

## Clinical Practice Guidelines – Breast Disease Site

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<b>Guideline Title:</b>	Indications for Use of Breast Magnetic Resonance Imaging (MRI)	<b>Date:</b>	<b>(O):</b> June 30, 2011 <b>(R):</b> Aug 31, 2017
<b>Tumor Group:</b>	Breast Disease Site Group	<b>Page:</b>	1 of 7
<b>Issuing Authority:</b>	Dr. Rick Bhatia, Clinical Chief, Diagnostic Imaging	<b>Date Signed:</b>	Jan 19, 2018
<b>Adapted From:</b>	Alberta Health Services “magnetic resonance imaging for breast cancer screening, pre-operative assessment, and follow-up” guideline, January 2012 (36).		

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### Introduction:

Magnetic resonance imaging (MRI) of the breast has become a useful tool for the detection and characterization of breast disease, assessment of local extent of disease, evaluation of treatment response, and guidance for biopsy and localization.

MRI sensitivity rates are commonly known to be higher than those for mammography but notably lower in specificity. Therefore, the optimal use of breast MRI requires correlation with clinical history, physical examination and other imaging tools, such as mammography and breast ultrasound. It is also crucial that its interpretation be carried out by a radiologist with expertise in breast MRI.

Evidence does suggest that there are specific clinical situations where breast MRI can improve upon the detection of breast disease over standard imaging. This guideline is meant to provide family doctors, general practitioners, specialists and other interested parties with a list of current indications for its use.

Possible contraindications to breast MRI may include, but are not limited to, the presence of:

- cardiac pacemakers
- ferromagnetic intracranial aneurysm clips
- certain neurostimulators
- certain cochlear implants
- certain other ferromagnetic implants, devices, foreign bodies, or electronic devices.
- allergy to the gadolinium-based contrast used in MRI
- and patients with impaired renal function may experience a rare complication known as nephrogenic systemic fibrosis caused by the use of certain MRI contrast, which may prohibit its use.

The patient is provided a screening questionnaire, which **must** be completed and sent to the radiology department with the requisition prior to booking.

### Question:

<b>Guideline Title:</b>	Indications for Use of Breast Magnetic Resonance Imaging (MRI)	<b>Page:</b>	2 of 7
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What are the current indications for breast magnetic resonance imaging (MRI) use?

### Target Population:

Patients who meet the criteria outlined in the indications for the use of breast MRI.

### Supporting Evidence:

Breast MRI does not replace conventional imaging (ie. mammography or ultrasound) and physical examination. A negative breast MRI also does not exclude the presence of malignancy or preclude the appropriate management of an otherwise suspicious finding. There is, however, evidence to suggest that the utilization of breast MRI may be helpful in improving patient outcomes (1,2). Breast MRI is indicated in the following circumstances:

1. Screening of high risk individuals: MRI has been shown to be superior in sensitivity to mammography, but significantly lower in specificity, resulting in a higher false-positive rate. Therefore, it is recommended for use in screening only those patients deemed to be high risk. Patients with significant risk of developing breast cancer, would include those with
  - genetic predisposition\* (proven or presumptive) (3-7)
  - past history of mediastinal radiation between ages of 10 and 30 (8).It is recommended that MRI and mammography be performed, alternating every six months, beginning at age 25. There is no role for breast MRI in the routine screening of asymptomatic patients, including those with a personal history of breast cancer such as invasive lobular or invasive ductal carcinoma, LCIS (lobular carcinoma in situ), DCIS (ductal carcinoma in situ), or ADH (atypical ductal hyperplasia) (9,10).
2. Problem solving when mammographic, sonographic or clinical findings are suspicious but inconclusive:
  - Inconclusive findings of breast cancer - MRI imaging may be helpful for lesion identification when findings at physical examination and conventional imaging modalities are suggestive of breast cancer, but are inconclusive (11);
  - Pre-operative MRI - may be used in the following situations where the patient desires breast conserving surgery and:
    - there is a high risk for multifocal/multicentric disease;
    - the extent of the disease is unclear (12).
3. Assessment of positive margins following breast cancer surgery:
  - Previous lumpectomy - in patients who have recently undergone lumpectomy without preoperative MRI and those with close or positive surgical margins after lumpectomy, the extent of residual disease and possible multifocality or multicentricity demonstrated on MRI may help determine whether repeat excision or mastectomy is appropriate (13-15).

\*For a detailed description of proven or presumptive genetic predisposition, review the Breast Disease Site Group's "breast magnetic resonance imaging and high risk hereditary breast cancer" guideline.

4. Differentiation of post-surgical scarring from recurrent tumor:

## Clinical Practice Guidelines – Breast Disease Site

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**Guideline Title:** Indications for Use of Breast Magnetic Resonance Imaging (MRI) **Page:** 3 of 7

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- Visualization of recurrent disease - MRI may be helpful in differentiating normal post-lumpectomy scar tissue from possible recurrent/residual disease (11,16,17).
5. Search for source of primary malignancy when the breast is normal by conventional imaging in the presence of tumor positive axillary adenopathy:
    - Axillary adenopathy - when tumor positive axillary adenopathy is present but the findings from mammography, ultrasound, and physical examination are negative for primary malignancy, MRI may depict the site of primary malignancy in the breast (18-20).
  6. Assessment of response to neoadjuvant chemotherapy:
    - Neoadjuvant chemotherapy - in patients with locally advanced breast cancer, MRI imaging may be performed before, during, or after a chemotherapy regimen to evaluate the tumor response and the extent of residual disease before surgical intervention. If breast-conserving therapy is planned, a tissue marking clip should be placed within the malignancy by the radiologist, as the mammographic, sonographic, and clinical findings may no longer be apparent at imaging after treatment. Accurate localization and measurement of the residual tumor may be difficult (21,22).
  7. Assessment of breast implant integrity:
    - Breast augmentation - silicone implant rupture can be detected with MRI (23-25).

### **Note:**

- Reconstructed breast - to date there is not enough evidence to support routine MRI screening of the reconstructed breast.
- Breastfeeding/Lactation – the performance of breast MRI is not recommended while the patient actively engages in breastfeeding. Lactation creates normal hormonal changes in the breast including increased breast density and rapid diffuse enhancement which interferes with reliable image reporting (40).
- Pregnancy – the use of Gadolinium-based contrast agent in MRI imaging is contraindicated during pregnancy. No well-controlled studies have been performed to investigate its use in pregnant women, and is therefore not recommended. However, in extenuating circumstances and after all other imaging options have been exhausted, MRI with Gadolinium-based contrast may be considered only when the health of the mother and/or fetus could be at eminent risk, and the patient is fully informed of the risks and benefits of the procedure (37,40).

If a patient does fit the criteria, screening breast MRI will be requested by the referring physician and reported by a radiologist with specific training in breast MRI. Non urgent breast MRI should be scheduled during the second week of the menstrual cycle (days 5 to 13) in premenopausal women. Occasionally, areas of normal hormonally sensitive breast tissue can enhance intensely on MRI which can cause a false positive reading. Therefore, examination is best performed in mid-cycle (26).

**Important:** Breast MRI is **not** a routine investigational tool for use in all patients with biopsy proven breast cancer, but could be utilized when at least one of the fore mentioned criteria is met. It also is **not** indicated in the evaluation of occult contralateral breast cancer.

### **Recommendation:**

<b>Guideline Title:</b>	Indications for Use of Breast Magnetic Resonance Imaging (MRI)	<b>Page:</b>	4 of 7
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Patients, who otherwise have no contraindications, are eligible for magnetic resonance imaging of the breast when they meet at least one of the clinical indicators for its use.

### Search Strategy:

Literature searches for this guideline were conducted in Pubmed and the Cochrane Library, using keywords “magnetic resonance imaging” and “breast” and “neoplasms” and also “guidelines”. Guideline searches were also carried out on the websites of the world’s most highly respected cancer organizations and agencies. The initial search selected literature articles and source guidelines in English and dated after the year 2000, (unless the selection was an earlier landmark study) up to March 2011. The new search incorporated new study articles and source guidelines in English and dated from the year 2011, up to and including August 2016. The inclusion/exclusion process consisted of selecting source guidelines from reputable international cancer organizations, with preference given to those from Canadian sources where possible. One technical assessment and nine source guidelines were identified initially in the first search which conformed to our search criteria, of which the Alberta Health Services (AHS) “magnetic resonance imaging for breast cancer screening, pre-operative assessment, and follow-up” guideline had been chosen to be adapted (36). Four recent source guidelines were identified in the new search and were selected due to currency of content and/or were Canadian in origin (37-40).

The four identified source guidelines (37-40) were put through the ADAPTE process (41)(including an AGREE II assessment)(42), and the updated Alberta Health Services (AHS) “magnetic resonance imaging for breast cancer screening, pre-operative assessment, and follow-up” guideline was chosen to be adapted for use in our guideline (37). The AHS guideline was selected as the optimal choice due to its applicability, quality and currency of content.

There has been much debate but no consensus on the ‘grading of evidence’ in Canada. Presently, Canadian experts in the field of guideline development are involved in an ongoing in-depth analysis of the functionality of grading. Until such time as a report is released of their findings, and a consensus reached on whether to assign a grade of recommendation to a guideline, this group has decided to forgo the use of grading.

No competing or conflicts of interest were declared.

### Disclaimer:

These guidelines are a statement of consensus of the Breast Disease Site Group regarding their views of currently accepted approaches to diagnosis and treatment. Any clinician seeking to apply or consult the guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient’s care or treatment.

### Contact Information:

For more information on this guideline, please contact Dr. Nancy Wadden MD FRCPC, St. Clare’s Mercy Hospital, St. John’s, NL; Telephone 709-777-5657. For access to any of our guidelines, please visit our Cancer Care Program website at [www.easternhealth.ca](http://www.easternhealth.ca)

### Literature Support:

## Clinical Practice Guidelines – Breast Disease Site

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**Guideline Title:** Indications for Use of Breast Magnetic Resonance Imaging (MRI) **Page:** 5 of 7

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## Clinical Practice Guidelines – Breast Disease Site

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**Guideline Title:** Indications for Use of Breast Magnetic Resonance Imaging (MRI) **Page:** 6 of 7

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## Clinical Practice Guidelines – Breast Disease Site

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**Guideline Title:** Indications for Use of Breast Magnetic Resonance Imaging (MRI) **Page:** 7 of 7

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