FEP Medical Policy Manual

FEP 6.01.29 Magnetic Resonance Imaging for Detection and Diagnosis of Breast Cancer

Effective Policy Date: January 1, 2020
Original Policy Date: December 2011

Related Policies:
None

Magnetic Resonance Imaging for Detection and Diagnosis of Breast Cancer

Description

Magnetic resonance imaging (MRI) of the breast is performed using scanners and intravenous imaging contrast agents in combination with specialized breast coils. This evidence review only addresses the use of breast MRI for clinical indications related to the detection or diagnosis of breast cancer.

OBJECTIVE

The objective of this evidence review is to determine whether magnetic resonance imaging of the breast improves the net health outcome for individuals undergoing breast cancer screening, breast cancer detection, and/or evaluation for breast cancer before and/or after treatment.

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POLICY STATEMENT

All policy statements below refer to performing magnetic resonance imaging (MRI) of the breast with contrast agents and a breast coil. MRI of the breast without a breast coil, regardless of the clinical indication, is considered investigational. See additional comments in the Policy Guidelines section about the breast imaging team and the need for breast MRI centers to perform MRI-guided biopsy and localization.

Screening Uses

MRI of the breast may be considered medically necessary for breast cancer screening patients with high risk of breast cancer. (For definitions on each of the risk levels, see the Policy Guidelines section.)

MRI of the breast is considered investigational as a screening technique in average-risk patients.

MRI of the breast is considered investigational as a screening technique for the detection of breast cancer when the sensitivity of mammography (ie, mammography using low-dose x-rays for imaging) is limited (ie, dense breasts, breast implants, scarring after breast cancer treatment).

Detection Uses

MRI of the breast may be considered medically necessary for detection of a suspected occult breast primary tumor in patients with axillary nodal adenocarcinoma (ie, negative mammography and physical exam).

MRI of the breast may be considered medically necessary in patients with a new diagnosis of breast cancer to evaluate the contralateral breast when clinical and mammographic findings are normal.

MRI of the breast is considered investigational for diagnosis of low-suspicion findings on conventional testing not indicated for immediate biopsy and referred for short-interval follow-up.

MRI of the breast is considered investigational for the diagnosis of a suspicious breast lesion in order to avoid biopsy.

Treatment-Related Uses

MRI of the breast may be considered medically necessary for preoperative tumor mapping of the involved (ipsilateral) breast to evaluate the presence of multicentric disease in patients with clinically localized breast cancer who are candidates for breast conservation therapy (see the Policy Guidelines section).

MRI of the breast may be considered medically necessary for presurgical planning in patients with locally advanced breast cancer (before and after completion of neoadjuvant chemotherapy) to permit tumor localization and characterization.

MRI of the breast may be considered medically necessary to determine the presence of pectoralis major muscle/chest wall invasion in patients with posteriorly located tumors.

MRI of the breast may be considered medically necessary to evaluate a documented abnormality of the breast before obtaining an MRI-guided biopsy when there is documentation that other methods, such as palpation or ultrasound, are not able to localize the lesion for biopsy.

MRI of the breast is considered investigational to determine response during neoadjuvant chemotherapy in patients with locally advanced breast cancer.

MRI of the breast is considered investigational for evaluation of residual tumor in patients with positive margins after initial lumpectomy or breast conservation surgery.
POLICY GUIDELINES

High-risk Considerations

There is no standardized method for determining a woman's risk of breast cancer that incorporates all possible risk factors. Clinical practice guidelines offer guidance on factors known to individually indicate a high risk of breast cancer (see the Supplemental Information section).

A number of factors may increase the risk of breast cancer but do not by themselves indicate high risk. It is possible that combinations of factors may be indicative of high risk, but it is not possible to quantitate estimates of risk. As a result, it may be necessary to individualize the estimate of risk, whereby one would need to take into account the numerous risk factors. A number of risk factors, not individually indicating high risk, are included in the National Cancer Institute Breast Cancer Risk Assessment Tool (also called the Gail model). Risk factors in the model can be accessed online (http://www.cancer.gov/bcrisktool/Default.aspx).

Considerations for Performing Magnetic Resonance Imaging

Breast magnetic resonance imaging (MRI) exams should be performed and interpreted by an expert breast imaging team working with the multidisciplinary oncology treatment team.

As noted, breast MRI exams require a dedicated breast coil and the use of contrast agents by radiologists familiar with the optimal timing sequences and other technical aspects of image interpretation. The breast MRI center also should have the ability to perform MRI-guided biopsy and/or wire localization of findings detected by MRI.

Considerations for Preoperative MRI

Preoperative MRI in patients with localized disease results in higher rates of mastectomy and lower rates of breast-conserving therapy. There is uncertainty from the available evidence on whether outcomes are improved by changing to a more extensive operation. If biopsies are performed on all MRI-identified lesions, and if shared patient decision making is used for altering the surgical approach, then the probability of improved outcomes is increased.

BENEFIT APPLICATION

Experimental or investigational procedures, treatments, drugs, or devices are not covered (See General Exclusion Section of brochure).

FDA REGULATORY STATUS

MRI of the breast can be performed using commercially available magnetic resonance scanners and intravenous magnetic resonance contrast agents. Specialized breast coils such as the Access Breast Coil 4/SMS (Confirma) and magnetic resonance-compatible equipment for performing biopsy have been developed and cleared for marketing by the U.S. Food and Drug Administration through the 510(k) process. The Food and Drug Administration determined that these devices are substantially equivalent to predicate devices for use "in conjunction with a magnetic resonance imager (MRI) to produce diagnostic and interventional images of the breast, chest wall and axillary tissues that can be interpreted by a trained physician."

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**Rationale**

**Summary of Evidence**

**Screening Uses**

For individuals who are asymptomatic with high-risk of breast cancer who receive magnetic resonance imaging (MRI) as an adjunct to screening for breast cancer, the evidence includes systematic reviews (including a TEC Assessment) and diagnostic accuracy studies. The relevant outcomes are overall survival (OS), disease-specific survival, test accuracy and validity, and resource utilization. Studies have found that MRI is more sensitive than mammography or ultrasonography in detecting malignancy. Because of the high likelihood of malignancy among women at high-risk for breast cancer, the benefits of detecting cancer earlier with MRI outweigh the disadvantages of incurring unnecessary workups and biopsies due to false-positive results. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who are asymptomatic with average-risk of breast cancer who receive MRI as an adjunct to screening for breast cancer, the evidence includes systematic reviews and clinical validity studies. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. The systematic reviews did not identify any randomized controlled trials (RCTs) or nonrandomized comparative studies evaluating MRI for screening average-risk women. One comparative observational study has been published since the systematic reviews. The diagnostic accuracy of screening tests would likely be lower in this lower prevalence population, and there would be higher false-positive rates, morbidity, and anxiety. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals with characteristics limiting the accuracy of mammography (eg, dense breasts) who receive MRI as an adjunct to screening for breast cancer, the evidence includes a systematic review (TEC Assessment) and diagnostic accuracy studies. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. There are limited data on the diagnostic accuracy of MRI vs mammography in patients who have had breast-conserving therapy or who have dense breasts. The evidence is insufficient to determine the effects of the technology on health outcomes.

**Detection Uses**

For individuals who have suspected occult breast primary tumor with axillary nodal adenocarcinoma with negative mammography who receive MRI as an adjunct to detect breast cancer eligible for breast-conserving therapy (BCT), the evidence includes a systematic review (TEC Assessment) and meta-analysis. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. The studies found that adjunctive use of breast MRI to guide BCS rather than preemptive mastectomy allowed a substantial portion of patients to avoid the morbidity of mastectomy. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have breast cancer who receive adjunctive MRI of the contralateral breast, the evidence includes cohort studies. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. A study of nearly 1000 patients found that MRI could detect contralateral breast cancer with a high degree of accuracy. Although long-term outcomes of these contralateral breast cancers are not fully known, important changes in management will occur (eg, simultaneous treatment of synchronous cancers) as a result of these findings, which should lead to improved outcomes. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have low-suspicion findings on conventional mammography who receive MRI as an adjunct to detect breast cancer, the evidence includes a systematic review (TEC Assessment). The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. The TEC Assessment concluded that, although the available studies suggested reasonably high diagnostic accuracy, none of the studies used prospective methods in appropriate study populations or appropriate comparison interventions such as short-interval mammographic follow-up. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have suspicious breast lesions who receive MRI as an adjunct to further characterize lesions, the evidence includes systematic reviews (including a TEC Assessment) and cohort studies. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. Studies have found that MRI for evaluation of suspicious breast lesions has relatively...
high sensitivity and a moderately high specificity. However, it has not yet been established that the negative predictive value (NPV) is sufficient to preclude the need for biopsy. Although 2 recent studies have reported NPVs greater than 90% in certain types of breast lesions, these were non-U.S., single-institution studies that require replication in larger, multicenter trials. Therefore, the use of MRI to further characterize suspicious lesions is currently unlikely to alter clinical management. In addition, the moderately high rate of false-positives will lead to substantial numbers of unnecessary biopsies. The evidence is insufficient to determine the effects of the technology on health outcomes.

### Treatment-Related Uses

For individuals who have clinically localized breast cancer who receive MRI for preoperative mapping to identify multicentric disease, the evidence includes RCTs, systematic reviews, and prospective cohort studies. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. Studies have found that, for patients with clinically localized breast cancer, MRI can detect additional areas of disease in the ipsilateral or contralateral breast beyond what is detected by standard imaging; further, MRI is associated with a higher rate of mastectomy. Follow-up studies have reported mixed results including no significant reduction in reoperations rates after MRI while other studies have reported lower odds of reoperation in patients with invasive lobular carcinoma. No significant differences in ipsilateral local or distant recurrence-free survival after MRI-guided treatment were found in meta-analyses. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have locally advanced breast cancer undergoing neoadjuvant chemotherapy who receive an MRI to guide surgical decisions after neoadjuvant chemotherapy, the evidence includes diagnostic accuracy studies and systematic reviews. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. Both a 2004 TEC Assessment and a 2015 systematic review found that MRI results were well-correlated with pathologic assessment for measuring residual tumor size after neoadjuvant chemotherapy. The 2015 systematic review also found that MRI performed better than conventional methods. Using breast MRI instead of conventional methods to guide surgical decisions on BCT vs mastectomy after neoadjuvant chemotherapy would be at least as beneficial and may lead to appropriate surgical treatment more often. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have posteriorly located breast tumors who receive MRI to evaluate chest wall involvement, the evidence includes cohort studies. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. Only a few small studies were identified but MRI was 100% accurate in identifying chest wall involvement compared with the criterion standard. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have a suspicious breast lesion recommended for biopsy but not localizable by mammography or ultrasonography who receive MRI to evaluate and localize the lesion prior to biopsy, the evidence includes a cohort study. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. A small cohort study from Brazil identified malignant tumors in 60% of patients with MRI-detected occult lesions using contrast-enhanced MRI. Although there is little published evidence supporting this indication, improved health outcomes are expected by enabling earlier diagnosis of breast cancer for suspicious lesions where other good options are not available. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have locally advanced breast cancer undergoing neoadjuvant chemotherapy who receive an MRI to evaluate response to chemotherapy, the evidence includes diagnostic accuracy studies and systematic reviews. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. Studies, including systematic reviews, have not found that there is sufficient evidence to determine whether breast MRI can reliably predict lack of response to neoadjuvant chemotherapy. There is a large amount of variability in reported performance characteristics of MRI in published studies, leaving uncertainty about the true accuracy of MRI for this purpose. Furthermore, evidence would need to show that any resulting change in patient management (eg, discontinuation of chemotherapy; change to a different regimen) would improve outcomes. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have positive surgical margins after lumpectomy or BCS who receive MRI to evaluate residual tumor, the evidence includes cohort studies. The relevant outcomes are OS, disease-specific survival, test accuracy and validity, and resource utilization. The studies, most of which were retrospective and published before 2005, generally reported moderate sensitivity and specificity with MRI for detection of residual disease compared with the criterion standard. Two retrospective studies published since 2015 have an uncertain or high-risk of bias and therefore performance characteristics are unknown. The evidence is insufficient to determine the effects of the technology on health outcomes.

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SUPPLEMENTAL INFORMATION

Practice Guidelines and Position Statements

National Comprehensive Cancer Network

Current NCCN guidelines on breast cancer (v.1.2019), breast cancer screening and diagnosis (v.2.2019), and genetic assessment of those at high-risk of breast and/or ovarian cancer (v.3.2019) list the following indications for breast magnetic resonance imaging (MRI).

Screening (as an adjunct to mammography):

"Recommend Annual MRI Screening (Based on Evidence)

• First-degree relative of BRCA carrier, but untested: commence at age 25-29 y
• Lifetime risk 20% or greater, as defined by models that are largely dependent on family history. Encourage genetic testing for first-degree relatives. If testing declined, recommend MRI.

Recommend Annual MRI Screening (Based on Expert Consensus Opinion):

• Radiation to chest between 10 and 30 years

Consider MRI screening for LCIS [lobular carcinoma in situ] and ALH [atypical lobular hyperplasia]/ADH [atypical ductal hyperplasia] based on emerging evidence if lifetime risk ≥20%

Insufficient evidence to Recommend for or Against MRI Screening:

• Lifetime risk 15%-20%, as defined by models that are largely dependent on family history
• Heterogeneously or extremely dense breast on mammography
• Women with a personal history of breast cancer, including ductal carcinoma in situ (DCIS)

Recommend Against MRI Screening (Based on Expert Consensus Opinion):

• Women at <15% lifetime risk".

The NCCN guidelines state that women at "increased risk" of breast cancer include the following groups:

• Women with a prior history of breast cancer;
• Women ≥ 35 years of age with a 5-year risk of invasive breast cancer ≥ 1.7% (per Gail Model);
• Women who have a lifetime risk <20% based on history of LCIS or ADH/ALH;
• Women who have a lifetime risk >20% as defined by models that are largely dependent on family history;
• Women between the ages of 10 and 30 years with prior thoracic RT [radiotherapy]

The NCCN guidelines for genetic or familial high-risk assessment for breast cancer recommend MRI screening with contrast for patients with BRCA pathogenic or likely pathogenic variants starting at age 25-29 years or individualized if the family had breast cancer diagnosis before age 30. The guidelines further state that MRI with contrast can be considered for patients with the following genetic variants:
• ATM, CHEK2, and NBN, starting at age 40

• CDH1 and PALB2, starting at age 30

• NF1, from ages 30 to 50.  

The NCCN guidelines also state there is insufficient evidence for any recommendations for use of breast MRI for patients with the following genetic variants: BARD1, BRIP1, MLH1, MSH2, MSH6, PMS2, EPCAM, RAD51C, RAD51D, STK11, TP53, PTEN, FANCC, MRE11A, MUTYH heterozygotes, RECQL4, RAD50, RINT1, SLX4, SMARCA, or XRCC2.

Guidelines on breast cancer screening and diagnosis make the following recommendations on Diagnosis:

• Optional MRI for women with nipple discharge, no palpable mass and a BI-RADS rating of 1-3.

• Guideline discussion update in progress: “For patients with skin changes consistent with serious breast disease, consideration of breast MRI is included in the guidelines for those with benign biopsy of skin or nipple following BI-RADS category 1-2 assessment. Since a benign skin punch biopsy in a patient with clinical suspicion of inflammatory breast cancer (IBC) does not rule out malignancy, further evaluation is recommended...[and] MRI may facilitate diagnosis of IBC.”

Guidelines on breast cancer make the following recommendations on pretreatment evaluation:

• "May be useful for identifying primary cancer in women with axillary nodal adenocarcinoma and occult (unidentified) primary cancer, or with Paget’s disease, or with invasive lobular carcinoma poorly (or inadequately) defined on mammography, ultrasound, or physical examination."

Guidelines on breast cancer make the following recommendations on treatment:

• "May be helpful for breast cancer evaluation before and after preoperative systemic therapy to define extent of disease, response to treatment, and potential for breast-conserving therapy."

• "False-positive findings on breast MRI are common. Surgical decisions should not be based solely on MRI findings. Additional tissue sampling of areas of concern identified by breast MRI is recommended."

Guidelines on breast cancer make the following recommendations on surveillance:

• Utility of MRI in follow-up screening in women with prior breast cancer is undefined. Generally, it should only be considered for women with a greater than 20% lifetime risk of second primary breast cancer.

American Cancer Society

The American Cancer Society (2017) guide on early detection of breast cancer has recommended the following on MRI:

“A breast MRI is mainly used for women who have been diagnosed with breast cancer, to help measure the size of the cancer, look for other tumors in the breast, and to check for tumors in the opposite breast. For certain women at high-risk for breast cancer, a screening MRI is recommended along with a yearly mammogram. MRI is not recommended as a screening tool by itself because it can miss some cancers that a mammogram would find.

Although MRI can find some cancers not seen on a mammogram, it’s also more likely to find something that turns out not to be cancer (called a false positive). False-positive findings have to be checked out to know that cancer isn’t present. This means more tests and/or biopsies. This is why MRI is not recommended as a screening test for women at average risk of breast cancer, because it would mean unneeded biopsies and other tests for many of these women.”
American College of Radiology

The American College of Radiology has appropriateness criteria for breast imaging, which were developed in 2012 and revised in 2017; palpable breast masses, revised in 2016; initial workup and surveillance for stage I breast cancer, reviewed in 2019; and monitoring response to neoadjuvant therapy, 2017 (see Table 1).

Table 1. MRI-Related to Criteria for Breast Cancer Screening, Diagnosis, and Monitoring Response

<table>
<thead>
<tr>
<th>Specific Indications</th>
<th>MRI Rating</th>
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<tr>
<td>High-risk women: women with a BRCA gene variant and their untested first-degree relatives, women with a history of chest irradiation between the ages of 10 and 30 years, women with 20% or greater lifetime risk of breast cancer</td>
<td>Usually appropriate with and without contrast (with mammography)</td>
</tr>
<tr>
<td>Intermediate-risk women: women with personal history of breast cancer, lobular neoplasia, atypical ductal hyperplasia, or 15%-20% lifetime risk of breast cancer</td>
<td>May be appropriate with and without contrast (with mammography)</td>
</tr>
<tr>
<td>Average-risk women: women with &lt;15% lifetime risk of breast cancer, breasts not dense</td>
<td>Usually not appropriate with and without contrast</td>
</tr>
<tr>
<td>Evaluating palpable breast mass. All indications reviewed</td>
<td>Usually not appropriate with and without contrast</td>
</tr>
<tr>
<td>Initial determination of tumor size and extent within the breast prior to neoadjuvant chemotherapy.</td>
<td>Usually appropriate without and with contrast</td>
</tr>
<tr>
<td>Imaging of the breast after initiation or completion of neoadjuvant chemotherapy [if a prechemotherapy MRI was performed].</td>
<td>Usually appropriate without and with contrast</td>
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<tr>
<td>Axillary evaluation prior to neoadjuvant chemotherapy.</td>
<td>May be appropriate without and with contrast</td>
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<tr>
<td>Known breast cancer. Axillary evaluation after completion of neoadjuvant chemotherapy, axilla not previously evaluated.</td>
<td>May be appropriate without and with contrast</td>
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<tr>
<td>Surveillance. Rule out local recurrence.</td>
<td>May be appropriate without and with contrast</td>
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MRI: magnetic resonance imaging.

The College (2018) issued recommendations for breast cancer screening in women at higher-than-average risk. The recommendations for MRI are as follows:

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American Society of Clinical Oncology

The American Society of Clinical Oncology (2006) has published guidelines for follow-up and management after primary treatment of breast cancer. In 2013, the guidelines were updated with a systematic review of the literature through March 2012, and no revisions were made. The guidelines recommended against the use of breast MRI "for routine follow-up in an otherwise asymptomatic patient with no specific findings on clinical examination." Furthermore, "The decision to use breast MRI in high-risk patients should be made on an individual basis depending on the complexity of the clinical scenario." 

International Late Effects of Childhood Cancer Guideline Harmonization Group

The International Late Effects of Childhood Cancer Guideline Harmonization Group from 9 countries (2013) published evidence-based recommendations for breast cancer surveillance in female survivors of childhood, adolescent, and young adult cancer who received chest irradiation before age 30 years and have no genetic predisposition to breast cancer. The authors found concordance among previous guidelines to initiate annual breast MRI exams beginning at age 25 or 8 years after radiation. Based on a systematic review of the literature to August 2011 and expert consensus, the authors recommended mammography, breast MRI, or both for surveillance (strong recommendation based on high-quality evidence with a low degree of uncertainty). The authors acknowledged that "no prospective studies have assessed the use of MRI screening in this population." The recommendation was therefore based on extrapolation of evidence from patients with hereditary risk for breast cancer.

U.S. Preventive Services Task Force Recommendations

The U.S. Preventive Services Task Force (2016) updated its recommendations on breast cancer screening. The Task Force concluded the following on breast MRI:

"... the current evidence is insufficient to assess the balance of benefits and harms of adjunctive screening for breast cancer using breast ultrasonography, magnetic resonance imaging, DBT [digital breast tomosynthesis], or other methods in women identified to have dense breasts on an otherwise negative screening mammogram."

Medicare National Coverage

There is no national coverage determination. In the absence of a national coverage determination, coverage decisions are left to the discretion of local Medicare carriers.

REFERENCES


2. Blue Cross and Blue Shield Association Technology Evaluation Center (TEC). Magnetic resonance imaging of the breast in screening women considered to be at high genetic risk of breast cancer. TEC Assessments 2003;Volume 18:Tab 15.


11. Blue Cross and Blue Shield Association Technology Evaluation Center (TEC). Breast magnetic resonance imaging (MRI) for detection or diagnosis of primary or recurrent breast cancer TEC Assessments. 2004;Volume 19:Tab 1.


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36. Blue Cross and Blue Shield Association Technology Evaluation Center (TEC). Breast MRI for management of patients with locally advanced breast cancer who are being referred for neoadjuvant chemotherapy. TEC Assessments. 2004;Volume 19:Tab 7.


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**POLICY HISTORY** - THIS POLICY WAS APPROVED BY THE FEP® PHARMACY AND MEDICAL POLICY COMMITTEE ACCORDING TO THE HISTORY BELOW:

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<tr>
<th>Date</th>
<th>Action</th>
<th>Description</th>
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<tr>
<td>December 2011</td>
<td>New policy</td>
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<tr>
<td>June 2013</td>
<td>Replace policy</td>
<td>Rationale extensively written; References removed, references 8, 9, 18, 31, 44-46, 49 &amp; 54 added. Policy statement amended to clarify that medically necessary statements refer to performing MRI of the breast with a breast coil and the use of contrast.</td>
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<tr>
<td>September 2014</td>
<td>Replace policy</td>
<td>Policy updated with literature review; references 16, 21, 46-49, 56-57, 64-65, and 77-82 added; references 11, 13, and 26-27 updated. No change to policy statements.</td>
</tr>
<tr>
<td>December 2019</td>
<td>Reactivate policy</td>
<td>Policy updated with literature review through July 8, 2019; references added; references on NCCN updated. Policy statements unchanged. Policy reactivated for use with prior approval where applicable.</td>
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