

SNMMI AUC Factsheet for Lymphoscintigraphy in Sentinel Node Mapping and Lymphedema/Lipedema



AUC INTRODUCTION

Nuclear medicine imaging studies are essential for the diagnosis and management of many diseases. The ready availability of medical imaging studies in conjunction with concerns about missed diagnoses has, at times, resulted in inappropriate use and overuse of all medical imaging technology, including nuclear imaging. The overuse may have resulted in an unnecessary financial burden on the healthcare system and in some cases unnecessary exposure to ionizing radiation. Overuse and inconsistent use of imaging procedures has prompted a push for multi-stakeholder consensus documents outlining the most appropriate and cost-effective use of advanced medical imaging studies.

It is hoped that this document, developed by medical experts knowledgeable in the appropriate use of radiopharmaceuticals for lymphoscintigraphy in sentinel lymph node (SLN) mapping and lymphedema, will improve healthcare outcomes for the intended patient population while helping to decrease unnecessary imaging costs. This document is presented to assist healthcare practitioners considering nuclear medicine lymphatic imaging techniques; however, each patient is unique, as is each clinical presentation, and therefore this document cannot replace clinical judgment.

CLINICAL SCENARIOS FOR BREAST CANCER

Patients with breast cancer should be assigned a clinical or, when appropriate, pathological stage, as this informs both treatment options and prognosis. Accurate nodal assessment is essential to breast cancer staging and prognostication.

In theory, the SLN represents the first lymph node with direct lymphatic drainage from the primary tumor. Multiple randomized trials have shown that SLN biopsy (SLNB) staging for breast cancer can safely be performed in place of axillary lymph node dissection (ALND) staging for women with small tumors of <2 cm and no clinical evidence of metastatic disease. SLNB is less likely to cause lymphedema and other morbidities than ALND.

Further, studies have shown that:

- ALND may not be necessary if the SLNB showed microscopic disease in only 1 or 2 positive axillary lymph nodes;
- SLNB can also be used in patients with known axillary lymph node metastases who complete neoadjuvant chemotherapy with good clinical response; and
- axillary radiation has decreased morbidity and is an acceptable alternative to ALND for patients with low tumor burden in positive SLNs.

Clinical Scenarios for Breast Cancer

Scenario #	Description	Appropriateness	Score
1	Invasive breast cancer of any histological type without evidence of axillary or distant metastases and without evidence of skin or chest wall invasion	Appropriate	9
2	Invasive breast cancer of any histological type with pathological evidence of axillary metastases and no evidence of skin or local chest wall invasion or distant metastases	May be Appropriate	5
3	Invasive breast cancer of any histological type with evidence of distant metastases	May be Appropriate	5
4	Ductal carcinoma in situ (DCIS) without suspicious features and DCIS or pleomorphic lobular carcinoma in situ (LCIS) without planned mastectomy or other surgery affecting lymphatic drainage	Rarely Appropriate	2
5	DCIS with suspicious features and DCIS or pleomorphic LCIS with planned mastectomy or other surgery affecting lymphatic drainage	Appropriate	8
6	Planned reduction mammoplasty or risk-reducing mastectomy in patients without a known breast cancer diagnosis	Rarely Appropriate	1
7	In-breast recurrence or de novo ipsilateral breast cancer without evidence of axillary or distant metastases and without evidence of skin or chest wall invasion	Appropriate	9
8	Inflammatory breast cancer or breast cancer with evidence of skin or local chest wall invasion	Rarely Appropriate	1
9	Phyllodes tumor	Rarely Appropriate	1
10	Paget's disease of the breast, cancer not identified prior to surgery	May be Appropriate	6

CLINICAL SCENARIOS FOR SKIN CANCER

Many tumors arising in the skin have a propensity for lymphatic metastasis. For lesions such as melanoma and Merkel cell carcinoma (MCC), SLNB has become the accepted standard of care for initial staging in the absence of clinically evident metastatic disease. SLNB is more controversial in non-melanoma primary tumors such

as squamous cell carcinoma (SCC) and malignant cutaneous adnexal tumors (MCATs) such as eccrine carcinoma. For genital primary SCC arising in the vulva or penis, SLNB is now common practice.

Several factors should be considered when determining which agents and equipment to use for SLN detection. For further discussion, please refer to the full published AUC (accessible using the QR code on page 1).

Clinical Scenarios for Skin Cancer

Scenario #	Description	Appropriateness	Score
11	Primary cutaneous melanoma without clinical evidence of metastasis	Appropriate	9
12	Cutaneous melanoma following a local-regional recurrence	May be Appropriate	6
13	Pigmented lesions of uncertain metastatic potential	May be Appropriate	6
14	Primary melanoma of the anus or vagina without clinical evidence of metastasis	Appropriate	7
15	Cutaneous and mucosal (penile, vulvar) squamous cell or basal carcinoma without clinical evidence of metastasis	Appropriate	8
16	Merkel cell carcinoma without clinical evidence of metastasis	Appropriate	9
17	Malignant adnexal cutaneous tumors (eccrine, sweat gland, SCC with eccrine de-differentiation) without clinical evidence of metastasis	May be Appropriate	6
18	Selected sarcoma subtypes (synovial, epithelioid, rhabdomyosarcoma, angiosarcoma, clear cell sarcoma) without evidence of metastasis	May be Appropriate	6

CLINICAL SCENARIOS FOR CANCERS AT OTHER SITES

The success of sentinel node localization in melanoma and breast cancer has led to the application of sentinel node scintigraphy to several other sites. Other than for cervical cancer and oral cavity cancers, the

effectiveness of SLNB using radiotracers in these other malignancies is still under investigation.

For further discussion on each site, please refer to the full published AUC (accessible using the QR code on page 1).

Clinical Scenarios for Cancers at Other Sites

Scenario #	Description	Appropriateness	Score
19	Prostate cancer (initial stage)	Appropriate	7
20	Cervical cancer (initial stage)	Appropriate	7
21	Endometrial cancer, low-risk patient	May be Appropriate	5
22	Endometrial cancer, high-risk patient	May be Appropriate	6
23	Ovarian cancer	Rarely Appropriate	3
24	Vaginal squamous cell cancer	May be Appropriate	6
25	Primary malignancy of the GI tract without clinical evidence of metastasis	May be Appropriate	5
26	Oral cavity	Appropriate	9
27	Oropharyngeal cancer	May be Appropriate	6

CLINICAL SCENARIOS FOR LYMPHEDEMA AND LIPEDEMA

Lymphoscintigraphy of the extremities is usually performed with injection of a radiotracer into the hand or foot followed by imaging of tracer migration. Lymphoscintigraphy offers assessment of lymphatic function of a limb better than anatomical studies such as

invasive lymphangiography or magnetic resonance lymphangiography.

Physiological information provided by scintigraphic imaging and anatomical information provided by studies such as CT, MRI, and lymphangiography are often both needed for the diagnosis and management of patients with lymphedema and lipedema.

Clinical Scenarios for Lymphedema and Lipedema

Scenario #	Description	Appropriateness	Score
28	Clinical suspicion for primary lymphedema of the extremities	Appropriate	8
29	Clinical suspicion for secondary lymphedema of the extremities	Appropriate	7
30	Clinical suspicion for breast lymphedema	May be Appropriate	4
31	Lipedema of the extremities	May be Appropriate	6
32	Limb edema of unclear etiology	Appropriate	8

Rating and Scoring

The above clinical scenarios are scored as “appropriate,” “may be appropriate,” or “rarely appropriate” on a scale from 1 to 9. Scores 7–9 indicate that the use of the procedure is appropriate for the specific clinical scenario and is generally considered acceptable. Scores 4–6 indicate that the use of the procedure may be appropriate for the specific clinical scenario. This implies that more research is needed to classify the use of lymphoscintigraphy in the particular clinical scenario definitively, or that some patient sub-populations in the described clinical scenario may benefit more than others. Scores 1–3 indicate that the use of the procedure is rarely appropriate for the specific clinical scenario and generally is not considered acceptable.

Methodology

The process for AUC development was modeled after the RAND/UCLA Appropriateness Method for AUC development. It includes multi-stakeholder identification of a list of relevant clinical scenarios, a systematic review of evidence in the literature, and a systematic synthesis of available evidence, while adhering to the Institute of Medicine’s standards for developing trustworthy clinical guidance.

This AUC was developed by the Society of Nuclear Medicine and Molecular Imaging with participation from experts affiliated with the following organizations: American College of Nuclear Medicine, American College of Radiology, American College of Surgeons, American Head and Neck Society, American Society of Breast Surgeons, American Society of Clinical Oncology, Australia and New Zealand Society of Nuclear Medicine, European Association of Nuclear Medicine, Society for Vascular Medicine, Society of Surgical Oncology.

For the complete manuscript and listing of references, visit:

https://s3.amazonaws.com/rdcms-snm/production/public/FileDownloads/Procedure_Standards/Appropriate%20Use%20Criteria%20for%20Lymphoscintigraphy%209%5F8%5F22%20Final%20BOD%20Approval.pdf

For a complete list of Appropriate Use Criteria (AUC) documents go to: www.snm.org/auc