Epithelial Cell Cytology in Breast Cancer Risk Assessment

Policy Number: AHS – G2059 – Epithelial Cell Cytology in Breast Cancer Risk Assessment	Effective Date: 11/01/2026

POLICY DESCRIPTION | INDICATIONS AND/OR LIMITATIONS OF COVERAGE | TABLE OF TERMINOLOGY | SCIENTIFIC BACKGROUND | GUIDELINES AND RECOMMENDATIONS | APPLICABLE STATE AND FEDERAL REGULATIONS | APPLICABLE CPT/HCPCS PROCEDURE CODES | EVIDENCE-BASED SCIENTIFIC REFERENCES | REVISION HISTORY

I. Policy Description

Nipple aspiration and/or ductal lavage are non-invasive techniques to obtain epithelial cells for cytological examination to aid in the evaluation of nipple discharge for breast cancer risk.[1] Fine-needle aspiration (FNA) is another approach that can be used in the initial diagnosis of a suspicious breast mass, although core biopsy is superior in sensitivity, specificity, and correct histological grading.[2]

II. Indications and/or Limitations of Coverage

Application of coverage criteria is dependent upon an individual's benefit coverage at the time of the request.

The following does not meet coverage criteria due to a lack of available published scientific literature confirming that the test(s) is/are required and beneficial for the diagnosis and treatment of an individual's illness.

1) Cytologic analysis of epithelial cells (e.g., nipple aspiration, fine-needle aspiration [FNA]) to diagnose, to screen for, or to assess risk of developing breast cancer **DOES NOT MEET COVERAGE CRITERIA**.

III. Table of Terminology

Term	Definition
ACR	American College of Radiology
ASBS	American Society of Breast Surgeons
CMS	Centers for Medicare and Medicaid Services
CSC	Conventional Smear Cytology
DHEA	Dehydroepiandrosterone
FDA	Food and Drug Administration
FNA	Fine-Needle Aspiration
LBC	Liquid Based Cytology
LDT	Laboratory Developed Tests
NAF	Nipple Aspirate Fluid
NCCN	National Comprehensive Cancer Network
NCI	National Cancer Institute
PED	Proliferative Epithelial Disease

IV. Scientific Background

Breast cancer is the most frequently diagnosed cancer and is a leading cause of cancer death in the United States. Nipple discharge is a common breast complaint. Most nipple discharge is of benign origin; however, it is necessary to differentiate patients with benign nipple discharge from those who have an underlying pathology. In approximately five to 20 percent of pathologic nipple discharge cases, cancer is identified.[1]

Breast cancer originates in breast epithelium and is associated with progressive molecular and morphologic changes. Individuals with atypical breast ductal epithelial cells have an increased relative risk of breast cancer. Cytological evaluation of epithelial cells in nipple discharge has been used as a diagnostic aid. Due to the scant cellularity of specimens by expression or aspiration of nipple discharge, ductal lavage was developed to enhance the ease and efficiency of collecting breast epithelial cells for cytologic analysis. The analysis of breast-specific liquid biopsies, such as nipple aspirate fluid, has potential to be used as a biomarker profiling technique for monitoring breast health.[3] Researchers report that the measurement of nipple aspirate fluid, including miRNA, pathological nipple discharge, and breast ductal fluids, may help to improve early detection and management of breast cancer.[4]

Fine-needle aspiration (FNA) is a biopsy option for a suspicious palpable breast mass. FNA is a rapid diagnosis technique, but it is not as accurate as core needle biopsy. FNA cannot differentiate in situ and invasive cancer and has higher rates of negative results and insufficient samples than core needle biopsy. The success of FNA results also varies with the operator and cytopathologist.[5]

Analytic Validity

In a retrospective study of 618 patients with nipple discharge over a 14-year period, the sensitivity and specificity of cytology were 17 and 66 percent, respectively; the authors concluded that "nipple discharge cytology has little complementary diagnostic value."[6]

Clinical Utility and Validity

Hornberger, et al. (2015) performed a meta-analysis on the use of nipple aspirate fluid (NAF) in identifying breast cancer based on proliferative epithelial disease (PED). The authors reviewed 16 articles, 20808 unique aspirations, and 17378 subjects. Among cancer-free patients, 51.5% aspirations contained fluid, of which 27.7% showed a PED on cytology. Of the two prospective studies of 7850 women, patients with abnormal cytology showed a 2.1-fold higher risk of developing breast cancer compared to those without fluid.[7]

Chatterton, et al. (2016) measured sex steroid levels in NAF; hormones were measured in samples from 160 breast cancer cases and 157 controls. Results showed a significantly higher concentration of dehydroepiandrosterone (DHEA) in the NAF of patients with breast cancer compared to controls; further, DHEA levels were highly correlated with estradiol levels, indicating "a potentially important role of this steroid in breast cancer risk."[8]

Kamalı and Kamalı (2022) studied the usefulness of testing methods in surgical decision making. The study included 141 patients with pathological nipple discharge who were planning to undergo surgery. The diagnostic efficiency of ductal lavage cytology was compared to that of ultrasonography, mammography, magnetic resonance imaging, and ductography. The sensitivity of ductal lavage cytology

was 70.5% and the specificity was 94.1%. The authors conclude that "negative cytology does not exclude the possibility of malignancy, and positive results do not help in the differential diagnosis."[9]

Zhu, et al. (2025) released a study on using direct analysis of nipple discharge using liquid based cytology (LBC) and by passing the conventional smear cytology (CSC). "LBC has better diagnostic sensitivity than CSC (40.00% vs. 22.22%, $\chi 2 = 6.636$, $P = 0.01$). The specificity was improved (LBC 100% vs. CSC 95.2%)."When looking at the diagnostic validity "LBC had higher sensitivity than CSC for breast tumors (52.78% vs. 30.56% for breast cancer; and 31.48% vs. 16.67% for intraductal papilloma)."[10] The study concluded that LBC may overcome the contamination and low-cellularity limitations associated with smear cytology and improve the diagnostic yield in patients presenting with nipple discharge.

V. Guidelines and Recommendations

American Society of Breast Surgeons (ASBS)

The Official Statement by the ASBS regarding Screening Mammography does not mention ductal lavage at all in their statement.[11]

In 2016, the ASBS published a consensus guideline on the concordance assessment of image-guided breast biopsies and the management of borderline or high-risk lesions. These guideline state that "the decision to excise a papillary lesion without atypia needs to be individualized based on risk, including such criteria as size; symptomatology, including palpability and presence of nipple discharge; and breast cancer risk factors."[12] This is the only mention of nipple discharge in the document.

National Comprehensive Cancer Network (NCCN)

National Comprehensive Cancer Network Clinical Practice Guidelines in breast cancer screening and diagnosis state that "thermography and ductal lavage are not recommended by the NCCN Panel for breast cancer screening or diagnosis" and the panel "only recommends use of FNA for symptomatic relief of a cyst or possible abscess", as core needle biopsy has increased accuracy over FNA for diagnosing cancer.[13] The NCCN also notes that "the FDA has issued a safety alert stating that ductal lavage should not be a replacement for mammograms."[13]

Food and Drug Administration (FDA)

In 2017 the FDA issued a safety warning stating that "…the FDA is unaware of any valid scientific data to show that a nipple aspirate test, when used on its own, is an effective screening tool for any medical condition, including the detection of breast cancer or other breast disease."[14] This was further affirmed with a safety warning published in 2023: "thermograms and nipple aspirate tests are not substitutes for mammograms."[15]

American College of Radiology (ACR)

The 2022 ACR appropriateness criteria for the evaluation of nipple discharge do not mention cytology. The ACR states that "image-guided FNA and core biopsy are not required for the evaluation of physiologic nipple discharge." The ACR also notes "although some institutions demonstrate good results using FNA, larger series have shown that core biopsy is superior to FNA in terms of sensitivity, specificity, and correct histologic grading of a lesion."[16]

National Cancer Institute (NCI)

The NCI notes that FNA, nipple aspirate, and ductal lavage are proposed as screening techniques for breast cancer "but none have demonstrated an association with reduced mortality."[17] These methods are not recommended as routine screening tools and are not included in NCI's endorsed clinical practices.

VI. Applicable State and Federal Regulations

Food and Drug Administration (FDA)

Many labs have developed specific tests that they must validate and perform in house. These laboratory-developed tests (LDTs) are regulated by the Centers for Medicare and Medicaid (CMS) as high-complexity tests under the Clinical Laboratory Improvement Amendments of 1988 (CLIA '88). LDTs are not approved or cleared by the U. S. Food and Drug Administration; however, FDA clearance or approval is not currently required for clinical use.

VII. Applicable CPT/HCPCS Procedure Codes

Procedure codes appearing in medical policy documents are only included as a general reference. This list may not be all inclusive and is subject to updates. In addition, codes listed are not a guarantee of payment.

CPT	Code Description
88108	Cytopathology, concentration technique, smears and interpretation (eg, Saccomanno technique)
88112	Cytopathology, selective cellular enhancement technique with interpretation (eg, liquid based slide preparation method), except cervical or vaginal
88172	Cytopathology, evaluation of fine needle aspirate; immediate cytohistologic study to determine adequacy for diagnosis, first evaluation episode, each site
88173	Cytopathology, evaluation of fine needle aspirate; interpretation and report
88177	Cytopathology, evaluation of fine needle aspirate; immediate cytohistologic study to determine adequacy for diagnosis, each separate additional evaluation episode, same site (List separately in addition to code for primary procedure)

Current Procedural Terminology© American Medical Association. All Rights reserved.

VIII. Evidence-based Scientific References

1. Golshan M. Nipple discharge. Updated February 3, 2026. https://www.uptodate.com/contents/nipple-discharge
2. Moy L, Heller SL, Bailey L, et al. ACR Appropriateness Criteria(®) Palpable Breast Masses. *J Am Coll Radiol*. May 2017;14(5s):S203-s224. doi:10.1016/j.jacr.2017.02.033
3. Shaheed SU, Tait C, Kyriacou K, Linforth R, Salhab M, Sutton C. Evaluation of nipple aspirate fluid as a diagnostic tool for early detection of breast cancer. *Clin Proteomics*. 2018;15:3. doi:10.1186/s12014-017-9179-4
4. Moelans CB, Patuleia SIS, van Gils CH, van der Wall E, van Diest PJ. Application of Nipple Aspirate Fluid miRNA Profiles for Early Breast Cancer Detection and Management. *Int J Mol Sci*. Nov 19 2019;20(22)doi:10.3390/ijms20225814
5. Joe BN, Esserman LJ. Breast biopsy. Updated October 27, 2025. https://www.uptodate.com/contents/breast-biopsy

6. Kooistra BW, Wauters C, van de Ven S, Strobbe L. The diagnostic value of nipple discharge cytology in 618 consecutive patients. *European journal of surgical oncology : the journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology*. Jun 2009;35(6):573-7. doi:10.1016/j.ejso.2008.09.009
7. Hornberger J, Chen SC, Li Q, Kakad P, Quay SC. Proliferative epithelial disease identified in nipple aspirate fluid and risk of developing breast cancer: a systematic review. *Current medical research and opinion*. Feb 2015;31(2):253-62. doi:10.1185/03007995.2014.988209
8. Chatterton RT, Heinz RE, Fought AJ, et al. Nipple Aspirate Fluid Hormone Concentrations and Breast Cancer Risk. *Horm Cancer*. Apr 2016;7(2):127-36. doi:10.1007/s12672-016-0252-7
9. Kamalı GH, Kamalı S. The Role of Ductal Lavage Cytology in the Diagnosis of Breast Cancer. *Archives of Iranian Medicine (AIM)*. 2022;25(11)doi:10.34172/aim.2022.118
10. Zhu J, Cong H, Zhang X, et al. New method for cytological evaluation using direct nipple discharge without aspiration. *Scientific Reports*. 2025/02/04 2025;15(1):4175. doi:10.1038/s41598-025-88456-9
11. ASBS. Screening Mammography. 2019. https://www.breastsurgeons.org/docs/statements/Position-Statement-on-Screening-Mammography.pdf
12. ASBS. Consensus Guideline on Concordance Assessment of Image-Guided Breast Biopsies and Management of Borderline or High-Risk Lesions. https://www.breastsurgeons.org/docs/statements/Consensus-Guideline-on-Concordance-Assessment-of-Image-Guided-Breast-Biopsies.pdf
13. NCCN. NCCN Clinical Practice Guidelines in Oncology; Breast Cancer Screening and Diagnosis V1.2026. National Comprehensive Cancer Network. Updated March 5, 2026. https://www.nccn.org/professionals/physician_gls/pdf/breast-screening.pdf
14. Williams A, Omnigraphics Inc. *Breast Cancer Sourcebook*. Sixth edition. ed. Omnigraphics,; 2019:1 online resource. https://www.amazon.com/Breast-Cancer-Sourcebook-Health-Reference/dp/0780816870
15. FDA. Mammography: What You Need to Know. Updated October 26, 2023. https://www.fda.gov/consumers/consumer-updates/mammography-what-you-need-know
16. Sanford MF, Slanetz PJ, Lewin AA, et al. ACR Appropriateness Criteria® Evaluation of Nipple Discharge: 2022 Update. *J Am Coll Radiol*. Nov 2022;19(11s):S304-s318. doi:10.1016/j.jacr.2022.09.020
17. NCI. Breast Cancer Screening (PDQ®)–Health Professional Version. Updated April 10, 2025. https://www.cancer.gov/types/breast/hp/breast-screening-pdq

IX. Revision History

Revision Date	Summary of Changes
01/01/2022	Initial Effective Date
05/20/2022	Updated background, guidelines, and evidence-based scientific references. Literature review did not necessitate any modifications to the coverage criteria. Added CPT code-88108, Removal of 88172 and 88173. Removed policy M2126 from related polices as it is not adopted policy.
04/04/2023	Policy reviewed at least 3 times in detail over the past 12 months as part of Avalon's new client policy reconciliation process. In addition, the professional society guidelines have been reviewed and, to our knowledge, there have been no new updates or guidance. Please share with Avalon any new literature that may change coverage criteria. Committee approved 04/04/2023

12/07/2023	Reviewed and Updated: Updated the background, guidelines and recommendations, and evidence-based scientific references. Literature review necessitated the following changes to coverage criteria: CC1 updated to reflect that all cytological analysis for breast cancer diagnosis DNMCC, as biopsy should be used to diagnose. CC now reads: "1) Cytologic analysis of epithelial cells to assess breast cancer risk and manage patients at high risk of breast cancer DOES NOT MEET COVERAGE CRITERIA." Added CPT code 88172, 88173, 88177 Committee approved: 12/07/2023
10/21/2024	Reviewed and Updated: Updated the background, guidelines and recommendations, and evidence-based scientific references. Literature review did not necessitate any modifications to coverage criteria. Committee approved: 10/21/2024
02/11/2026	CAB Review Q4 2025: Reviewed and Updated: Updated the background, guidelines and recommendations, and evidence-based scientific references. Literature review did not necessitate any modifications to coverage criteria. Committee Approved: 02/11/2026
06/17/2026	CAB Review Q2 2026: Reviewed and Updated: Updated the background, guidelines and recommendations, and evidence-based scientific references. Literature review necessitated the following changes to coverage criteria: Edits made to CC1 for clarity on the situations where epithelial cell cytology is not supported, CC1 now reads: "1) Cytologic analysis of epithelial cells (e.g., nipple aspiration, fine-needle aspiration [FNA]) to diagnose, to screen for, or to assess risk of developing breast cancer DOES NOT MEET COVERAGE CRITERIA." Committee Approved: 06/17/2026