JonesRadiology

Breast density and implications for screening

For General Practitioners to support decisions regarding screening of asymptomatic patients aged 40+, who are known to have dense breast tissue.

Bookings and Enquiries
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A clearer picture

Breast density – What is it?

Breast density is determined by the relative proportion of fibroglandular tissue which appears white on a mammogram and fatty tissue which appears dark.

A mammogram is required to assess breast density.

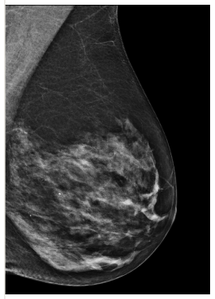
Jones Radiology reports breast density routinely.

Radiologists use subjective and quantitative analysis to assign a density category according to the American College of Radiology Breast Imaging-Reporting and Data System (BI-RADS), from "A" least dense, through to "D" extremely dense.

Approximately 10% of women have extremely dense breasts. Breast density can change over time, typically reducing with age.

BIRADS A:
Almost entirely fatty

BIRADS B: Scattered fibroglandular density



BIRADS C:
Heterogeneously dense

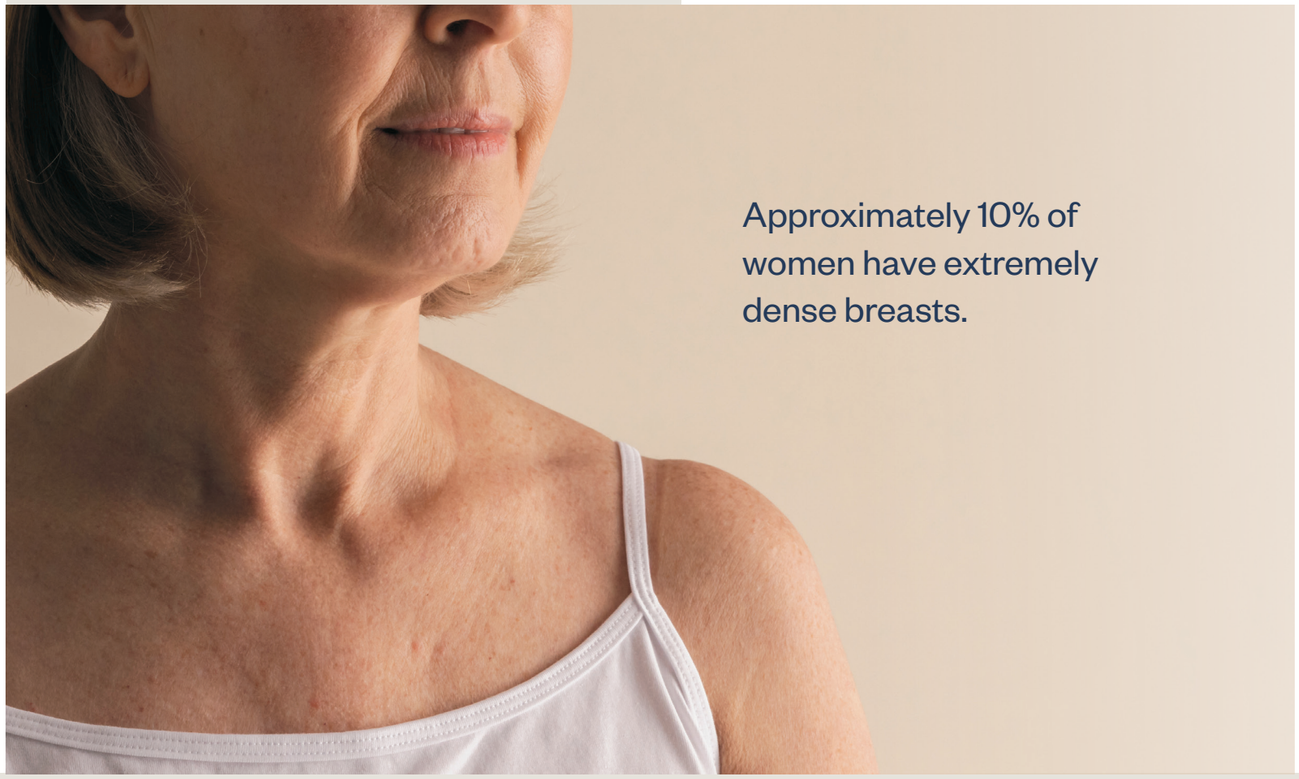
BIRADS D:
Extremely dense

Why is breast density important?

Dense tissue can mask some of the mammographic features of malignancy, as both fibroglandular tissue and cancers appear white on a mammogram.

High breast density is an independent risk factor for malignancy. The risk of breast malignancy is increased approximately 1.5x for BIRADS C density and 2x for BIRADS D density compared to "average" BIRADS B fibrofatty tissue[1].

Interval cancers (diagnosed 1-2 years after a normal mammogram) are more likely in dense breasts.



Approximately 10% of women have extremely dense breasts.

Implications of high breast density for screening

Mammography is the recommended screening modality to detect breast cancer for all patients, because it is proven to reduce breast cancer mortality.

There is evidence that the addition of other imaging tests (supplemental screening) detects additional cancers in women with dense breasts. Long term data regarding mortality outcome is not yet available.

A risk-based model for breast cancer screening will likely be developed in the future, however there are currently no Australian guidelines recommending the use of supplemental screening tests for patients with dense breasts.

US and European radiological societies now advocate MRI for patients with higher-than-average risk, including those with extremely dense breasts.

Decisions regarding screening must consider all potential risk factors for breast cancer, including family history, reproductive history and lifestyle factors.

Supplemental screening tests

For context, 2D mammography has a cancer detection rate (CDR) of approximately 6 per 1000 women screened. Ultrasound and MRI are two commonly used screening tests which are not affected by breast density.

Ultrasound

Supplemental ultrasound enables a small increase in cancer detection rate in dense breasts, approximately 2 per 1000 cases[2]. Benign breast changes such as fibrocystic change and large breast size can make ultrasound challenging.

Indeterminate findings are relatively common, approaching 10%. These require further imaging or biopsy but ultimately prove benign.

Breast MRI

This test uses intravenous gadolinium to detect the abnormal vascularity characteristic of malignant lesions. It is the most sensitive test for detection of malignancy, detecting ~16 additional cases of malignancy per 1000 after a negative mammogram[3]. It is effective for detection of DCIS and invasive disease including very small lesions. Abnormal findings are typically worked up with ultrasound +/- biopsy. Some will ultimately prove to be benign but the false positive rate is significantly reduced on follow up scans.

MRI does not involve ionising radiation and is a safe test. The imaged region includes the axilla and chest wall which informs tumour staging and treatment decisions in the event of a cancer diagnosis.

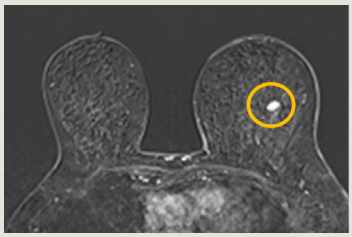
MRI has an established role in the screening of high-risk women, for example due to BRCA genetic mutations. There is emerging evidence that women with extremely dense breast tissue also benefit from MRI.

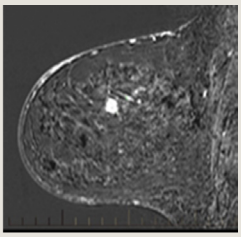
The DENSE trial in Europe assessed supplemental MRI in women aged 50-75 years with extremely dense breast tissue following a negative mammogram. MRI detected 16.5 additional cancers per 1000 and significantly reduced the rate of interval cancers[4].

1. Bodewes FTH et al. Mammographic breast density and the risk of breast cancer: A systematic review and meta-analysis. Breast 2022; 66:62-8. 2. **Berg WA et al**. Screening breast ultrasound using handheld or automated technique in women with dense breasts. J Breast Imag 2019; 1(4): 283-96. 3. **Kuhl C et al**. Supplemental breast MR imaging screening of women with average risk of breast cancer. Radiology 2017; 283(2): 361-370. 4. **Bakker MF et al**. DENSE trial study group. Supplemental MRI screening for women with extremely dense breast tissue. NEJM 2019; 381 (22): 2091-2102. 5. **Baxter GC et al**. A meta-analysis comparing the diagnostic performance of abbreviated MRI and a full diagnostic protocol in breast cancer. Clin Radiol 2021; 76(2):154; e23-32.

Case Study 01

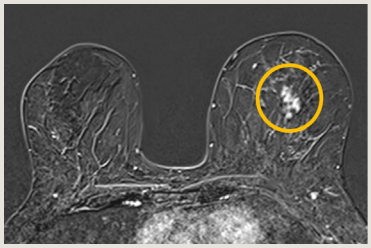
60y, BI-RADS C density. Mammogram/tomosynthesis and ultrasound reported as normal. MRI detected 10mm left breast lesion was malignant, node negative.

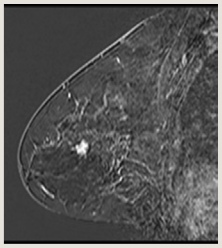




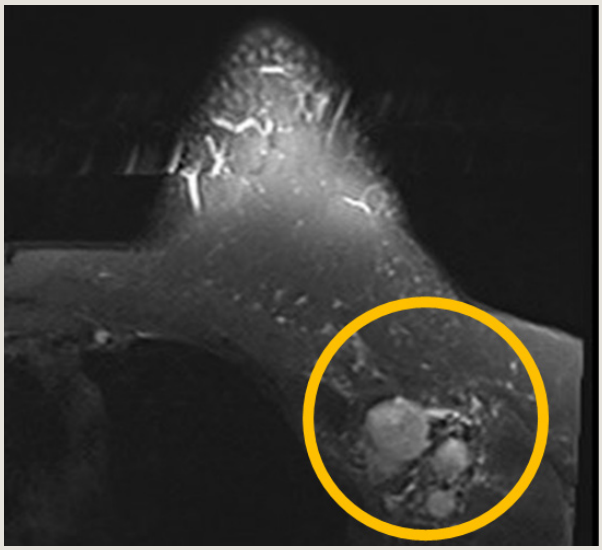
Case Study 02

70y with remote history of right breast cancer. BIRADS D density. Annual surveillance mammogram was stable. The referral for breast MRI was precautionary due to high density and risk factors. MRI detected left breast lesion was malignant.





Breast MRI extended field of view demonstrating bulky left axillary lymphadenopathy. The real value of MRI in the screening setting is improved diagnosis of small, node negative breast malignancy. MRI can also detect very subtle lymph node abnormalities which is important for accurate staging.



Referring for screening breast MRI

General practitioners can refer directly to Jones for an **Abbreviated Breast MRI**.

This technique was developed specifically for screening asymptomatic patients, with the aim of providing shorter, well tolerated scans and increasing overall access to MRI. Most importantly, studies show this has comparable sensitivity for malignancy compared to standard MRI[5].

How to refer

- Requests must specify **Abbreviated Breast MRI** which will attract a private fee.
- Clinical indication should specify "for screening" and may include breast density category.

GP Referred Breast MRI is available at St Andrew's Hospital and Victor Radiology Centre.

Key messages

- Mammography is recommended first line screening for all patients. Many cancers can be detected even when breast tissue is dense.
- If opting for MRI after a screening mammogram reporting dense breasts, additional referral for tomosynthesis and ultrasound is **not required** within the same screening cycle due to the greater sensitivity of MRI.
- If your patient has a breast symptom, please refer to our piece **Breast Imaging – Current Best Practice**.