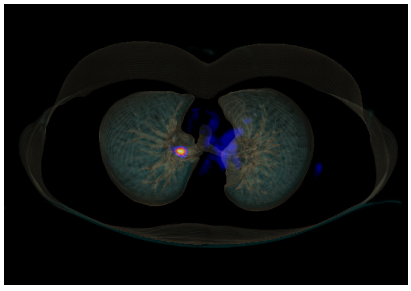
**Indication sheet**

SIEMENS Healthineers

# Characterization of the solitary pulmonary nodule with PET imaging

**While conventional imaging establishes the presence of solitary pulmonary nodules (SPNs), invasive procedures that involve risk may be required to characterize the lesions.**



PET/CT utilization as a diagnostic tool could reduce the number of unnecessary biopsies or thoracotomies on benign SPNs.[1]

"Nodules that were classified as indeterminate on CT were correctly characterized on PET in over 80% of the cases."

"PET should be obtained in the diagnostic work-up of patients with SPN." — Fletcher et al.[2,3]

## PET/CT characterizes SPNs with diagnostic accuracy.

**Diagnostic accuracy of PET in SPN characterization[4,5]**

| | Sensitivity | Specificity | NPV | PPV | Accuracy |
|---|---|---|---|---|---|
| PET/CT | 97% | 85% | 92% | 93% | 92% |

## PET enables the physician to make a more informed clinical decision.

American College of Chest Physicians recommends: In patients with low-to-moderate pretest probability of malignancy (5 to 65%) and an indeterminate SPN that measures at least 8 mm in diameter, we suggest that functional imaging, preferably with positron emission tomography (PET), should be performed to characterize the nodule.[6]

PET/CT not only has the potential for uncovering malignancy, but also has other roles in patient management, such as staging, evaluation of a response to therapy and detection of recurrence.

## Medicare recognizes the utility of PET and PET/CT in solitary pulmonary nodule (SPN).[7]

**Initial Treatment Strategy**
Medicare covers PET scans for characterization of a single pulmonary nodule under Initial Treatment Strategy of Lung Cancer.

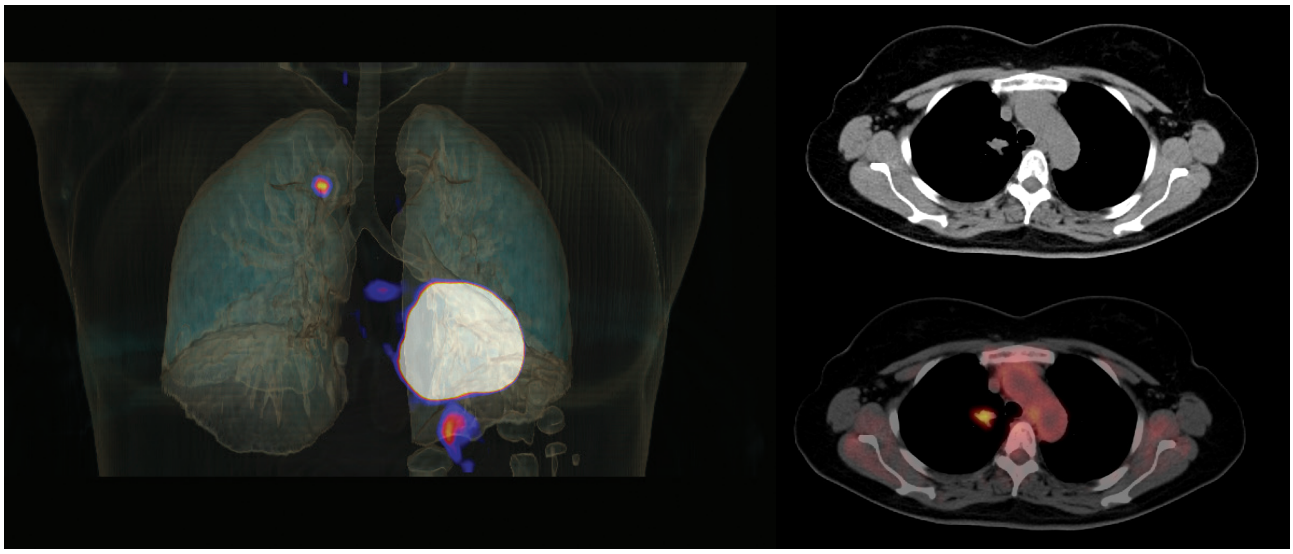
- To determine whether or not the beneficiary is an appropriate candidate for an invasive diagnostic or therapeutic procedure
- To determine the optimal anatomic location for an invasive procedure
- To determine the anatomic extent of tumor when the recommended anti-tumor treatment reasonably depends on the extent of the tumor.

The ordering physician is responsible for documenting the medical necessity of the PET scan and that it meets these criteria.

**Society of Nuclear Medicine and Molecular Imaging (SNMMI) Center of Excellence PET PROS Diagnosis of Pulmonary Nodules:**

**CMS Coverage Policy**
PET and PET/CT are approved by the Centers for Medicare and Medicaid Services (CMS) for characterization of solitary pulmonary nodules not exceeding 4 cm to determine the likelihood of malignancy. Claims should include evidence of the initial detection of a primary lung nodule, usually by computed tomography.[7,8]

# PET/CT helps differentiate between benign and malignant solitary pulmonary nodules



Data courtesy of University of Tennessee Medical Center, Knoxville, Tennessee, USA

**History**

A 58-year-old patient developed bronchitis with onset of shortness of breath. Non-smoker, history of secondhand smoke exposure from mother, who died of small cell lung cancer.

A chest X-ray revealed abnormality in the right apex that warranted a CT scan.

CT demonstrated 2.0 x 1.5 cm RUL nodule.

**PET/CT findings and pathology**

Further evaluation with PET/CT revealed a nodule as hypermetabolic concerning for malignancy, no evidence of distant disease.

A biopsy was then performed resulting in confirmation of suspicion of malignancy, adenocarcinoma in origin.

**Overall evaluation**

PET/CT helps in proper clinical management. Results of PET/CT scan revealed patient at high risk of malignancy and therefore required pathological evaluation. Biopsy of nodule proved to be malignant through histopathology and consistent with PET findings. SPN was then surgically resected.

The PET/CT scan also revealed no distant disease eliminating the need for invasive regimen of chemo and/or radiation therapy.


[1] Sim YT, et al. Imaging of solitary pulmonary nodule—a clinical review. *Quant Imaging Med Surg.* 2013 Dec;3(6): 316-326.

[2] Fletcher JW, et al. A comparison of the diagnostic accuracy of $^{18}$F-FDG PET and CT in the characterization of solitary pulmonary nodules. *J Nucl Med.* 2008 Feb;49(2): 179-85.

[3] Fletcher JW, et al. Recommendations on the use of $^{18}$F-FDG PET in oncology. *J Nucl Med.* 2008 Mar;49(3): 480-508.

[4] Ambrosini V, et al. PET/CT imaging in different types of lung cancer: an overview. *Eur J Radiol.* 2012 May;81(5): 988–1001.

[5] Kim SK, et al. Accuracy of PET/CT in characterization of solitary pulmonary lesions. *J Nucl Med.* 2007 Feb;48(2): 214-20.

[6] Gould MK, et al. Evaluation of individuals with pulmonary nodules: when is it lung cancer? Diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. *Chest.* 2013 May;143 (5 Suppl):e93S-120S.

[7] CMS Publication 100-03, Medicare National Coverage Determinations Manual, Chapter 1, Part 4, Section 220.6). Available at http://www.cms.hhs.gov/manuals/downloads/ncd103c1_part4.pdf

[8] SNM PET PROS. Available at http://interactive.snm.org/docs/PET_PROS/DiagnosisPulmonaryNodules.pdf

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