MEDICAL POLICY

POLICY TITLE	SCINTIMAMMOGRAPHY AND GAMMA IMAGING OF THE BREAST AND AXILLA
POLICY NUMBER	MP-5.021

Original Issue Date (Created):	**8/9/2002**
Most Recent Review Date (Revised):	**8/18/2020**
Effective Date:	**11/1/2020**

I. POLICY

Scintimammography, breast-specific gamma imaging (BSGI), and molecular breast imaging (MBI) are considered **investigational** in all applications, including but not limited to its use as an adjunct to mammography or in staging the axillary lymph nodes. There is insufficient evidence to support a conclusion concerning the health outcomes or benefits associated with these procedures.

Use of gamma detection following radiopharmaceutical administration for localization of sentinel lymph nodes in patients with breast cancer may be considered **medically necessary**.

Policy Guidelines
The most commonly-used radiopharmaceutical in breast-specific gamma imaging or molecular breast imaging is technetium 99m (Tc-99m) sestamibi.

The most commonly used radiopharmaceuticals for sentinel lymph node detection using either lymphoscintigraphy or hand-held gamma detection include Tc 99m–labeled colloids (eg, sulfur colloid).

Cross-references:

MP-5.022 Radioimmunoscintigraphy Imaging Monoclonal Antibody Imaging with Indium-111 Capromab Pendetide for Prostate Cancer

II. PRODUCT VARIATIONS

Top

This policy is only applicable to certain programs and products administered by Capital BlueCross please see additional information below, and subject to benefit variations as discussed in Section VI below.

POLICY TITLE	SCINTIMAMMOGRAPHY AND GAMMA IMAGING OF THE BREAST AND AXILLA
POLICY NUMBER	MP-5.021

III. DESCRIPTION/BACKGROUND

Top

Scintimammography, breast-specific gamma imaging (BSGI), and molecular breast imaging (MBI) use radiotracers with nuclear medicine imaging as a diagnostic tool for abnormalities of the breast. These tests are distinguished by the use of differing gamma camera technology, which may improve diagnostic performance for detecting small lesions. BSGI uses a single-head breast-specific gamma camera and a compression device; whereas, MBI uses dual-head breast-specific gamma cameras that also produce breast compression. Preoperative lymphoscintigraphy and/or intraoperative hand-held gamma detection of sentinel lymph nodes is a method of identifying sentinel lymph nodes for biopsy after radiotracer injection. Surgical removal of one or more sentinel lymph nodes is an alternative to full axillary lymph node dissection for staging evaluation and management of breast cancer.

MAMMOGRAPHY

Mammography is the main screening modality for breast cancer, despite its limitations in terms of less than ideal sensitivity and specificity. Limitations of mammography are a particular issue for women at high risk of breast cancer, for whom cancer risk exceeds the inconvenience of more frequent screening, starting at a younger age, with more frequent false-positive results. Furthermore, the sensitivity of mammography is lower in women with radiographically dense breasts, which is more common among younger women. The clinical utility of adjunctive screening tests is primarily in the evaluation of women with inconclusive results on mammography. A biopsy is generally performed on a breast lesion if imaging cannot rule out malignancy with certainty. Therefore, adjunctive tests will be most useful in women with inconclusive mammograms if they have a high negative predictive value (NPV) and can preclude the need for biopsy. Additional imaging for asymptomatic women who have dense breasts and negative mammograms has been suggested, but the best approach is subject to debate (see the 2013 TEC Special Report).

SCINTIMAMMOGRAPHY

Scintimammography is a diagnostic modality using radiopharmaceuticals to detect breast tumors. After intravenous injection of a radiopharmaceutical, the breast is evaluated using planar imaging. Scintimammography is performed with the patient lying prone, and the camera positioned laterally, which increases the distance between the breast and the camera. Special camera positioning to include the axilla may be included when the area of interest is an evaluation for axillary metastases. Scintimammography using conventional imaging modalities has relatively poor sensitivity in detecting smaller lesions (eg, <15 mm), because of the relatively poor resolution of conventional gamma cameras in imaging the breast.

BREAST-SPECIFIC GAMMA IMAGING

Breast-specific gamma imaging (BSGI) and molecular breast imaging (MBI) were developed to address the poor resolution of conventional gamma cameras. Breast-specific gamma cameras acquire images while the patient is seated in a position similar to that in mammography and the breast is lightly compressed. Detector heads are immediately next to the breast, increasing resolution, and images can be compared with mammographic images. BSGI and MBI differ

primarily in the number and type of detectors used (e.g., multicrystal arrays of cesium iodide or sodium iodide, or nonscintillating, semiconductor materials, such as cadmium zinc telluride). In some configurations, a detector is placed on each side of the breast and used to compress it lightly. The maximum distance between the detector and the breast is therefore from the surface to the midpoint of the breast. The radiotracer typically used is technetium 99m (Tc 99m) sestamibi, and MBI takes approximately 40 minutes.

LYMPHOSCINTIGRAPHY AND HAND-HELD GAMMA DETECTION

Preoperative lymphoscintigraphy and/or intraoperative hand-held gamma detection of sentinel lymph nodes is a method of identifying sentinel lymph nodes for biopsy after radiotracer injection. Surgical removal of one or more sentinel lymph nodes is an alternative to full axillary lymph node dissection for staging evaluation and management of breast cancer. Several trials have compared outcomes following sentinel lymph node biopsy with axillary lymph node dissection for managing patients who have breast cancer. The National Surgical Adjuvant Breast and Bowel Project (NSABP) trial B-32 examined whether sentinel lymph node dissection (SLND) provides similar survival and regional control as full axillary lymph node dissection in the surgical staging and management of patients with clinically invasive breast cancer. This multicenter randomized controlled trial included 5611 women and observed statistically similar results for overall survival, disease-free survival, and regional control based on 8-year Kaplan-Meier estimates. An additional 3-year follow-up of morbidity after surgical node dissection revealed lower morbidity in the SLND group, including lower rates of arm swelling, numbness, tingling, and fewer early shoulder abduction deficits. A recent systematic review and meta-analysis by Ram et al (2014) reported no significant difference in overall survival (hazard ratio, 0.94; 95% confidence interval, 0.79 to1.19), no significant difference in disease-free survival (hazard ratio 0.83; 95% confidence interval, 0.60 to 1.14), and similar rates of locoregional recurrence. However, axillary node dissection was associated with significantly greater surgical morbidity (eg, wound infection, arm swelling, motor neuropathy, numbness) than sentinel node biopsy.

RADIOPHARMACEUTICALS

Scintimammography, BSGI, and MBI

The primary radiopharmaceutical used with BSGI or MBI is Tc 99m sestamibi. The product label states that Tc 99m sestamibi is "indicated for planar imaging as a second-line diagnostic drug after mammography to assist in the evaluation of breast lesions in patients with an abnormal mammogram or a palpable breast mass. Technetium Tc-99m sestamibi is not indicated for breast cancer screening, to confirm the presence or absence of malignancy, and it is not an alternative to biopsy."

Technetium TC-99m tetrofosmin (Myoview™), a gamma-emitter used in some BSGI studies, is approved by the Food and Drug Administration (FDA) only for cardiac imaging.

Lymphoscintigraphy and/or Hand-Held Gamma Detection of Sentinel Lymph Nodes

The primary radiopharmaceuticals used for lymphoscintigraphy include Tc 99m pertechnetate–labeled colloids and Tc 99m tilmanocept (Lymphoseek). Whereas, Tc 99m sulfur

colloid may frequently be used for intraoperative injection and detection of sentinel lymph nodes using hand-held gamma detection probe.

RADIATION EXPOSURE

Scintimammography, BSGI, and MBI

The radiation dose associated with BSGI is substantial for diagnostic breast imaging modalities. According to Appropriateness Criteria from American College of Radiology (ACR), the radiation dose from BSGI is 10 to 30 mSv, which is 15 to 30 times higher than the dose from a digital mammogram. According to ACR, at these levels, BSGI is not indicated for breast cancer screening.

According to a study by Hruska and O'Connor (2015; who reported receiving royalties from licensed technologies by an agreement with Mayo Clinic and Gamma Medica), the effective dose from a lower "off-label" administered dose of 240 to 300 MBq (6.5-8 mCi) of Tc 99m sestamibi that is made feasible with newer dual-head MBI systems, is 2.0 to 2.5 mSv. For comparison, the effective dose (i.e., mean glandular dose) of digital mammography is estimated to be about 0.5 mSv. However, it is important to note that the dose for MBI is given to the entire body. The authors compared this dose with the estimated annual background radiation, which varies worldwide between 2.5 mSv and 10 mSv, and asserted that the effective dose from MBI "is considered safe for use in routine screening."

Hendrick (2010) calculated mean glandular doses and lifetime attributable risks of cancer due to film mammography, digital mammography, BSGI, and positron emission mammography (PEM).[13,] The author, a consultant to GE Healthcare and a member of the medical advisory boards of Koning (manufacturer of dedicated breast computed tomography) and Bracco (magnetic resonance contrast agents), used group risk estimates from the Biological Effects of Ionizing Radiation VII report[14,] to assess the risk of radiation-induced cancer and mortality from breast imaging studies. For a patient with average-sized breasts (compressed thickness during mammography of 5.3 cm per breast), estimated lifetime attributable risks of cancer at age 40 were:

- 5 per 100,000 for digital mammography (breast cancer only),
- 7 per 100000 for screen-film mammography (breast cancer only),
- 55 to 82 per 100,000 for BSGI (depending on the dose of Tc 99m sestamibi), and
- 75 for 100,000 for PEM.

Corresponding lifetime attributable risks of cancer mortality at age 40 were:

- 1.3 per 100,000 for digital mammography (breast cancer only),
- 1.7 per 100,000 for screen film mammography (breast cancer only),
- 26 to 39 per 100,000 for BSGI, and

- 31 for 100,000 for PEM.

A major difference in the impact of radiation between mammography and BSGI or PEM is that, for mammography, the substantial radiation dose is limited to the breast. With BSGI and PEM, all organs are irradiated, increasing the risks associated with radiation exposure.

Notes: The term *molecular breast imaging* is used in different ways, sometimes for any type of breast imaging involving molecular imaging, including PEM, and sometimes it is used synonymously with the term *breast-specific gamma camera*, as used in this review.

Use of single-photon emission computed tomography and positron emission tomography of the breast are not addressed in this review.

REGULATORY STATUS

Several scintillation (gamma) cameras have been cleared for marketing by FDA through the 510(k) process for "measuring and imaging the distribution of radionuclides in the human body by means of photon detection." Examples of gamma cameras used in BSGI are the Dilon 6800® (Dilon Technologies) and single-head configurations of Discovery NM750b (GE Healthcare). Dual-head cameras used in MBI include LumaGEM™ (Gamma Medical) (FDA product code IYX) and Discovery NM750b (GE Healthcare).

Tc-99m sestamibi (marketed by Draxis Specialty Pharmaceuticals, Cardinal Health 14, Mallinckrodt, and Pharmalucence) has been approved by FDA with the following labeling: "Breast Imaging: Technetium TC 99M Sestamibi is indicated for planar imaging as a second-line diagnostic drug after mammography to assist in the evaluation of breast lesions in patients with an abnormal mammogram or a palpable breast mass. Technetium TC 99M Sestamibi is not indicated for breast cancer screening, to confirm the presence or absence of malignancy, and it is not an alternative to biopsy."

In 2013, Tc 99m tilmanocept (Lymphoseek; Navidea Biopharmaceuticals) was approved by FDA for use in breast cancer and melanoma as a radioactive diagnostic imaging agent to help localize lymph nodes.

Technetium-99m-sulfur colloid was approved by FDA through the new drug application (NDA; GE Healthcare, NDA 017456; Mallinckrodt, NDA 017724) process although these products appear to be marketed no longer. In addition, in 2011, Technetium Tc 99m Sulfur Colloid Kit (Pharmalucence) was approved by FDA through the NDA process (NDA 017858) for use as an injection to localize lymph nodes in breast cancer patients.

In 2018, FDA granted approval to Northstar Medical Radioisotopes for its RadioGenix™ System, which produces molybdenum 99, the material used to generate Tc 99m. Previously, molybdenum 99 was only produced from enriched uranium in facilities outside of the United States.

IV. RATIONALE

Top

SUMMARY OF EVIDENCE

Scintimammography, BSGI, and MBI for Diagnosis

For individuals who have dense breasts or high risk for breast cancer who receive scintimammography, BSGI, or MBI as an adjunct to mammography, the evidence includes diagnostic accuracy studies. Relevant outcomes are overall survival, disease-specific survival, test accuracy and validity, and treatment-related morbidity. Three prospective studies have assessed the incremental difference in diagnostic accuracy when BSGI or MBI is added to mammography in women at increased risk. Sensitivity was higher with combined BSGI or MBI and mammography, but specificity was lower. Studies of women at increased risk of breast cancer and negative mammograms found that a small number of additional cancers were detected, but the recall rate was relatively high. Studies tended to include women at different risk levels (eg, women with dense breasts and those with *BRCA1*). Moreover, any potential benefits need to be weighed against potential risks of additional radiation exposure. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have indeterminate or suspicious breast lesions who receive scintimammography, BSGI, or MBI, the evidence includes diagnostic accuracy studies. The relevant outcomes are overall survival, disease-specific survival, test accuracy and validity, and treatment-related morbidity. In the available studies, compared with biopsy, the negative predictive value (NPV) of BSGI (or MBI) varied from 83% to 94%. Given the relative ease and diagnostic accuracy of the criterion standard of biopsy, coupled with the adverse consequences of missing a breast cancer, the NPV of BSGI (or MBI) would have to be extremely high to alter treatment decisions. The evidence to date does not demonstrate this level of NPV. Moreover, the value of BSGI in evaluating indeterminate or suspicious lesions must be compared with other modalities that would be used, such as spot views for diagnostic mammography. The evidence is insufficient to determine the effects of the technology on health outcomes.

Scintimammography and BSGI for Treatment

For individuals who have breast cancer undergoing detection of residual tumor after neoadjuvant therapy who receive scintimammography and BSGI, the evidence includes diagnostic accuracy studies and a meta-analysis. Relevant outcomes are overall survival, disease-specific survival, test validity, and treatment-related morbidity. The meta-analysis of studies evaluating the accuracy of BSGI for detecting residual tumor after neoadjuvant therapy found a pooled sensitivity of 86% and a pooled specificity of 69%, compared with histopathologic analysis. No studies were identified that compared the diagnostic accuracy of BSGI with other imaging approaches, or that investigated the clinical utility of this potential application of BSGI. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have breast cancer undergoing surgical planning for breast-conserving therapy who receive scintimammography and BSGI, the evidence includes a retrospective observational study. Relevant outcomes are overall survival, disease-specific survival, test

validity, and treatment-related morbidity. In the retrospective study, results suggested that magnetic resonance imaging identified more patients than BSGI who were not appropriate candidates for breast-conserving therapy. Prospective comparative studies are needed. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have breast cancer undergoing detection of axillary metastases who receive scintimammography and BSGI, the evidence includes diagnostic accuracy studies and systematic reviews of diagnostic accuracy studies. Relevant outcomes are overall survival, disease-specific survival, test validity, and treatment-related morbidity. A meta-analysis of the available diagnostic accuracy studies found that the sensitivity and specificity of BSGI are not high enough for this technology to replace the current standard practice, surgical nodal dissection. The evidence is insufficient to determine the effects of the technology on health outcomes.

Radiopharmaceutical and Gamma Detection for Treatment

For individuals who have breast cancer undergoing sentinel lymph node biopsy for detection of axillary metastases who receive radiopharmaceutical and gamma detection for localization of sentinel lymph nodes, the evidence includes 3 studies and a meta-analysis. Relevant outcomes are overall survival, disease-specific survival, test validity, and treatment-related morbidity. A meta-analysis and 3 additional studies have provided evidence that using radiopharmaceutical and gamma detection for localization of sentinel lymph nodes yields high success rates in identifying sentinel lymph nodes; additionally, the diagnostic performance generally offers better detection rates with radiopharmaceutical than with alternative methods (eg, using only blue dye). The evidence has indicated that sentinel lymph node biopsy provides similar long-term outcomes as full axillary lymph node dissection for control of breast cancer and offers more favorable early results with reduced arm swelling and better quality of life. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

V. DEFINITIONS

Top

RADIOPHARMACEUTICAL is a radioactive chemical or drug that has a specific affinity for a particular body tissue or organ. It can be used in nuclear medicine to obtain images of structures, or to treat radiation-sensitive diseases.

VI. BENEFIT VARIATIONS

Top

The existence of this medical policy does not mean that this service is a covered benefit under the member's health benefit plan. Benefit determinations should be based in all cases on the applicable health benefit plan language. Medical policies do not constitute a description of benefits. A member’s health benefit plan governs which services are covered, which are excluded, which are subject to benefit limits and which require preauthorization. There are different benefit plan designs in each product administered by Capital BlueCross. Members and

providers should consult the member's health benefit plan for information or contact Capital BlueCross for benefit information.

VII. DISCLAIMER

Top

Capital BlueCross's medical policies are developed to assist in administering a member's benefits, do not constitute medical advice and are subject to change. Treating providers are solely responsible for medical advice and treatment of members. Members should discuss any medical policy related to their coverage or condition with their provider and consult their benefit information to determine if the service is covered. If there is a discrepancy between this medical policy and a member's benefit information, the benefit information will govern. If a provider or a member has a question concerning the application of this medical policy to a specific member's plan of benefits, please contact Capital BlueCross' Provider Services or Member Services. Capital BlueCross considers the information contained in this medical policy to be proprietary and it may only be disseminated as permitted by law.

VIII. CODING INFORMATION

TOP

Note: This list of codes may not be all-inclusive, and codes are subject to change at any time. The identification of a code in this section does not denote coverage as coverage is determined by the terms of member benefit information. In addition, not all covered services are eligible for separate reimbursement.

Investigational; therefore not covered:

HCPCS Code	Description
S8080	Scintimammography (radioimmunoscintigraphy of the breast), unilateral, including supply of radiopharmaceutical

Covered when medically necessary:

CPT Codes®								
78195	78800	78801	78830	78831	78832	78835		

HCPC Codes ®	Description
A9500	Technetium tc-99m sestamibi, diagnostic, per study dose
A9520	Technetium tc-99m, tilmanocept, diagnostic, up to 0.5 millicuries
A9541	Technetium Tc-99m sulfur colloid, diagnostic, per study dose, up to 20 millicuries

ICD-10-CM Diagnosis Code	Description
C50.011	Malignant neoplasm of nipple and areola, right female breast
C50.012	Malignant neoplasm of nipple and areola, left female breast

C50.019	Malignant neoplasm of nipple and areola, unspecified female breast
C50.021	Malignant neoplasm of nipple and areola, right male breast
C50.022	Malignant neoplasm of nipple and areola, left male breast
C50.029	Malignant neoplasm of nipple and areola, unspecified male breast
C50.111	Malignant neoplasm of central portion of right female breast
C50.112	Malignant neoplasm of central portion of left female breast
C50.119	Malignant neoplasm of central portion of unspecified female breast
C50.121	Malignant neoplasm of central portion of right male breast
C50.122	Malignant neoplasm of central portion of left male breast
C50.129	Malignant neoplasm of central portion of unspecified male breast
C50.211	Malignant neoplasm of upper-inner quadrant of right female breast
C50.212	Malignant neoplasm of upper-inner quadrant of left female breast
C50.219	Malignant neoplasm of upper-inner quadrant of unspecified female breast
C50.221	Malignant neoplasm of upper-inner quadrant of right male breast
C50.222	Malignant neoplasm of upper-inner quadrant of left male breast
C50.229	Malignant neoplasm of upper-inner quadrant of unspecified male breast
C50.311	Malignant neoplasm of lower-inner quadrant of right female breast
C50.312	Malignant neoplasm of lower-inner quadrant of left female breast
C50.319	Malignant neoplasm of lower-inner quadrant of unspecified female breast
C50.321	Malignant neoplasm of lower-inner quadrant of right male breast
C50.322	Malignant neoplasm of lower-inner quadrant of left male breast
C50.329	Malignant neoplasm of lower-inner quadrant of unspecified male breast
C50.411	Malignant neoplasm of upper-outer quadrant of right female breast
C50.412	Malignant neoplasm of upper-outer quadrant of left female breast
C50.419	Malignant neoplasm of upper-outer quadrant of unspecified female breast
C50.421	Malignant neoplasm of upper-outer quadrant of right male breast
C50.422	Malignant neoplasm of upper-outer quadrant of left male breast
C50.429	Malignant neoplasm of upper-outer quadrant of unspecified male breast
C50.511	Malignant neoplasm of lower-outer quadrant of right female breast
C50.512	Malignant neoplasm of lower-outer quadrant of left female breast
C50.519	Malignant neoplasm of lower-outer quadrant of unspecified female breast
C50.521	Malignant neoplasm of lower-outer quadrant of right male breast
C50.522	Malignant neoplasm of lower-outer quadrant of left male breast
C50.529	Malignant neoplasm of lower-outer quadrant of unspecified male breast
C50.611	Malignant neoplasm of axillary tail of right female breast
C50.612	Malignant neoplasm of axillary tail of left female breast
C50.619	Malignant neoplasm of axillary tail of unspecified female breast
C50.621	Malignant neoplasm of axillary tail of right male breast
C50.622	Malignant neoplasm of axillary tail of left male breast
C50.629	Malignant neoplasm of axillary tail of unspecified male breast
C50.811	Malignant neoplasm of overlapping sites of right female breast
C50.812	Malignant neoplasm of overlapping sites of left female breast
C50.819	Malignant neoplasm of overlapping sites of unspecified female breast
C50.821	Malignant neoplasm of overlapping sites of right male breast
C50.822	Malignant neoplasm of overlapping sites of left male breast

C50.829	Malignant neoplasm of overlapping sites of unspecified male breast
C50.911	Malignant neoplasm of unspecified site of right female breast
C50.912	Malignant neoplasm of unspecified site of left female breast
C50.919	Malignant neoplasm of unspecified site of unspecified female breast
C50.921	Malignant neoplasm of unspecified site of right male breast
C50.922	Malignant neoplasm of unspecified site of left male breast
C50.929	Malignant neoplasm of unspecified site of unspecified male breast

**If applicable, please see Medicare LCD or NCD for additional covered diagnoses.*

IX. REFERENCES

Top

1. *Aarsvold JN, Alazraki NP. Update on detection of sentinel lymph nodes in patients with breast cancer. Semin Nucl Med. Apr 2005;35(2):116-128. PMID 15765374*
2. *American College of Radiology (ACR). Appropriateness criteria®: breast cancer screening. 2016; https://acsearch.acr.org/docs/70910/Narrative. Accessed August 19, 2020.*
3. *American College of Radiology (ACR). Appropriateness criteria®: breast pain. 2016; https://acsearch.acr.org/docs/3091546/Narrative/. Accessed August 19, 2020..*
4. *Ashikaga T, Krag DN, Land SR, et al. Morbidity results from the NSABP B-32 trial comparing sentinel lymph node dissection versus axillary dissection. J Surg Oncol. Aug 1 2010;102(2):111-118. PMID 20648579*
5. *Berrington de Gonzalez A, Berg CD, Visvanathan K, et al. Estimated risk of radiation-induced breast cancer from mammographic screening for young BRCA mutation carriers. J Natl Cancer Inst. Feb 4 2009;101(3):205-209. PMID 19176458*
6. *Blue Cross and Blue Shield Association Technology Evaluation Center (TEC). Special report: screening symptomatic women with dense breasts and normal mammograms for breast cancer. TEC Assessments. 2013; Volume 28: Tab 15.*
7. *Blue Cross and Blue Shield Association Technology Evaluation Center (TEC). Breast-specific gamma imaging (BSGI), molecular breast imaging (MBI), or scintimammography with breast-specific gamma camera. Technol Eval Cent Assess Program Exec Summ. Jun 2013;28(2):1-4. PMID 23865107*
8. *Brem RF, Petrovitch I, Rapelyea JA, et al. Breast-specific gamma imaging with 99mTc-Sestamibi and magnetic resonance imaging in the diagnosis of breast cancer--a comparative study. Breast J. Sep-Oct 2007;13(5):465- 469. PMID 17760667*
9. *Brem RF, Rapelyea JA, Zisman G, et al. Occult breast cancer: scintimammography with high-resolution breastspecific gamma camera in women at high risk for breast cancer. Radiology. Oct 2005;237(1):274-280. PMID 16126919*
10. *Brem RF, Ruda RC, Yang JL, et al. Breast-specific gamma-imaging for the detection of mammographically occult breast cancer in women at increased risk. J Nucl Med. May 2016;57(5):678-684. PMID 26823569*
11. *Cho MJ, Yang JH, Yu YB, et al. Validity of breast-specific gamma imaging for Breast Imaging Reporting and Data System 4 lesions on mammography and/or ultrasound. Ann Surg Treat Res. Apr 2016;90(4):194-200. PMID 27073789*

12. *Committee on Practice Bulletins-Gynecology. Practice Bulletin Number 179: Breast cancer risk assessment and screening in average-risk women. Obstet Gynecol. Jul 2017;130(1): e1-e16. PMID 28644335*
13. *Edwards C, Williams S, McSwain AP, et al. Breast-specific gamma imaging influences surgical management in patients with breast cancer. Breast J. Sep-Oct 2013;19(5):512-519. PMID 23848225*
14. *Ernestos B, Nikolaos P, Koulis G, et al. Increased chromosomal radiosensitivity in women carrying BRCA1/BRCA2 mutations assessed with the G2 assay. Int J Radiat Oncol Biol Phys. Mar 15 2010;76(4):1199- 1205. PMID 20206018*
15. *Food and Drug Administration (FDA). 510(k) Summary: Gamma Medica™ Instruments: LumaGEM Scintillation Camera (K993813). 2000; https://www.accessdata.fda.gov/cdrh_docs/pdf/K993813.pdf. Accessed August 19, 2020.*
16. *GE Healthcare. Myoview™kit for the preparation of technetium Tc99m tetrofosmin for injection. 2011 May; https://www.gehealthcare.com. Accessed August 19, 2020.*
17. *Goldsmith SJ, Parsons W, Guiberteau MJ, et al. SNM practice guideline for breast scintigraphy with breastspecific gamma-cameras 1.0. J Nucl Med Technol. Dec 2010;38(4):219-224. PMID 21057112*
18. *Guo C, Zhang C, Liu J, et al. Is Tc-99m sestamibi scintimammography useful in the prediction of neoadjuvant chemotherapy responses in breast cancer? A systematic review and meta-analysis. Nucl Med Commun. Jul 2016;37(7):675-688. PMID 26974314*
19. *Health risks from exposure to low levels of ionizing radiation: BEIR VII, Phase 2. Washington, DC: National Research Council of the National Academies Press; 2006.*
20. *Hendrick RE. Radiation doses and cancer risks from breast imaging studies. Radiology. Oct 2010;257(1):246- 253. PMID 20736332*
21. *Hruska CB, O'Connor MK. Curies, and grays, and sieverts, oh my: a guide for discussing radiation dose and risk of molecular breast imaging. J Am Coll Radiol. Oct 2015;12(10):1103-1105. PMID 26435124*
22. *Hruska CB, O'Connor MK. Nuclear imaging of the breast: translating achievements in instrumentation into clinical use. Med Phys. May 2013;40(5):050901. PMID 23635248*
23. *Hruska CB, Phillips SW, Whaley DH, et al. Molecular breast imaging: use of a dual-head dedicated gamma camera to detect small breast tumors. AJR Am J Roentgenol. Dec 2008;191(6):1805-1815. PMID 19020253*
24. *Johnson CB, Boneti C, Korourian S, et al. Intraoperative injection of subareolar or dermal radioisotope results in predictable identification of sentinel lymph nodes in breast cancer. Ann Surg. Oct 2011;254(4):612-618. PMID 21918427*
25. *Krag DN, Anderson SJ, Julian TB, et al. Sentinel-lymph-node resection compared with conventional axillarylymph-node dissection in clinically node-negative patients with breast cancer: overall survival findings from the NSABP B-32 randomised phase 3 trial. Lancet Oncol. Oct 2010;11(10):927-933. PMID 20863759*
26. *Lantheus Medical Imaging. Cardiolite® kit for the preparation of technetium Tc99m sestamibi for injection. 2016; http://www.cardiolite.com/healthcare-professionals/prescribing-info.asp. Accessed August 19, 2020*

27. *Lee HS, Ko BS, Ahn SH, et al. Diagnostic performance of breast-specific gamma imaging in the assessment of residual tumor after neoadjuvant chemotherapy in breast cancer patients. Breast Cancer Res Treat. May 2014;145(1):91-100. PMID 24671359*
28. *Lyman GH, Somerfield MR, Giuliano AE. Sentinel lymph node biopsy for patients with early-stage breast cancer: 2016 American Society of Clinical Oncology Clinical Practice Guideline Update Summary. J Oncol Pract. Mar 2017;13(3):196-198. PMID 28118104*
29. *Martin RC, 2nd, Edwards MJ, Wong SL, et al. Practical guidelines for optimal gamma probe detection of sentinel lymph nodes in breast cancer: results of a multi-institutional study. For the University of Louisville Breast Cancer Study Group. Surgery. Aug 2000;128(2):139-144. PMID 10922983*
30. *Mathew MA, Saha AK, Saleem T, et al. Pre-operative lymphoscintigraphy before sentinel lymph node biopsy for breast cancer. Breast. Feb 2010;19(1):28-32. PMID 19913418*
31. *Meissnitzer T, Seymer A, Keinrath P, et al. The added value of semiquantitative breast-specific gamma imaging in the work-up of suspicious breast lesions compared to mammography, ultrasound and 3T MR Imaging. Br J Radiol. Apr 17 2015:20150147. PMID 25882690*
32. *Monticciolo DL, Newell MS, Moy L, et al. Breast cancer screening in women at higher-than-average risk: Recommendations from the ACR. J Am Coll Radiol. Mar 2018;15(3 Pt A):408-414. PMID 29371086*
33. *Moy L, Heller SL, Bailey L, et al. ACR Appropriateness Criteria(R) palpable breast masses. J Am Coll Radiol. May 2017;14(5S):S203-S224. PMID 28473077*
34. *National Comprehensive Cancer Network (NCCN). NCCN Clinical Practice Guidelines in Oncology: Breast Cancer. Version 3.2018. https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf. Accessed August 19, 2020*
35. *National Comprehensive Cancer Network (NCCN). NCCN Clinical Practice Guidelines in Oncology: Breast Cancer Screening and Diagnosis. Version 3.2018. 2018; https://www.nccn.org/professionals/physician_gls/pdf/breast-screening.pdf. Accessed August 19, 2020*
36. *O'Connor M, Rhodes D, Hruska C. Molecular breast imaging. Expert Rev Anticancer Ther. Aug 2009;9(8):1073- 1080. PMID 19671027*
37. *Pesek S, Ashikaga T, Krag LE, et al. The false-negative rate of sentinel node biopsy in patients with breast cancer: a meta-analysis. World J Surg. Sep 2012;36(9):2239-2251. PMID 22569745*
38. *Ram R, Singh J, McCaig E. Sentinel node biopsy alone versus completion axillary node dissection in node positive breast cancer: systematic review and meta-analysis. Int J Breast Cancer. Nov 2014;2014:513780. PMID 25383226*
39. *Rhodes DJ, Hruska CB, Conners AL, et al. Journal club: molecular breast imaging at reduced radiation dose for supplemental screening in mammographically dense breasts. AJR Am J Roentgenol. Feb 2015;204(2):241-251. PMID 25615744*
40. *Rhodes DJ, Hruska CB, Phillips SW, et al. Dedicated dual-head gamma imaging for breast cancer screening in women with mammographically dense breasts. Radiology. Jan 2011;258(1):106-118. PMID 21045179*

41. *Schillaci O, Scopinaro F, Spanu A, et al. Detection of axillary lymph node metastases in breast cancer with Tc99m tetrofosmin scintigraphy. Int J Oncol. Mar 2002;20(3):483-487. PMID 11836558*
42. *Schillaci O, Spanu A, Danieli R, et al. Molecular breast imaging with gamma emitters. Q J Nucl Med Mol Imaging. Dec 2013;57(4):340-351. PMID 24322791*
43. *Shermis RB, Wilson KD, Doyle MT, et al. Supplemental breast cancer screening with molecular breast imaging for women with dense breast tissue. AJR Am J Roentgenol. Aug 2016;207(2):450-457. PMID 27186635*
44. *Spanu A, Chessa F, Meloni GB, et al. The role of planar scintimammography with high-resolution dedicated breast camera in the diagnosis of primary breast cancer. Clin Nucl Med. Nov 2008;33(11):739-742. PMID 18936602*
45. *Spanu A, Dettori G, Nuvoli S, et al. (99)mTc-tetrofosmin SPET in the detection of both primary breast cancer and axillary lymph node metastasis. Eur J Nucl Med. Dec 2001;28(12):1781-1794. PMID 11734916*
46. *Spanu A, Sanna D, Chessa F, et al. The clinical impact of breast scintigraphy acquired with a breast specific gamma-camera (BSGC) in the diagnosis of breast cancer: incremental value versus mammography. Int J Oncol. Aug 2012;41(2):483-489. PMID 22641247*
47. *Sun X, Liu JJ, Wang YS, et al. Roles of preoperative lymphoscintigraphy for sentinel lymph node biopsy in breast cancer patients. Jpn J Clin Oncol. Aug 2010;40(8):722-725. PMID 20430775*
48. *Taillefer R. The role of 99mTc-sestamibi and other conventional radiopharmaceuticals in breast cancer diagnosis. Semin Nucl Med. Jan 1999;29(1):16-40. PMID 9990681*
49. *Tan H, Jiang L, Gu Y, et al. Visual and semi-quantitative analyses of dual-phase breast-specific gamma imaging with Tc-99m-sestamibi in detecting primary breast cancer. Ann Nucl Med. Jan 2014;28(1):17-24. PMID 24142630*
50. *Unkart J, Wallace A. Use of lymphoscintigraphy with Tc-99m tilmanocept does not affect the number of nodes removed during sentinel node biopsy in breast cancer [abstract]. J Nucl Med. 2016;57(Suppl 2):615. PMID*
51. *van der Vorst JR, Schaafsma BE, Verbeek FP, et al. Randomized comparison of near-infrared fluorescence imaging using indocyanine green and 99(m) technetium with or without patent blue for the sentinel lymph node procedure in breast cancer patients. Ann Surg Oncol. Dec 2012;19(13):4104-4111. PMID 22752379*
52. *Xu HB, Li L, Xu Q. Tc-99m sestamibi scintimammography for the diagnosis of breast cancer: meta-analysis and meta-regression. Nucl Med Commun. Nov 2011;32(11):980-988. PMID 21956488*
53. *Blue Cross Blue Shield Association Medical Policy Reference Manual. 6.01.18, Scintimammography and Gamma Imaging of the Breast and Axilla. October 2019.*

POLICY TITLE	SCINTIMAMMOGRAPHY AND GAMMA IMAGING OF THE BREAST AND AXILLA
POLICY NUMBER	MP-5.021

X. POLICY HISTORY

Top

MP 5.021	**CAC 5/27/03**
	CAC 4/26/05
	CAC 4/25/06
	CAC 4/24/07 Consensus review.
	CAC 7/29/08
	CAC 7/28/09 Consensus review.
	CAC 5/25/10 Adopted BCBSA Criteria
	CAC 4/26/11 Changed title to match BCBSA title change. Changed policy statement to include "molecular imaging" as investigational to match BCBSA changes.
	CAC 6/26/12 Consensus review. No change to policy statement, references updated.
	7/25/13 Administrative update. coding review complete
	CAC 9/24/13 Consensus review. No change to policy statements, references updated. Changed FEP variation to reference the policy manual. Added rationale section. Updated Background/Description.
	CAC 9/30/14 Consensus review. Title changed from Scintimammography/Breast-Specific Gamma Imaging/Molecular Breast Imaging to Scintimammography and Gamma Imaging of the Breast and Axilla. New investigational policy statement for preoperative or intraoperative sentinel lymph node detection using handheld or mounted mobile gamma cameras added. Other policy statement unchanged. No coding changes required. Updated Background Description and Rationale.
	CAC 9/29/15 Consensus review. No changes to the policy statements. Background, reference and rationale update. Medicare variation added to refer to independent diagnostic testing facilities. Coding Reviewed
	1/1/17 Administrative update. Product variation section reformatted.
	CAC 11/29/16 Minor revision. Revised policy statement to include "use of gamma detection following radiopharmaceutical administration for localization of sentinel lymph nodes in patients with breast cancer may be considered medically necessary. Background, rationale, and references updated. Coding Reviewed.
	CAC 12/19/17 Consensus review. Policy statements unchanged. Policy Guidelines, Description/Background, Rationale and Reference sections updated.
	11/1/18 Consensus review. Policy statements unchanged. Rationale condensed and reference section updated.
	2/1/19 Consensus review. Policy statements unchanged.
	4/1/19 Coding reviewed and updated.
	09/26/19 Consensus review. No changes to policy statements. Coding and complete literature review.

POLICY TITLE	SCINTIMAMMOGRAPHY AND GAMMA IMAGING OF THE BREAST AND AXILLA
POLICY NUMBER	MP-5.021

	1/1/2020 Coding update. New 2020 CPT codes added to the policy;78830, 78831, 78832, and 78835.
	8/18/2020 Consensus review. No change to policy statement.

Top