



## Evidence-Based Series 15-11 Version 3 REQUIRES UPDATING

A Quality Initiative of the  
Program in Evidence-Based Care (PEBC), Cancer Care Ontario (CCO)

### Magnetic Resonance Imaging Screening of Women at High Risk for Breast Cancer

*The Expert Panel on MRI Screening of Women at High Risk for Breast Cancer*

An assessment conducted in January 2021 indicated that Evidence-Based Series (EBS) 15-11 Version 3 REQUIRES UPDATING. It is still appropriate for this document to be available while this updating process unfolds. The PEBC has a formal and standardized process to ensure the currency of each document ([PEBC Assessment & Review Protocol](#))

EBS 15-11 consists of 4 sections. You can access the summary and full report here: <https://www.cancercareontario.ca/en/guidelines-advice/types-of-cancer/2051>

- Section 1: Guideline Recommendations (ENDORSED)
- Section 2A: Systematic Review
- Section 2B: Systematic Review of Cost-Effectiveness Literature
- Section 3: EBS Development Methods and External Review Process
- Section 4: [Document Review Summary and Tool](#)

January 24, 2018

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**PEBC Report Citation (Vancouver Style):** Warner E, Messersmith H, Causer P, Eisen A, Shumak R, Plewes D. Magnetic resonance imaging screening of women at high risk for breast cancer. Warner E, Agbassi C, reviewers. Toronto (ON): Cancer Care Ontario; 2012 Aug 31 [REQUIRES UPDATING 2021 Jan]. Program in Evidence-based Care Evidence-based Guideline No.: 15-11 Version 3 REQUIRES UPDATING.

**Journal Citation (Vancouver Style):** Warner E, Messersmith H, Causer P, Eisen A, Shumak R, Plewes D. Systematic review: using magnetic resonance imaging to screen women at high risk for breast cancer. *Ann Intern Med.* 2008 May 6;148(9):671-9.

IN REVIEW

## Guideline Report History

GUIDELINE VERSION	SYSTEMATIC REVIEW		PUBLICATIONS	NOTES AND KEY CHANGES
	Search Dates	Data		
Original version Apr 2007	1988-2006	Full Report	Peer-reviewed publication Web publication	N/A
Reviewed Version 2 Aug 2012	2006 -2011	New data found in Section 4 (Appendix A)		2007 recommendations are <b>ENDORSED</b>
Current Version 3 Jan 2018	2012-2017	New data found in Section 4: Document Review Summary and Tool		2012 recommendations are <b>ENDORSED</b>

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## Evidence-Based Series 15-11 Version 3: Section 1

# Magnetic Resonance Imaging Screening of Women at High Risk for Breast Cancer: Guideline Recommendations

*The Expert Panel on MRI Screening of Women at High Risk for Breast Cancer*

A Quality Initiative of the  
Program in Evidence-based Care (PEBC), Cancer Care Ontario (CCO)

**These guideline recommendations have been ENDORSED, which means that the recommendations are still current and relevant for decision making. Please see Section 4 (Document Review Summary and Tool) for a summary of updated evidence published between 2007 and 2017, and for details on how this Clinical Practice Guideline was ENDORSED.**

January 24, 2018

### Questions

- What is the effectiveness of adding breast magnetic resonance imaging (MRI) to standard screening (mammography) compared to screening mammography alone?
- Does the addition of breast MRI to standard screening detect breast cancer at an earlier stage?
- What is the optimal frequency of MRI screening?
- Are there subgroups (risk category, age, or breast density) that benefit more from MRI screening than do others?
- What harms are associated with MRI screening, and are there any relative or absolute contraindications to its use?
- In the presence of an abnormal finding seen only on MRI imaging, what is the optimal workup and follow-up after screening?

### Target Population

Women at very high risk for breast cancer, 'very high risk' being defined as:

1. Known mutation in BRCA1, BRCA2 or other gene predisposing to a markedly elevated breast cancer risk.
2. Untested first-degree relative of a carrier of such a gene mutation

3. Family history consistent with a hereditary breast cancer syndrome and estimated personal lifetime cancer risk >25%.
4. High-risk marker on prior biopsy (atypical ductal hyperplasia, atypical lobular hyperplasia, lobular carcinoma in situ [LCIS]) or previous breast cancer.
5. Radiation therapy to chest (before age 30 and at least eight years previous but screening would not start before age 30. [e.g., a patient who is 35 and had radiation at age 29 would be eligible when she is 37. A patient who is 26 and had radiation at age 18 would be eligible at age 30. A patient who is 40 and had radiation at age 31 is not eligible]).

## RECOMMENDATIONS

*(The recommendations were slightly modified with respect to risk category 5 during the 2017 ENDORSEMENT)*

**MRI in addition to mammography is recommended for women in target population risk categories 1, 2, 3, and 5 above. The evidence is insufficient to recommend MRI screening for patients in risk category 4.**

- Multiple studies, four in abstract form, were identified that evaluated MRI in comparison to mammography in women at high risk for breast cancer. These studies all found superior sensitivity for the detection of breast cancer with MRI compared to mammography. MRI was also found by most studies to have inferior specificity to mammography, with higher recall and biopsy rates associated with MRI.
- A meta-analysis done by the Working Group in 2007 of eight studies with the necessary data found MRI to have numerically superior discriminatory power overall compared to mammography in determining the true breast cancer status of high-risk women. The summary sensitivity was 80.1% (95% confidence interval [CI] 73.3% to 85.8%) for MRI and 36.8% (95% CI 29.6% to 44.5%) for mammography. The summary specificity was 93.0% (95% CI 92.5% to 93.6%) for MRI and 97.5% (95% CI 97.1% to 97.8%) for mammography. The overall diagnostic odds ratio for MRI was 77.338 (95% CI 29.117 to 205.41) versus 32.003 (14.633 to 69.989) for mammography. Due to the limited number of studies included, a direct statistical comparison of the two modalities was not possible.
- **Added to the 2017 Endorsement:** The risk of breast cancer by age 50 years is comparable to BRCA1 mutation carriers in category 5 patients; namely 35% and 31% in Hodgkin's Lymphoma survivors and BRCA1 carriers, respectively (Moskowitz CS, Chou JF, Wolden SL, et al. Breast cancer after chest radiation therapy for childhood cancer. *J Clin Oncol.* 2014;32(21):2217-23).

## Expert Opinion and Qualifying Statements

- While there is insufficient evidence at this time to make a definitive recommendation regarding the appropriate screening frequency, it is the opinion of the Working Group that women should be screened annually, as this was the frequency typical of the identified studies on which the recommendation for screening is based.
- While there is insufficient evidence at this time to make a definitive recommendation regarding the ages of patients who should be screened, it is the opinion of the Working Group that women should be screened annually from 30 to 69 years of age. Age 30 is an appropriate age to begin screening as women at that age with BRCA mutations are at much greater risk of breast cancer than women aged 50 and older in the general population. Age 69 is an appropriate age to end screening because: the relative risk of cancer decreases with age in the population at hereditary risk; mammographic sensitivity increases with age; very few subjects were included in the studies greater than age 69; and the evidence

for mortality reduction from screening in the general population is lacking for women older than age 70.

**Expert opinion and qualifying statements modified in the 2017 Endorsement:**

- It is the opinion of the Working Group that the benefits of MRI in terms of increased sensitivity outweigh the potential harms of higher recall rates and biopsy rates for all women in risk category 5 who received  $\geq 20$  Gy radiation before the age of 30. For this group, screening should begin at age 30 or eight years after the chest irradiation, whichever is later, as the risk for breast cancer does not increase significantly until eight years after treatment (Koo E, Henderson MA, Dwyer M, Skandarajah AR. Management and prevention of breast cancer after radiation to the chest for childhood, adolescent, and young adulthood malignancy. *Ann Surg Oncol*. 2015 Dec;22 Suppl 3:S545-51).
- The Children's Oncology Group's Long-Term Follow-Up Guidelines for Survivors of Childhood, Adolescent, and Young Adult Cancer (<http://www.survivorshipguidelines.org/>) recommends that for patients in risk category 5, annual screening with both mammography and MRI begin at age 25, a starting age consistent with U.S. MRI screening guidelines for the other high risk groups (National Comprehensive Cancer Network. Breast Cancer Screening and Diagnosis [Version 1.2017] [https://www.nccn.org/professionals/physician\\_gls/pdf/breast-screening.pdf](https://www.nccn.org/professionals/physician_gls/pdf/breast-screening.pdf). Accessed 20 November 2017). This (Ontario) Working Group, however, did not find justification for screening from age 25 in this group (or any of the other high risk groups). In particular, a review of one prospective and 3 retrospective studies published since 2011 that looked at the results of adding MRI to mammography for screening risk category 5 found only 3 cases of breast cancer detected before age 30 out of a total of 51 cases and all 3 of these were detected by both MRI and mammography (See Section 4 for additional information).
- With respect to risk category 4, there are preliminary data that a subgroup of patients in risk category 4 might benefit from the addition of MRI to mammography (e.g., women who in addition to a high risk benign biopsy or previous breast cancer, also have breast density  $\geq 50\%$  and a family history of breast cancer though insufficient to put them in category 3 [Nadler M, Al-Attar H, Warner E, et al. MRI surveillance for women with dense breasts and a previous breast cancer and/or high risk lesion. *Breast*. 2017 Aug;34:77-82]). The Expert Panel members, however, consider the evidence to be insufficient to recommend MRI screening for risk category 4.

*Funding*

The PEBC is supported by Cancer Care Ontario (CCO) and the Ontario Ministry of Health and Long-Term Care. All work produced by the PEBC is editorially independent from its funding agencies.

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