

## Positron Emission Tomography for Oncological Applications

### DESCRIPTION

Positron Emission Tomography (PET) scans are based on the use of positron emitting radionuclide tracers coupled to organic molecules such as glucose, ammonia, or water. The radionuclide tracers simultaneously emit 2 high-energy photons in opposite directions that can be simultaneously detected by a PET scanner. The PET scanner consists of multiple detectors that encircle the area of interest. A variety of tracers are used for PET scanning including oxygen-15, nitrogen-13, carbon-11, and fluorine-18. The most commonly used radiotracer in oncology imaging is fluorine-18 coupled with fluorodeoxyglucose (FDG). FDG has a metabolism related to glucose metabolism. It has been considered potentially useful in cancer imaging, since tumor cells show increased metabolism of glucose.

### POLICY

Positron emission tomography scans for oncological applications listed below are considered medically necessary if the medical appropriateness criteria are met. **(Click on the underlined word below to be taken directly to the corresponding Medical Appropriateness.)**

- [Brain](#)
- [Breast](#)
- [Cervical](#)
- [Colorectal](#)
- [Esophageal](#)
- [Head and Neck](#)
- [Liver](#)
- [Lung](#)
- [Lymphoma / Non-Hodgkin's Lymphoma](#)
- [Melanoma](#)
- [Occult Primary](#)
- [Pancreatic](#)
- [Testicular](#)
- [Thyroid](#)

NOTE: PET scans should only be performed once per 12 months, unless the procedure is proven to be medically necessary with supporting documentation. This recommendation is similar to current Medicare guidelines.

Positron emission tomography scans for oncological applications including, but not limited to, the following are considered **investigational**:

- Bladder
- Kidney
- Ovarian
- Parathyroid
- Prostate
- Soft Tissue Sarcoma (including GIST)

See Medical Appropriateness section for **not medically necessary** statements.

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### See also:

- [Milliman Care Guideline - PET, Myocardial](#)
- [PET for Miscellaneous Applications](#)

### MEDICAL APPROPRIATENESS

Any radiopharmaceutical utilized for this procedure must have FDA approval or have been determined by the FDA to be safe and effective.

#### Brain Cancer

PET is considered **medically appropriate** when used to differentiate between treatment-induced tumor necrosis and tumor recurrence when the results may potentially alter treatment management.

#### Breast Cancer

PET is considered **medically appropriate** for **any** of the following indications:

- Detection of primary lesions; **or**
- Detection of bone metastasis; **or**
- Staging of axillary lymph nodes; **or**
- To rule out metastasis in newly diagnosed, early-stage breast cancer when **any** of the following criteria are met:
  - Primary tumor greater than 5cm in diameter; **or**
  - Presence of axillary lymphadenopathy on physical examination; **or**
  - Indication of metastatic disease by documentation of symptoms and / or findings on physical examination.

#### Cervical Cancer

PET is considered **medically appropriate** for **any** of the following indications:

- During workup; **or**
- During staging when the para-aortic lymph node is positive by surgical staging; **or**
- With selective bulky stage IB2, IIA, IIB, IIIA, IIIB, IV with positive adenopathy by CT, MRI and/or PET; **or**
- If FNA is clinically indicated; **or**
- If invasive cancer is found at simple hysterectomy stage IA2; **or**
- During surveillance workup if there is persistent or recurrent disease.

#### Colorectal Cancer

PET is considered **medically appropriate** when **all** of the following are met:

- Suspicion of recurrent colorectal cancer, hepatic or extrahepatic metastases, indicated by rising CEA levels; or other diagnostic tests are normal or equivocal; **and**
- Results may potentially alter treatment management (e.g., deciding whether surgical intervention is warranted).

#### Esophageal Cancer

PET is considered **medically appropriate** for the following indication:

- If there is no evidence of distant metastatic disease for staging prior to surgery to assess resectability with endoscopic ultrasound

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### Head and Neck Cancer

PET is considered **medically appropriate** for **any** of the following indications:

- Identification of an unknown primary tumor suspected to be head and neck cancer; **or**
- Initial staging of cervical lymph node metastases of head and neck cancer; **or**
- Detection of residual or recurrent head and neck cancer.

### Liver Cancer

PET is considered **medically appropriate** when **all** of the following apply:

- Suspicion of recurrent colorectal cancer, hepatic or extrahepatic metastases, indicated by rising CEA levels; or other diagnostic tests are normal or equivocal; **and**
- Results may potentially alter treatment management (e.g., deciding whether surgical intervention is warranted).

### Lung Cancer

FDG PET is considered **medically appropriate** for **any** of the following indications:

- Imaging of a solitary pulmonary nodule when chest x-ray and computed tomography have failed to distinguish benign from malignant disease, and the test results may alter treatment management; **or**
- Staging of known lung cancer.

FDG PET is considered **not medically necessary** for long-term surveillance following curative-intent therapy for lung cancer.

### Lymphoma / Non-Hodgkin's Lymphoma

FDG PET is considered **medically appropriate** for **any** of the following indications:

- Initial staging; **or**
- Differentiating benign from malignant disease; **or**
- Follow-up after treatment for lymphoma, when results may potentially alter treatment management.

### Melanoma

FDG PET is considered **medically appropriate** for **any** the following indications **only** when the results may potentially alter treatment management:

- Detection of extranodal metastasis at initial staging; **or**
- Detection of extranodal metastasis following treatment.

### Occult Primary Tumor (OPT)

PET is considered **medically appropriate** for **any** of the following indications:

- If there is a single site of the disease and the individual is considering local or regional treatment; **or**
- After a negative workup for occult primary tumor; **or**
- To rule out or detect additional sites of disease

FDG PET is considered **not medically necessary** if used instead of or as part of the initial workup for OPT, or for individuals with multiple sites of metastases.

### Pancreatic Cancer

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FDG PET is considered **medically appropriate** for the evaluation of a suspicious pancreatic mass to distinguish between benign and malignant disease when **all** of the following apply:

- Other diagnostic tests are normal or equivocal; **and**
- Results may potentially alter treatment management (e.g., deciding whether surgical intervention is warranted).
- FDG PET is considered **not medically necessary** for the staging of pancreatic cancer, unless the results may significantly alter treatment management.

### Testicular Cancer

PET is considered **medically appropriate** for any of the following indications:

- After primary treatment with chemotherapy in stage IIB, IIC or III seminoma testicular cancer

### Thyroid Cancer

PET is considered **medically appropriate** for detection of recurrent thyroid cancer or suspected metastasis, and / or differentiation between benign and malignant disease when **all** of the following apply:

- Thyroglobulin (Tg) value and 131 Iodine whole body scan are non-diagnostic; **and**
- Results may potentially alter treatment management (e.g., deciding whether surgical intervention is warranted).

### **ADDITIONAL INFORMATION**

Published literature is inadequate to permit conclusion regarding the utilization of positron emission tomography scans for oncological applications listed as investigational. Evidence is lacking that utilization of positron emission tomography scans for these oncological applications would improve health outcomes.

**SOURCES** (Listed in alphabetical order according to indication.)

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