — she has been cancer free.

On further questioning, Janine has no other risk factors for breast cancer.

Breast clinical examination is normal.

You advise Janine to undergo 3D mammography, breast ultrasound and breast MRI to establish a baseline assessment of her breasts. You also advise her to wait until this is completed before falling pregnant.

Janine opts for MRI only so that she can reduce the radiation dose to her body. A lump is detected, and a biopsy is performed. The lump is diagnosed as a fibroadenoma (benign).

Janine is then referred to a genetic counsellor at the local genetics clinic, with a view to genetic testing.

Conclusion

A SYSTEMATIC approach to breast cancer detection should be implemented in asymptomatic moderate- to high-risk women under 50.[4] Testing should commence at age 25-30 or 10 years before the youngest relative developed breast cancer. Testing usually includes annual 3D mammography and MRI, with or without ultrasound.[5]

Genetic testing for *BRCA1*/*BRCA2* mutations should be offered only with pre-test and post-test counselling to discuss limitations, potential benefits and possible consequences.[4] Referral to a family cancer clinic may be appropriate for those with a first-degree relative diagnosed with breast cancer before the age of 50, or a family history of breast and/or ovarian cancer.[6]

How to Treat Quiz

Breast cancer detection in moderate-to-high risk women 21 October 2016

INSTRUCTIONS

Complete this quiz online and fill in the GP evaluation form to earn 2 CPD or PDP points.
We no longer accept quizzes by post or fax.

The mark required to obtain points is 80%. Please note that some questions have more than one correct answer.

GO ONLINE TO COMPLETE THE QUIZ

www.australiandoctor.com.au/education/how-to-treat

1. Which TWO statements regarding breast cancer are correct?
a) Breast cancer is the number one cancer diagnosed in women across Australia.
b) Since 1991, the BreastScreen Australia program has had a major impact in moderating an increasing incidence trend for breast cancer, as well as contributing to falling mortality in all women.
c) The Marmot review confirmed a 20% reduction in breast cancer mortality in women who have been screened.
d) There is a robust screening program for asymptomatic women under 50 years who are at moderate to high risk because of family history or germline mutation.

2. Which THREE key factors are associated with an increased risk of breast cancer?
a) Family history of breast cancer.
b) Relatives diagnosed with cancer at a young age.
c) Family history of cervical cancer.
d) Male relative with breast cancer.

3. Which TWO factors categorise a woman as potentially moderate risk?
a) One first-degree relative diagnosed with breast cancer under the age of 50, without the additional features of the potentially high-risk group.
b) Ashkenazi Jewish ancestry.
c) Breast cancer in a male relative.
d) Two second-degree relatives diagnosed with breast cancer on the same side of the family, with at least one under 50, without the additional features of the potentially high-risk group.

4. Which THREE factors categorise a woman as potentially high risk?
a) A family member with established presence of a high-risk breast cancer germline mutation.
b) One first-degree relative diagnosed with breast cancer before the age of 50.
c) Two first- or second-degree relatives on one side of the family diagnosed with breast or ovarian cancer, plus Ashkenazi Jewish ancestry.
d) Two first- or second-degree relatives on one side of the family diagnosed with breast or ovarian cancer, plus breast cancer in a male relative.

5. Which TWO statements regarding imaging modalities are correct?
a) 3D mammography has some limitations — for example, it may produce false positives.
b) An ultrasound-guided core biopsy is indicated whenever breast ultrasound confirms a solid lump in a woman over 40.
c) Suspicious microcalcifications or architectural distortions seen on mammography should ideally be assessed with ultrasound.
d) 3D mammography has the potential to reduce the number of avoidable biopsies because it is better at visualising masses, distortions and asymmetrical densities.

6. Which THREE are advantages of 3D over 2D mammography?
a) Increase in invasive breast cancer detection.
b) Increase in all breast cancer detection.
c) Ability to better visualise masses, distortions and asymmetrical densities.
d) Increased detection in women with fatty breasts, as is common in women under 50.

7. Which TWO at-risk groups are most suited to 3D mammography?
a) Those with a strong family history of breast or ovarian cancer.
b) Patients with any breast changes, signs or symptoms.
c) Patients with fatty breasts.
d) Women who have previously taken, or are still taking, the contraceptive pill.

8. Which THREE statements regarding the role of ultrasound are correct?
a) There is good evidence to support the proven mortality benefit of adjuvant ultrasound with mammography in women under 50.
b) The sensitivity of mammography is improved with the addition of ultrasound in all ages.
c) At present, the addition of bilateral survey breast ultrasound examination to annual mammography is not generally recommended for screening asymptomatic women.
d) Ultrasound is particularly useful for women with breast signs and/or symptoms who are under 35, pregnant or breastfeeding.

9. Which TWO statements regarding breast biopsy are correct?
a) The most common risk associated with breast biopsy is infection.
b) MRI-guided breast biopsy is usually only performed when a breast lesion that requires biopsy can only be seen on MRI.
c) Fine-needle aspiration is preferred over core biopsy for solid breast lesions.
d) A breast biopsy is indicated for indeterminate, suspicious or malignant-appearing lesions.

10. Which THREE statements regarding the genetics of cancer are correct?
a) *BRCA1* and *BRCA2* mutations have been identified as having the strongest association with breast cancer risk.
b) Germline mutations in high-risk genes are common.
c) Females who carry a *BRCA1* or *BRCA2* gene mutation have a cumulative risk by age 70 of 55% for *BRCA1* and 47% for *BRCA2* mutations.
d) Men who carry a *BRCA1* or *BRCA2* gene mutation have an increased risk for prostate cancer.

CPD QUIZ UPDATE

The RACGP requires that a brief GP evaluation form be completed with every quiz to obtain category 2 CPD or PDP points for the 2014-16 triennium. You can complete this online along with the quiz at **www.australiandoctor.com.au.** Because this is a requirement, we are no longer able to accept the quiz by post or fax. However, we have included the quiz questions here for those who like to prepare the answers before completing the quiz online.

Australian Doctor Education

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NEXT WEEK

Next week's How to Treat describes paediatric foot and ankle injuries, explaining why the anatomy of the paediatric foot predisposes to certain patterns of injury, and listing the assessment and management of these injuries. The author is **Dr Andrew Wines**, orthopaedic surgeon, Sydney and Dubbo, NSW.