Aetna considers any of the following minimally invasive image-guided breast biopsy procedures medically necessary as alternatives to needle localization core surgical biopsy (NLBx) in members with abnormalities identified by mammography that are non-palpable or difficult to palpate (i.e., because they are deep, mobile, small (less than 2 cm), or are composed of clustered microcalcifications):

1. Advanced Breast Biopsy Instrument (ABBI); or
2. Stereotactically guided core-needle biopsy; or
3. Ultrasound-guided core-needle biopsy; or
4. MRI-guided core-needle biopsy; or
5. Vacuum assisted core-needle biopsy (Mammotome™ device).

Aetna considers other minimally invasive image-guided breast biopsy procedures (i.e., those not mentioned above) experimental and investigational (e.g., PET-guided breast biopsy (Naviscan)) because their effectiveness has not been established.

Aetna considers radioactive seed localization for breast lesion/cancer experimental and investigational because its effectiveness has not been established.
Aetna considers tomosynthesis-guided localization/biopsy experimental and investigational because its effectiveness has not been established.

Aetna considers the use of the SAVI SCOUT surgical guidance system during localized excisional biopsy or lumpectomy experimental and investigational because its effectiveness has not been established.

See also CPB 0071 - Positron Emission Tomography (PET) (../1_99/0071.html), CPB 0105 - Magnetic Resonance Imaging (MRI) of the Breast (../100_199/0105.html), and CPB 0517 - Breast Ductal Lavage and Fiberoptic Ductoscopy (../500_599/0517.html).

Background
Recent comparative studies have demonstrated several advantages of minimally invasive breast biopsy procedures over needle localization core surgical biopsy (NLBx). Minimally invasive breast biopsy procedures take less time to perform than NLBx, cause less patient discomfort and cosmetic deformity, result in less artifact on subsequent mammography, and are more cost effective. If a benign lesion is found, the patient can be followed with clinical examinations and mammography and an open surgical procedure is avoided.

Biopsies can be obtained either with a fine-needle (20-gauge) or large bore (11- and 14-gauge) needle. However, the large-core biopsy is favored over fine-needle biopsy for several reasons: (i) large core biopsy samples can be interpreted by pathologists who do not have special training in cytopathology; (ii) specimens obtained by large core biopsy are more likely to be sufficient than those obtained by fine-needle biopsy; (iii) large core biopsy samples allow the pathologist to differentiate in-situ from invasive carcinoma; and (iv) pathologists can characterize lesions more completely with large-core biopsy samples.

For larger, fixed, palpable lesions, image guidance is considered not medically necessary for performing an adequate biopsy. In these cases, palpation-guided biopsy is sufficient for locating the
lesion and obtaining an adequate tissue sample. However, image-guidance has been shown to be useful for directing the biopsy of non-palpable or vaguely palpable lesions. The Center for Medicare and Medicaid Services (CMS, 2002) concluded that image-guided biopsy may be indicated for lesions that are non-palpable or vaguely palpable, and that “clinical studies suggest that such lesions may include those that are vaguely palpable, mobile, deep, or small, particularly less than 2 cm. Palpable lesions that demonstrate a small area of clustered microcalcifications on a mammogram may be difficult to biopsy using palpation alone and thus may warrant image-guided biopsy. Lesions that are difficult to biopsy using palpation are generally those that border on being non-palpable; non-palpable lesions are not amenable to palpation-guided biopsy.”

Hanna et al (2005) stated that stereotactic breast biopsy techniques minimize the surgical trauma associated with conventional wire-guided open breast biopsy for non-palpable breast lesions (NPBLs). Advanced breast biopsy instrumentation (ABBI) allows for a 2-cm core of breast tissue to be excised under stereotactic guidance in an outpatient setting. These investigators reported their initial experience with ABBI. Hospital charts from 89 ABBI procedures between October 1996 and July 2002 were retrospectively reviewed for patient characteristics, ABBI parameters, radiographic appearance, pathology, complications, and clinical follow-up. Data were presented as percentage/median (range). Median age was 59 years (range of 39 to 80 years), mammographic lesions were classified as calcifications 49% (44/89), soft tissue 39% (35/89), or mixed 11% (10/89). Median radiographic size was 7 mm (1 to 60 mm). Final pathology revealed ductal carcinoma in situ (DCIS) in 7% (6/89) and invasive cancer in 22% (20/89). Microscopically clear margins were obtained in 55% (11/20) of patients with invasive cancer. Of these, 82% (9/11) chose not to undergo further local surgical therapy. Eight patients remain disease free at 56 months (range of 41 to 95 months) follow-up. The 9th patient was deceased at 6 months from an unrelated cause. The overall complication rate was 3% (3/89). A definitive diagnosis was obtained in 100% of malignant and 87% of benign cases. Median waiting time was 19 days (range of 0 to 90 days). The
authors' experience demonstrated that ABBI is an effective diagnostic tool for NPBLs. It is associated with minimal complications, and provides negative margins in over 50% of malignant cases. In selected patients with invasive cancer and negative margins, ABBI may obviate the need for further local surgical treatment. Furthermore, ABBI merits additional investigation as a therapeutic modality for early breast cancer.

Szynglarewicz et al (2011) compared the procedure duration time for different methods of minimally invasive image-guided vacuum-assisted breast biopsy (VABB). A total of 691 women with non-palpable breast masses classified as BI-RADS IV or V were studied. All of them underwent minimally invasive percutaneous VABB with an 11-gauge needle. In 402 patients an ultrasound-guided procedure with a hand-held device was performed while in 289 women stereotactic biopsy was carried out using a dedicated prone table unit with digital imaging. In each case the duration of biopsy was measured in terms of the total procedure time, room time and physician time. There were no significant differences between the stereotactic and ultrasound-guided groups with regard to patient age, body mass index, menopausal status, history of parity, hormone replacement therapy, breast parenchymal pattern (according to Wolfe's classification), family history of breast cancer, mass size and number of samples. Ultrasound-guided biopsy was found to take significantly less time than prone stereotactic biopsy in every aspect of procedure duration. Mean total procedure time, room time, and physician time in minutes were 26.7 ± 8.2 versus 47.5 ± 9.4 (p < 0.01), 23.1 ± 8.5 versus 36.5 ± 9.2 (p < 0.05), and 12.3 ± 5.6 versus 18.6 ± 5.9 (p < 0.05), respectively. The authors concluded that ultrasound-guided breast biopsy is less time-consuming than the stereotactic procedure for both the patient and the physician. Because of the shorter procedure time (as well as other well-known advantages: real-time imaging, lower cost), ultrasound-guided biopsy should be considered the method of choice for sampling suspicious nonpalpable breast masses.

Radioactive seed localization (RSL) has also been advocated as a means to facilitate the operative excision of non-palpable breast
lesions, and appears to be a new option for women undergoing lumpectomies. With this procedure, a radiologist places a very low-energy radioactive seed into the abnormal tissue or tumor, guided by mammography. During the surgery, the surgeon uses a hand-held Geiger counter to more precisely identify the location of the tumor. The Geiger counter also allows the surgeon to obtain a three-dimensional (3-D) view of the tumor’s location. On the day of the lumpectomy, the patient arrives about 2 hours before the surgery to receive light sedation and a local anesthetic to numb the surgical area. After the surgeon removes the abnormal tissue or tumor along with the radioactive seed, the incision is closed and bandaged. Once the seed is removed with the breast tissue, the radioactivity is gone. The patient is able to leave the hospital later that same day.

Rao et al (2010) stated that seed localization uses a radioactive source to identify non-palpable breast lesions for excision; it is an emerging alternative to wire-localized breast biopsy (WLBB). Previous single health system studies reported decreased rates of re-excision and improved patient convenience with this technique. This study was the first to implement this procedure in a public health care delivery system composed of a primarily minority and low-income population. A multi-disciplinary team was formed to create a protocol for RSL and monitor the results. After 50 RSL were successfully completed, a retrospective matched-pair analysis with patients who had undergone WLBB during the same period was performed. Overall experience with the RSL protocol was reviewed, along with the occurrence of a seed loss. Processes necessary to re-activate the RSL protocol and prevent future losses were delineated. Radioactive seed localization is associated with decreased rates of re-excision and can be successfully implemented in a public health care system. The authors concluded that RSL is an attractive alternative to WLBB in a high-volume, county-based population. It allows increased efficiency in the operating room and has a low rate of complications. Cautionary measures must be taken to ensure proper seed chain of custody to prevent seed loss.

Jakub et al (2010) noted that WLBB remains the standard method for the surgical excision of non-palpable breast lesions. Because
of many of its shortcomings, most important a high microscopic positive margin rate, alternative approaches have been described, including RSL. These investigators highlighted the literature regarding RSL, including safety, the ease of the procedure, billing, and oncologic outcomes. Medline and PubMed were searched using the terms "radioactive seed" and "breast". All peer-reviewed studies were included in this review. The authors concluded that RSL is a promising approach for the resection of non-palpable breast lesions. It is a reliable and safe alternative to WLBB. Radioactive seed localization is at least equivalent compared with WLBB in terms of the ease of the procedure, removing the target lesion, the volume of breast tissue excised, obtaining negative margins, avoiding a second operative intervention, and allowing for simultaneous axillary staging.

McGhan et al (2011) performed a retrospective review of all consecutive RSL procedures performed at a single institution from January 2003 through October 2010. A total of 1,000 RSL breast procedures were performed in 978 patients. Indications for RSL included invasive carcinoma (52 %), in-situ carcinoma (22 %), atypical hyperplasia (11 %), and suspicious percutaneous biopsy findings (15 %). A total of 1,148 seeds were deployed using image guidance, with 76 % placed greater than or equal to 1 day before surgery. Most procedures (86 %) utilized 1 seed. A negative margin was achieved at the first operation in 97 % of patients with invasive carcinoma and 97 % of patients with ductal carcinoma in-situ (DCIS). An additional 9 % of patients with invasive carcinoma and 19 % of patients with DCIS had close (less than or equal to 2 mm) margins, and underwent re-excision. Sentinel lymph node biopsy was successfully performed in 99.8 % of cases. Adverse events included 3 seeds (0.3 %) not deployed correctly on first attempt and 30 seeds (2.6 %) displaced from the breast specimen during excision of the targeted lesion. All seeds were successfully retrieved, with no radiation safety concerns. Local recurrence rates were 0.9 % for invasive breast cancer and 3 % for DCIS after mean follow-up of 33 months. There was no evidence of a learning curve. The authors concluded that RSL is a safe, effective procedure that is easy to learn, with a low incidence of positive/close margins. They stated that RSL should be considered as the method of choice for localization of
non-palpable breast lesions. The main drawback of this study was its retrospective, non-randomized design.

Lovrics et al (2011) examined if radio-guided localization surgery (RGL) (radio-guided occult lesion localization [ROLL] and RSL) for non-palpable breast cancer lesions produces lower positive margin rates than standard WLBB surgery. These researchers performed a comprehensive literature review to identify clinical studies using either ROLL or RSL; included studies examined invasive or in-situ breast cancer, and reported pathologically assessed margin status or specimen volume/weight. Two reviewers independently assessed study eligibility and quality and abstracted relevant data on patient and surgical outcomes. Quantitative data analyses were performed. A total of 52 clinical studies on ROLL (n = 46) and RSL (n = 6) were identified; 27 met inclusion criteria: 12 studies compared RGL to WLBB and 15 studies were single cohorts using RGL. A total of 10 studies were included in the quantitative analyses. Data for margin status and re-operation rates from 4 randomized controlled trials (RCT; n = 238) and 6 cohort studies were combined giving a combined odds ratio (OR) of 0.367 and 95 % confidence interval (CI): 0.277 to 0.487 (p < 0.001) for margins status and OR 0.347, 95 % CI: 0.250 to 0.481 (p < 0.001) for re-operation rates. The authors concluded that the findings of this systematic review of RGL versus WLBB demonstrated that RGL technique produces lower positive margins rates and fewer re-operations. While this review was limited by the small size and quality of RCTs, the odds ratios suggested that RGL may be a superior technique to guide surgical resection of non-palpable breast cancers. They stated that these results should be confirmed by larger, multi-centered RCTs.

Langhans et al (2012) stated that the Danish national mammography screening program leads to identification of an increased number of small non-palpable breast tumors, suitable for breast-conserving surgery. Accurate lesion localization is therefore important. The current standard is WLBB and although effective it involves a risk of high rates of positive margin and re-operations. New methods are emerging and RSL seems promising with regards to re-operation rates and logistics. In RSL, a small titanium seed containing radioactive iodine is used to
mark the lesion.

The National Comprehensive Cancer Network (NCCN, 2012) clinical practice guideline on breast cancer does not mention the use of RSL.

Hahn and colleagues (2012) stated that the vacuum biopsy of the breast under sonographic guidance (VB) was introduced in Germany in the year 2000 and the first consensus recommendations were published by Krainick-Strobel et al in 2005. Since then, many clinical studies on this technique have been published. These investigators updated the consensus recommendations from 2005 regarding the latest literature. The consensus statements were the result of 2 preliminary meetings after the review of the latest literature by members of the Minimally Invasive Breast Intervention Study Group from the German Society of Senology. The final consensus text was review by all members of the work group. The statements listed under results obtained complete acceptance (consensus 100 %). The consensus recommendations described the indications, investigator qualifications, technical requirements, documentation, quality assurance and follow-up intervals regarding the latest literature. The authors concluded that the VB is a safe method for extracting breast tissue for histological work-up. The technique allows the resection of breast tissue up to 8 cm³. Besides the diagnostic indications, the method qualifies for a therapeutic resection of symptomatic benign lesions (e.g., fibroadenomas). The technique should be used in specialized breast centers working in a multi-disciplinary setup.

Kibil et al (2013) evaluated the value of the mammography-guided and ultrasound-guided vacuum-assisted core biopsy in the diagnosis and treatment of intra-ductal papillomas of breast and answered the question if Mammothone biopsy allows avoidance of surgery in these patients. In the period 2000 to 2011, a total of 2,246 vacuum-assisted core biopsies were performed, of which 1,495 were ultrasound-guided and 751 were mammography-guided (stereotaxic). In 76/2,246 patients (3.4 %), aged 19 to 88 years (mean age was 51.5) histopathological examination confirmed intra-ductal papilloma. Atypical lesions were
accompanying intra-ductal papilloma in 16/76 cases (21%). Open surgical biopsy performed in these group revealed invasive cancer in 3 women. In all 60 cases (79%) with benign papilloma in biopsy specimens, further clinical observation did not show recurrence or malignant transformation of lesions. The authors concluded that vacuum-assisted core biopsy is a minimally invasive and efficient method used for diagnosing intra-ductal papilloma of the breast. If histopathological examination confirms a benign character of the lesion, surgery may be avoided but regular follow-up is recommended. However in all cases, histopathologic diagnosis of papilloma with atypical hyperplasia or a suspected malignant lesion in imaging examinations, despite negative biopsy results, should always be an indication for surgical excision.

The use of tomosynthesis to guide breast procedures such as localization/biopsy is currently under investigation. Breast tomosynthesis, also called 3-D breast imaging, is a mammography system where the x-ray tube moves in an arc over the breast during the exposure. It creates a series of thin slices from which numerous projection images are obtained. Data from these projection images are then manipulated using reconstruction algorithms similar to computed tomography (CT) scans to produce thin-slice cross-sectional images through the breast. The manufacturer of the Affirm Breast Biopsy Guidance System (Hologic, Inc., Danbury, CT) states that “the biopsy option allows radiologists to locate and accurately target regions of interest for biopsy using tomosynthesis” (Hologic, 2012). However, the published peer-reviewed scientific literature has not demonstrated the accuracy and clinical utility of 3-D digital tomosynthesis. However, there is insufficient evidence to support the effectiveness and clinical utility of this approach.

Viala et al (2013) described their operating process and reported results of 118 stereotactic vacuum-assisted biopsies performed on a digital breast 3D-tomosynthesis system. Informed consent was obtained for all patients. A total of 106 patients had a lesion, 6 had 2 lesions. Sixty-one lesions were clusters of micro-calciﬁcations, 54 were masses and 3 were architectural distortions. Patients were in lateral decubitus position to allow
shortest skin-target approach (or sitting). Specific compression paddle, adapted on the system, performed, and graduated, allowing localization in X-Y. Tomosynthesis views defined the depth of lesion. Graduated Coaxial localization kit determined the beginning of the biopsy window. Biopsies were performed with an ATEC-Suros, 9-G hand-piece. All biopsies, except 1, had reached the lesions. Five hemorrhages were incurred in the process, but no interruption was needed; 8 breast hematomas all resolved spontaneously; 1 was an infection. About 40% of patients had a skin ecchymosis. Processing was fast, easy, and required lower irradiation dose than with classical stereotactic biopsies. Histology analysis reported 45 benign clusters of micro-calcifications, 16 malignant clusters of micro-calcifications, 24 benign masses, and 33 malignant masses. Of 13 malignant lesions, digital 2-D mammography failed to detect 8 lesions and under-estimated the classification of 5 lesions. Digital breast 3-D tomosynthesis depicted malignant lesions not visualized on digital 2-D mammography. The authors concluded that development of tomosynthesis biopsy unit integrated to stereotactic system will permit histology analysis for suspicious lesions.

An UpToDate review on “Breast imaging: Mammography and ultrasonography” (Venkataraman and Slanetz, 2014) states that “Breast tomosynthesis (also known as “3-D mammography”) has been approved by the US Food and Drug Administration for routine clinical use as an adjunct to standard mammography. Tomosynthesis is a modification of digital mammography and uses a moving x-ray source and digital detector. A three dimensional volume of data is acquired and reconstructed using computer algorithms to generate thin sections of images .... The examination has a slightly longer exposure time of 10 seconds per acquisition compared to standard digital mammography, which could increase the radiation dose per acquisition and increase the risk of motion artifacts. At present, tomosynthesis is approved only to be performed in conjunction with a conventional mammogram. Hence, when performed in the screening setting, the patient is exposed to approximately twice the usual radiation dose, which sometimes is greater if the patient had dense or thick breasts. This technique shows promise in screening women with dense breast tissue and with high risk for breast cancer, although
there are no prospective large studies to justify its routine use at the present time”. Furthermore, an, UpToDate review on “Breast biopsy” (Esserman and Joe, 2014) does not mention the use of tomosynthesis-guided biopsy.

McCarthy et al (2014) stated that early data on breast cancer screening utilizing digital breast tomosynthesis (DBT) combined with digital mammography (DM) have shown improvements in false-positive (FP) and false-negative (FN) screening rates compared with DM alone. However, these trials were performed at sites where conventional mammographic screening was concurrently performed, possibly leading to selection biases or with complex, multi-reader algorithms not reflecting general clinical practice. This study reported the impact on screening outcomes for DBT screening implemented in an entire clinic population. Recall rates, cancer detection, and positive predictive values (PPVs) of screening were compared for 15,571 women screened with DBT and 10,728 screened with DM alone prior to DBT implementation at a single breast imaging center. Generalized linear mixed-effects models were used to estimate the odds ratio (OR) for recall rate adjusted for age, race, presence of prior mammograms, breast density and reader. All statistical tests were 2-sided. DBT screening showed a statistically significant reduction in recalls compared to DM alone. For the entire population, there were 16 fewer recalls (8.8 % versus 10.4 %, p < 0.001, adjusted OR = 0.80, 95 % confidence interval [CI]: 0.74 to 0.88, p < 0.001) and 0.9 additional cancers detected per 1,000 screened with DBT compared to DM alone. There was a statistically significant increase in PPV1 (6.2 % versus 4.4 %, p = 0.047). In women younger than age 50 years screened with DBT, there were 17 fewer recalls (12.3 % versus 14.0 %, p = 0.02) and 3.6 additional cancer detected per 1,000 screened (5.7 versus 2.2 per 1,000, p = 0.02). The authors concluded that these data supported the clinical implementation of DBT in breast cancer screening; however, larger prospective trials are needed to validate our findings in specific patient subgroups.

In an editorial on “Breast Cancer Screening. Should Tomosynthesis Replace Digital Mammography?”, Pisano and Yaffe (2014) stated that “…. tomosynthesis is likely an advance over
digital mammography for breast cancer screening, but fundamental questions about screening remain, with all available technologies. Breast cancer remains a major public health problem, with approximately 40,000 US women dying annually. The continuing controversy surrounding the most effective strategy for deploying the various available technologies continues unabated, and clear consensus is lacking on when to screen, how often, and with what tools, or even which screen-detected cancers could be managed more conservatively. Only an appropriately powered multisite clinical trial of modern technology can answer the remaining questions definitively. The time is now for the National Institutes of Health to fund such a much-needed trial to address many of the remaining issues about breast cancer screening”.

The National Cancer Institute’s Factsheet on “Mammograms” (last reviewed 3/25/2014) states that “Three-dimensional (3D) mammography, also known as breast tomosynthesis, is a type of digital mammography in which x-ray machines are used to take pictures of thin slices of the breast from different angles and computer software is used to reconstruct an image. This process is similar to how a computed tomography (CT) scanner produces images of structures inside of the body. 3D mammography uses very low dose x-rays, but, because it is generally performed at the same time as standard two-dimensional (2D) digital mammography, the radiation dose is slightly higher than that of standard mammography. The accuracy of 3D mammography has not been compared with that of 2D mammography in randomized studies. Therefore, researchers do not know whether 3D mammography is better or worse than standard mammography at avoiding false-positive results and identifying early cancers”. [http://www.cancer.gov/cancertopics/factsheet/detection/mammograms](http://www.cancer.gov/cancertopics/factsheet/detection/mammograms).

Furthermore, the American College of Radiology (2014) encourages more studies to clarify the clinical role(s) of tomosynthesis and its long-term outcomes. [http://www.acr.org/About-Us/Media-Center/Position-Statements/Position-Statements-Folder/20141124-ACR-Statement-on-Breast](http://www.acr.org/About-Us/Media-Center/Position-Statements/Position-Statements-Folder/20141124-ACR-Statement-on-Breast).
Gilbert et al (2015) stated that digital breast tomosynthesis (DBT) is a 3D mammography technique with the potential to improve accuracy by improving differentiation between malignant and non-malignant lesions. These researchers compared the diagnostic accuracy of DBT in conjunction with 2D mammography or synthetic 2D mammography, against standard 2D mammography and determined if DBT improves the accuracy of detection of different types of lesions. Women (aged 47 to 73 years) recalled for further assessment after routine breast screening and women (aged 40 to 49 years) with moderate/high of risk of developing breast cancer attending annual mammography screening were recruited after giving written informed consent. All participants underwent a 2-view 2D mammography of both breasts and 2-view DBT imaging. Image-processing software generated a synthetic 2D mammogram from the DBT data sets. In an independent blinded retrospective study, readers reviewed (i) 2D or (ii) 2D + DBT or (iii) synthetic 2D + DBT images for each case without access to original screening mammograms or prior examinations. Sensitivities and specificities were calculated for each reading arm and by subgroup analyses. Data were available for 7,060 subjects comprising 6,020 (1,158 cancers) assessment cases and 1,040 (2 cancers) family history screening cases. Overall sensitivity was 87 % [95 % confidence interval (CI): 85 % to 89 %] for 2D only, 89 % (95 % CI: 87 % to 91 %) for 2D + DBT and 88 % (95 % CI: 86 % to 90 %) for synthetic 2D + DBT. The difference in sensitivity between 2D and 2D + DBT was of borderline significance (p = 0.07) and for synthetic 2D + DBT there was no significant difference (p = 0.6). Specificity was 58 % (95 % CI: 56 % to 60 %) for 2D, 69 % (95 % CI 67 % to 71 %) for 2D + DBT and 71 % (95 % CI: 69 % to 73 %) for synthetic 2D + DBT. Specificity was significantly higher in both DBT reading arms for all subgroups of age, density and dominant radiological feature (p < 0.001 all cases). In all reading arms, specificity tended to be lower for micro-calcifications and higher for distortion/asymmetry. Comparing 2D + DBT to 2D alone, sensitivity was significantly higher: 93 % versus 86 % (p < 0.001)
for invasive tumors of size 11 to 20 mm. Similarly, for breast
density 50% or more, sensitivities were 93% versus 86% (p =
0.03); for grade 2 invasive tumors, sensitivities were 91% versus
87% (p = 0.01); where the dominant radiological feature was a
mass, sensitivities were 92% and 89% (p = 0.04). For synthetic
2D + DBT, there was significantly (p = 0.006) higher sensitivity
than 2D alone in invasive cancers of size 11 to 20 mm, with a
sensitivity of 91%. The authors concluded that the specificity of
DBT and 2D was better than 2D alone; but there was only
marginal improvement in sensitivity. The performance of
synthetic 2D appeared to be comparable to standard 2D. If these
results were observed with screening cases, DBT and 2D
mammography could benefit to the screening program by
reducing the number of women recalled unnecessarily, especially
if a synthetic 2D mammogram were used to minimize radiation
exposure. They stated that further research is required into the
feasibility of implementing DBT in a screening setting, prognostic
modeling on outcomes and mortality, and comparison of 2D and
synthetic 2D for different lesion types.

Chamming's et al (2015) evaluated imaging performances for the
detection, characterization and biopsy of breast micro-
calcifications and made recommendations. French and English
publications were searched using PubMed, Cochrane Library and
international learned societies recommendations. Digital
mammography (DR [Direct Radiography] and CR [Computed
Radiography]) and screen-film mammography demonstrated
good performances for the detection and the characterization of
breast micro-calcifications. Systematic use of the 2013 edition of
the BI-RADS lexicon was recommended for description and
characterization of micro-calcifications. Faced with BI-RADS 4 or
5 micro-calcifications, breast ultrasound is recommended but a
normal result does not eliminate the diagnosis of cancer and
other examination should be performed. The authors stated that
literature review does not allow recommending digital breast
tomosynthesis, elastography or MRI to analyze micro-
calcifications. In case of probably benign micro-calcifications (BI-
RADS 3), 6 months, 1 year and at least 2 years follow-up are
recommended. In case a biopsy is indicated, it is recommended
to use a vacuum-assisted macrobiopsy system with 11-G needles
or bigger. If no calcification is visible on the radiography of the specimen, it is recommended to obtain additional samples.

Morra et al (2015) evaluated a commercial tomosynthesis computer-aided detection (CAD) system in an independent, multi-center dataset. Diagnostic and screening tomosynthesis mammographic examinations (n = 175; cranial caudal and medio-lateral oblique) were randomly selected from a previous institutional review board-approved trial. All subjects gave informed consent. Examinations were performed in 3 centers and included 123 patients, with 132 biopsy-proven screening-detected cancers, and 52 examinations with negative results at 1-year follow-up. A total of 111 lesions were masses and/or micro-calcifications (72 masses, 22 micro-calcifications, 17 masses with micro-calcifications) and 21 were architectural distortions. Lesions were annotated by radiologists who were aware of all available reports; CAD performance was assessed as per-lesion sensitivity and false-positive results per volume in patients with negative results. Use of the CAD system showed per-lesion sensitivity of 89 % (99 of 111; 95 % CI: 81 % to 94 %), with 2.7 ± 1.8 false-positive rate per view, 62 of 72 lesions detected were masses, 20 of 22 were micro-calcification clusters, and 17 of 17 were masses with micro-calcifications. Overall, 37 of 39 micro-calcification clusters (95 % sensitivity, 95 % CI: 81 % to 99 %) and 79 of 89 masses (89 % sensitivity, 95 % CI: 80 % to 94 %) were detected with the CAD system. On average, 0.5 false-positive rate per view were micro-calcification clusters, 2.1 were masses, and 1.1 were masses and micro-calcifications. The authors concluded that a digital breast tomosynthesis CAD system can allow detection of a large percentage (89 %, 99 of 111) of breast cancers manifesting as masses and micro-calcification clusters, with an acceptable false-positive rate (2.7 per breast view). Moreover, they stated that further studies with larger datasets acquired with equipment from multiple vendors are needed to replicate these findings and to study the interaction of radiologists and CAD systems.

Garcia-Leon et al (2015) compared the diagnostic validity of tomosynthesis and digital mammography for screening and diagnosing breast cancer. These investigators systematically
searched Medline, Embase, and Web of Science for the terms breast cancer, screening, tomosynthesis, mammography, sensitivity, and specificity in publications in the period comprising June 2010 through February 2013. They included studies on diagnostic tests and systematic reviews. Two reviewers selected and evaluated the articles. They used QUADAS 2 to evaluate the risk of bias and the NICE criteria to determine the level of evidence. They compiled a narrative synthesis. Of the 151 original studies identified, these researchers selected 11 that included a total of 2,475 women. The overall quality was low, with a risk of bias and follow-up and limitations regarding the applicability of the results. The level of evidence was not greater than level II. The sensitivity of tomosynthesis ranged from 69 % to 100 % and the specificity ranged from 54 % to 100 %. The negative likelihood ratio was good, and this makes tomosynthesis useful as a test to confirm a diagnosis; 1-view tomosynthesis was no better than 2-view digital mammography, and the evidence for the superiority of 2-view tomosynthesis was inconclusive. The authors concluded that the results for the diagnostic validity of tomosynthesis in the diagnosis of breast cancer were inconclusive and there were no results for its use in screening.

Melnikow et al (2016) performed a systematic review on “Supplemental screening for breast cancer in women with dense breasts” for the U.S. Preventive Services Task Force. Data sources included Medline, PubMed, Embase, and Cochrane database from January 2000 to July 2015. Studies reporting BI-RADS density reproducibility or supplemental screening results for women with dense breasts were selected for analysis. Quality assessment and abstraction of 24 studies from 7 countries were carried out; 6 studies were good-quality. Three good-quality studies reported reproducibility of BI-RADS density; 13 % to 19 % of women were re-categorized between "dense" and "non-dense" at subsequent screening. Two good-quality studies reported that sensitivity of ultrasonography for women with negative mammography results ranged from 80 % to 83 %; specificity, from 86 % to 94 %; and positive predictive value (PPV), from 3 % to 8 %. The sensitivity of MRI ranged from 75 % to 100 %; specificity, from 78 % to 94 %; and PPV, from 3 % to 33 % (3 studies). Rates of additional cancer detection with
Ultrasonography were 4.4 per 1,000 examinations (89% to 93% invasive); recall rates were 14%. Use of MRI detected 3.5 to 28.6 additional cancer cases per 1,000 examinations (34% to 86% invasive); recall rates were 12% to 24%. Rates of cancer detection with breast tomosynthesis increased by 1.4 to 2.5 per 1,000 examinations compared with mammography alone (3 studies). Recall rates ranged from 7% to 11%, compared with 7% to 17% with mammography alone. No studies examined breast cancer outcomes. The authors concluded that density ratings may be re-categorized on serial screening mammography. Supplemental screening of women with dense breasts found additional breast cancer but increased false-positive results. They stated that use of breast tomosynthesis may reduce recall rates. However, effects of supplemental screening on breast cancer outcomes remain unclear.

An UpToDate review on “Breast imaging: Mammography and ultrasonography” (Venkatarama and Slanetz, 2016) lists tomosynthesis as one of the newer mammography techniques. It states that “Tomosynthesis shows promise in screening women with dense breast tissue and high risk for breast cancer, although there are no prospective large studies with patient outcomes to justify its routine use at the present time”.

The National Comprehensive Cancer Network’s clinical practice guideline on “Breast cancer” (Version 1.2016) does not mention the use of tomosynthesis/3D mammography as a management tool.

Furthermore, on behalf of the U.S. Preventive Services Task Force, Siu (2016) concluded that (i) the current evidence is insufficient to assess the benefits and harms of digital breast tomosynthesis (DBT) as a primary screening method for breast cancer, and (ii) 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 (MRI), DBT, or other methods in women identified to have dense breasts on an otherwise negative screening mammogram.

Diego and associates (2016) stated that neoadjuvant
chemotherapy (NAC) downstages axillary disease in 55% of node-
positive (N1) breast cancer. The feasibility and accuracy of
sentinel lymph node biopsy (SLNB) after NAC for percutaneous
biopsy-proven N1 patients who are clinically node negative (cN0)
by physical examination after NAC is under investigation.
ACOSOG Z1071 reported a false-negative rate of less than 10% if
greater than or equal to 3 nodes are removed with dual tracer,
including excision of the biopsy-proven positive lymph node
(BxLN). These investigators reported their experience using RSL
to retrieve the BxLN with SLNB (RSL/SLNB) for cN0 patients after
NAC. They performed a retrospective review of a single-
institution, prospectively maintained registry for the years 2013
to 2014. Patients with BxLN who received NAC and had RSL/SLNB
were identified. All BxLNs were marked with a radiopaque clip
before NAC to facilitate RSL. A total of 30 patients with BxLN
before NAC were cN0 after NAC and underwent RSL/SLNB.
Median age was 55 years. Disease stage was IIA-IIIB; 29 of 30
had ductal cancer (12 triple negative and 16 HER-2 positive); 1 to
11 nodes were retrieved; 29 of 30 BxLN were successfully
localized with RSL. Note was made of the BxLN-containing
isotope and/or dye in 22 of 30; 19 patients had no residual
axillary disease; 11 had persistent disease. All who remained
node-positive had disease in the BxLN. The authors concluded
that RSL/SLNB is a promising approach for axillary staging after
NAC in patients whose disease becomes cN0. The status of the
BxLN after NAC predicted nodal status, suggesting that
localization of the BxLN may be more accurate than SLNB alone
for staging the axilla in the cN0 patient after NAC.

Gray and colleagues (2017) performed a systematic review of the
medical literature from 1995 to July 2016, with 434 abstracts
identified and evaluated. The analysis included 106 papers
focused on intra-operative management of breast cancer margins
and contained actionable data. Ultrasound-guided lumpectomy
for palpable tumors, as an alternative to palpation guidance, can
lower positive margin rates, but the effect when used as an
alternative to wire localization (WL) for non-palpable tumors is
less certain. Localization techniques such as RSL and radio-guided
occult lesion localization were found potentially to lower positive
margin rates as alternatives to WL depending on baseline positive
margin rates.

**The SAVI SCOUT Surgical Guidance System:**

The SAVI SCOUT surgical system is used to provide real-time guidance during localized excisional biopsy or lumpectomy to assist surgeons in the localization and retrieval of a non-palpable abnormality as localized by radiographic or ultrasound methods.

Cox et al (2016) stated that the current technique for locating non-palpable breast lesions is WL. Radioactive seed localization and intra-operative ultrasound were developed to improve difficulties with WL. The SAVI SCOUT surgical guidance system was developed to improve these methods. The SCOUT system is a non-radioactive, FDA-cleared medical device that uses electromagnetic wave technology to provide real-time guidance during excisional breast procedures. In this pilot study, consenting patients underwent localization and excision using an implantable electromagnetic wave reflective device (reflector) and a detector hand-piece with a console. Using image guidance, the reflector was placed up to 7 days before the surgical procedure. The primary end-points of the study were successful reflector placement, localization, and retrieval. The secondary end-points were percentage of clear margins, re-excision rates, days of placement before excision, and physician comparison with WL. This study analyzed 50 patients. The reflectors were placed under mammographic guidance (n = 18, 36 %) or ultrasound guidance (n = 32, 64 %). Of the 50 patients, 10 (20 %) underwent excisional biopsy and 40 (80 %) had a lumpectomy. The lesion and reflector were successfully removed in all 50 patients, and no adverse events occurred. Of the 41 patients who had in-situ and/or invasive carcinoma identified, 38 (93 %) had clear margins and 3 (7 %) were recommended for re-excision. The authors concluded that these data suggested that the SCOUT system is safe and effective for guiding the excision of non-palpable breast lesions and a viable alternative to standard localization options. They stated that a larger prospective, multi-institution trial of SCOUT is currently underway to validate these findings.

In a feasibility study, Mango et al (2016) evaluated the feasibility
of the SAVI SCOUT surgical guidance system, which uses a non-radioactive infrared-activated electromagnetic wave reflector, to localize and excise non-palpable breast lesions. These researchers evaluated the system’s use in 15 non-palpable breast lesions in 13 patients. The authors concluded that image-guided placement was successful for 15 of 15 (100%) reflectors. The final pathologic analysis found that lesion excision was successful, including 5 malignancies with negative margins. No patients required re-excision or experienced complications. They stated that the SAVI SCOUT is a feasible method for breast lesion localization and excision.

Furthermore, an ongoing study is examining the ability of the SAVI SCOUT system to guide surgeons to find a lesion instead of the standard technique of WL. [https://clinicaltrials.gov/ct2/show/NCT02370082](https://clinicaltrials.gov/ct2/show/NCT02370082)

**CPT Codes / HCPCS Codes / ICD-10 Codes**

*Information in the [brackets] below has been added for clarification purposes. Codes requiring a 7th character are represented by "+":*

*ICD-10 codes will become effective as of October 1, 2015:*

**CPT codes covered if selection criteria are met:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>19081</td>
<td>Biopsy, breast, with placement of breast localization device(s) (eg, clip, metallic pellet), when performed, and imaging of the biopsy specimen, when performed, percutaneous; first lesion, including stereotactic guidance</td>
</tr>
<tr>
<td>19082</td>
<td>each additional lesion, including stereotactic guidance (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>19083</td>
<td>Biopsy, breast, with placement of breast localization device(s) (eg, clip, metallic pellet), when performed, and imaging of the biopsy specimen, when performed, percutaneous; first lesion, including ultrasound guidance</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>19084</td>
<td>each additional lesion, including ultrasound guidance (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>19085</td>
<td>Biopsy, breast, with placement of breast localization device(s) (eg, clip, metallic pellet), when performed, and imaging of the biopsy specimen, when performed, percutaneous; first lesion, including magnetic resonance guidance</td>
</tr>
<tr>
<td>19086</td>
<td>each additional lesion, including magnetic resonance guidance (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>19281</td>
<td>Placement of breast localization device(s) (eg, clip, metallic pellet, wire/needle, radioactive seeds), percutaneous; first lesion, including mammographic guidance</td>
</tr>
<tr>
<td>19282</td>
<td>each additional lesion, including mammographic guidance (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>19283</td>
<td>Placement of breast localization device(s) (eg, clip, metallic pellet, wire/needle, radioactive seeds), percutaneous; first lesion, including stereotactic guidance</td>
</tr>
<tr>
<td>19284</td>
<td>each additional lesion, including stereotactic guidance (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>19285</td>
<td>Placement of breast localization device(s) (eg, clip, metallic pellet, wire/needle, radioactive seeds), percutaneous; first lesion, including ultrasound guidance</td>
</tr>
<tr>
<td>19286</td>
<td>each additional lesion, including ultrasound guidance (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>19287</td>
<td>Placement of breast localization device(s) (eg clip, metallic pellet, wire/needle, radioactive seeds), percutaneous; first lesion, including magnetic resonance guidance</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>19288</td>
<td>each additional lesion, including magnetic resonance guidance (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>76942</td>
<td>Ultrasonic guidance for needle placement (e.g., biopsy, aspiration, injection, localization device), imaging supervision and interpretation</td>
</tr>
</tbody>
</table>

**CPT codes not covered for indications listed in the CPB:**

**Radioactive seed localization, Tomosynthesis-guided localization/biopsy:**

No specific codes

- 77061 - 77063 Digital breast tomosynthesis

**Other CPT codes related to the CPB:**

- 10021 Fine needle aspiration; without imaging guidance
- 10022 with imaging guidance
- 19100 Biopsy of breast; percutaneous, needle core, not using imaging guidance
- 19101 open, incisional
- 19296 Placement of radiotherapy afterloading expandable catheter (single or multichannel) into the breast for interstitial radionuclide application following partial mastectomy, includes imaging guidance; on date separate from partial mastectomy
- +19297 Placement of radiotherapy afterloading expandable catheter (single or multichannel) into the breast for interstitial radionuclide application following partial mastectomy, includes imaging guidance; concurrent with partial mastectomy (List separately in addition to code for primary procedure)
- 19298 Placement of radiotherapy afterloading brachytherapy catheters (multiple tube and button type) into the breast for interstitial radionuclide application following (at the time of or subsequent to) partial mastectomy, includes imaging guidance
- 76098 Radiological examination, surgical specimen
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>77002</td>
<td>Fluoroscopic guidance for needle placement (e.g., biopsy, aspiration, injection, localization device)</td>
</tr>
<tr>
<td>77011</td>
<td>Computed tomography guidance for stereotactic localization</td>
</tr>
<tr>
<td>77012</td>
<td>Computed tomography guidance for needle placement (e.g., biopsy, aspiration, injection, localization device), radiological supervision and interpretation</td>
</tr>
<tr>
<td>77021</td>
<td>Magnetic resonance guidance for needle placement (e.g., for biopsy, needle aspiration, injection, or placement of localization device), radiological supervision and interpretation</td>
</tr>
<tr>
<td>+ 77051 - 77059</td>
<td>Breast mammography</td>
</tr>
</tbody>
</table>

**HCPCS codes not covered for indications listed in the CPB:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G0279</td>
<td>Diagnostic digital breast tomosynthesis, unilateral or bilateral (List separately in addition to G0204 or G0206)</td>
</tr>
</tbody>
</table>

**ICD-10 codes covered if selection criteria are met:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C50.011 - C50.929</td>
<td>Malignant neoplasm of breast</td>
</tr>
<tr>
<td>C79.2</td>
<td>Secondary malignant neoplasm of skin [of breast]</td>
</tr>
<tr>
<td>C79.81</td>
<td>Secondary malignant neoplasm of breast</td>
</tr>
<tr>
<td>D05.00 - D05.92</td>
<td>Carcinoma in situ of breast</td>
</tr>
<tr>
<td>D24.1 - D24.9</td>
<td>Benign neoplasm of breast</td>
</tr>
<tr>
<td>D48.60 - D48.62</td>
<td>Neoplasm of uncertain behavior of breast</td>
</tr>
<tr>
<td>N60.01 - N60.99</td>
<td>Benign mammary dysplasias</td>
</tr>
<tr>
<td>N63</td>
<td>Unspecified lump in breast [breast nodules]</td>
</tr>
<tr>
<td>R92.0 - R92.8</td>
<td>Abnormal and inconclusive findings on diagnostic imaging of breast</td>
</tr>
</tbody>
</table>
The above policy is based on the following references:


30. Hanna WC, Demyttenaere SV, Ferri LE, Fleiszer DM. The use


33. Deck W. Vacuum assisted breast biopsy. AETMIS 06-06 RE. Montreal, QC: Agence d'Evaluation des Technologies et des Modes d'Intervention en Sante (AETMIS); 2006.


50. Venkataraman S, Slanetz PJ. Breast imaging: Mammography and ultrasonography. UpToDate [online serial]. Waltham, MA: UpToDate; reviewed February 2014.

51. Esserman LJ, Joe BN. Breast biopsy. UpToDate [online serial]. Waltham, MA: UpToDate; reviewed February 2014.


AETNA BETTER HEALTH® OF PENNSYLVANIA

Amendment to
Aetna Clinical Policy Bulletin Number: CPB 0269 - Breast Biopsy Procedures

There are no amendments for Medicaid.