Medical Policy

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Title: Positron Emission Tomography (PET) Scanning: Oncologic Applications

See also: *Positron Emission Tomography (PET) Scanning: Cardiac Applications*
Positron Emission Tomography (PET) Scanning: Miscellaneous (Non-cardiac, Non-oncologic) Applications
Positron Emission Tomography (PET) Scanning: In Oncology to Detect Early Response during Treatment

Professional
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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 (referred to as coincidence detection) by a PET scanner, consisting of multiple stationary 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. Because of their short half-life, some tracers must be made locally using an onsite cyclotron. The radiotracer most commonly used in oncology imaging has been fluorine-18 coupled with fluorodeoxyglucose (FDG), which has a metabolism related to glucose metabolism. FDG has been considered useful in cancer imaging, since tumor cells show increased metabolism of glucose. The most common malignancies studied have been melanoma, lymphoma, lung, colorectal, and pancreatic cancer.

POLICY

I. PET scan with or without PET/CT fusion is considered **medically necessary** for the following tumors when results are expected to influence treatment decisions and standard imaging (e.g., CT, MRI or Ultrasound) is inconclusive or not indicated:

A. **Diagnosing or Staging**

1. Bone—Ewing sarcoma and osteosarcoma
2. Brain
3. Breast (except initial staging of axillary lymph nodes)
4. Cervix
5. Colorectal
6. Esophageal
7. Gastric Cancer
8. Gastrointestinal Stromal Tumors
9. Kidney Cancer
10. Head and Neck
11. Lung:
    - Non-Small Cell (NSCLC)
    - Small Cell (SCLC)
    - Evaluation of Solitary Pulmonary Nodule
12. Lymphoma:
    - Hodgkin's
    - Non-Hodgkin's
13. Melanoma (except initial evaluation of regional lymph nodes)
14. Musculoskeletal (including Soft Tissue Sarcoma)
15. Myeloma
16. Neuroblastoma
17. Neuroendocrine Tumor, poorly differentiated
18. Pancreas
19. Thyroid **or**
20. Cancer of Unknown Primary
21. Paraneoplastic syndromes

B. **Re-Staging**
   1. Brain
   2. Breast
   3. Cervix
   4. Colorectal
   5. Esophageal
   6. Gastric Cancer
   7. Gastrointestinal Stromal Tumors
   8. Head and Neck
   9. Kidney Cancer
   10. Lung – Non-Small Cell (NSCLC)
   11. Lymphoma:
       - Hodgkin's
       - Non-Hodgkin's
   12. Melanoma
   13. Myeloma
   14. Musculoskeletal (including Soft Tissue Sarcoma)
   15. Neuroblastoma
   16. Neuroendocrine Tumor, poorly differentiated
   17. Ovarian
   18. Testicular or
   19. Thyroid

C. **Other oncologic indications** may be considered **medically necessary** on a case by case basis when results are expected to influence treatment decisions.

D. **Experimental / Investigational** oncologic application include, but not limited to:
   1. Initial therapy for ovarian cancer or testicular cancer; or
   2. Subsequent therapy for small cell lung cancer (SCLC) or pancreatic cancer; or
   3. Diagnosis and management of prostate cancer; or
   4. To determine early response to treatments (PET scans done during a course of chemotherapy of reduction therapy).

E. **Surveillance**
   Intermittent surveillance scanning for Ewing Sarcoma is considered **medically necessary.**

Policy Guidelines

1. For this policy, PET scanning is discussed for the following 4 applications in oncology.

   Diagnosis
   Diagnosis refers to use of PET as part of the testing used in establishing whether or not a patient has cancer.

   Staging
   This refers to use of PET to determine the stage (extent) of the cancer at the time of diagnosis, before any treatment is given. Imaging at this time is generally to determine whether or not the cancer is localized. This may also be referred to as initial staging.

   Restaging
   This refers to imaging following treatment in 2 situations. Restaging is part of the evaluation of a patient in whom a disease recurrence is suspected based on signs and/or symptoms. Restaging also includes determining the extent of malignancy following completion of a full course of treatment.

   Surveillance
   This refers to use of imaging in asymptomatic patients (patients without objective signs or symptoms of recurrent disease). This imaging is completed 6 months or more (12 months or more for lymphoma) following completion of treatment.

2. As with any imaging technique, the medical necessity of positron emission tomography (PET) scanning depends in part on what imaging techniques are used either before or after the PET scanning. Due to its expense, PET scanning is typically considered after other techniques, such as computed tomography (CT), magnetic resonance imaging (MRI), or ultrasonography, provide inconclusive or discordant results. In patients with melanoma or lymphoma, PET scanning may be considered an initial imaging technique. If so, the medical necessity of subsequent imaging during the same diagnostic evaluation is unclear. Thus, PET should be considered for the medically necessary indications above only when standard imaging, such as CT or MRI, is inconclusive or not indicated.

3. In patients with epileptic seizures, appropriate candidates are patients with complex partial seizures that have failed to respond to medical therapy and who have been advised to have a resection of a suspected epileptogenic focus located in a region of the brain accessible to surgery. Conventional techniques for seizure localization must have been tried and provided data that suggested a seizure focus but were not sufficiently conclusive to permit surgery. In addition, the purpose of the positron emission tomography (PET) examination should be to avoid subjecting the patient to extended preoperative electroencephalographic recording with implanted

electrodes or to help localize and minimize the number of sites for implanted electrodes to reduce the morbidity of that procedure.

RATIONALE

This policy is based on multiple evaluations of positron emission tomography (PET), including TEC Assessments, other systematic reviews, meta-analyses, decision analyses, and cost-effectiveness analyses. From the perspective of evidence-based medicine, overall, the literature on use of PET scanning in oncology is quite limited. There are few rigorous studies that assess the impact of PET on clinical outcomes. The majority of the studies that report on outcomes describe changes in staging and/or treatment that result from the PET scan; however, the studies do not evaluate whether or not these changes result in an improvement in the net health outcome.

A 1997 TEC Assessment considered the use of PET scanning in the evaluation of solitary pulmonary nodules and staging of known lung cancer. (1) A 2006 evidence report by TEC for the Agency for Healthcare Research and Quality (AHRQ) addressed use of PET for staging small cell lung cancer (SCLC). (2) Three 1999 TEC Assessments (3-5) and one 2000 TEC Assessment (6) considered the use of PET scanning in the evaluation of melanoma, lymphoma, colorectal, and head and neck cancer. TEC Assessments from 2000 and 2002 addressed unknown primaries. (6, 7) One 2001 TEC Assessment, a 2002 decision analysis, and a 2005 systematic review focused on esophageal cancer. (8-10) Pancreatic cancer was evaluated in a 1999 TEC Assessment and the 2004 Agency for Healthcare Research and Quality (AHRQ) systematic review. (11, 12) The 2004 AHRQ systematic review also focused on ovarian cancer, as well as testicular cancer. Soft tissue sarcoma was the subject of a 2002 AHRQ systematic review. (13) Breast cancer was the focus of 2 TEC Assessments from 2001 and 2003, a systematic review from 2005, a systematic review from 2007, and a cost-effectiveness analysis from 2005. (14-18) Several uses of PET were reviewed in National Comprehensive Cancer Network (NCCN) Task Force documents released in 2007 and 2009. (19, 20) Another AHRQ systematic review evaluating use of PET for 9 cancers was published in 2008. (21) Systematic reviews and meta-analyses published in 2011 and 2012 address 10 indications for 9 malignancies (22, 12, 23-35). In the Assessments, PET scanning was considered an adjunct to other imaging methods (i.e., computed tomography [CT], magnetic resonance imaging [MRI], ultrasonography) often used when previous imaging studies are inconclusive or provide discordant results. In this setting, the clinical value of PET scans is the rate of discordance among imaging techniques and the percentage of time that PET scanning results in the correct diagnosis, as confirmed by tissue biopsy. The Assessments and other reviews offered the following observations and conclusions:

Bone Cancer

A systematic review and meta-analysis of studies examining the diagnostic accuracy of PET in Ewing sarcoma showed very high estimates of sensitivity and specificity (pooled sensitivity 96%, pooled specificity 92%). (36) Another study of PET in pediatric sarcoma (Ewing sarcoma and osteosarcoma) patients in which PET was used in addition to conventional imaging showed that PET was superior to conventional imaging in detecting lymph node and bone involvement. (37) The most thorough assessment of cancer involvement involved using both PET and conventional tests and produced important changes in therapy decisions.

There are very few studies examining the utility of PET in chondrosarcoma.

Brain Tumors

A systematic review and meta-analysis addressed use of fluorine-18 fluoro-ethyl-tyrosine (FET) in detecting primary brain tumors (22). While it used a sophisticated meta-analytic method, it did not compare use of 18F-FET PET with another imaging modality for diagnosis of brain tumors, so no conclusions can be reached about comparative effectiveness.

Breast Cancer

The 2001 TEC Assessment (14) focused on multiple applications of PET scanning in breast cancer, including characterization of breast lesions, staging axillary lymph nodes, detection of recurrence, and evaluating response to treatment. The 2003 TEC Assessment (15) re-examined all of the above indications except for its role in characterizing breast lesions.

- The bulk of the data regarding PET scanning for breast cancer focuses on its use as a technique to further characterize breast lesions such that patients could avoid biopsy of a mammographically indeterminate or suspicious lesion. The key statistic in this analysis is the false-negative rate, since patients with a false-negative result on a PET scan may inappropriately forego a biopsy and subsequent treatment. The false-negative rate will vary with the underlying prevalence of the disease, but may range from 5.5% to 8.5%. Given the relative ease of breast biopsy, this false-negative rate may be considered unacceptable, and thus patients may undergo biopsy regardless of the results of a PET scan.
- A 2005 systematic review and meta-analysis (16) focused on use of PET for detecting recurrence and metastases. The report concluded that PET is a valuable tool; however, it did not compare PET performance with that of other diagnostic modalities, so it is unclear if PET results in different management decisions and health outcomes.

A systematic review published in 2007 (18) on use of PET for staging axillary lymph nodes identified 20 studies. Of these, 3 studies were rated with the highest quality grade, corresponding to broad generalizability to a variety of patients and no significant flaws in research methods. The remaining studies were more flawed and/or were more narrowly generalizable. The review observed that there was great variability in estimates of sensitivity and specificity from the selected studies and that it is difficult to draw conclusions from the evidence. A National Comprehensive Cancer Network (NCCN) review of PET (19) concluded that PET was useful in staging and restaging regional or distant metastasis when the suspicion was high and other imaging inconclusive.

Two meta-analyses pooled studies on use of FDG PET to predict pathologic response to neoadjuvant therapy before surgery for locally advanced breast cancer (24, 33). These articles report similar pooled point estimates of both sensitivity and specificity. They both concluded that PET has reasonably high sensitivity and relatively low specificity. Neither article describes how PET should be used to influence patient management decisions and therefore whether health outcomes would be changed relative to decisions not based on PET results. Thus, it is unclear whether PET improves outcomes for predicting pathologic response to neoadjuvant therapy for locally advanced breast cancer.

Cervical Cancer

An AHRQ review published in 2008 identified several studies in which PET or PET/CT was used in the staging of advanced cervical cancer and for detection and staging of recurrent disease. (21) The report concluded that the majority of studies supported enhanced diagnostic accuracy, which would improve the selection of appropriate treatment for patients. For recurrent disease, PET identifies additional sites of metastasis which would alter treatment decisions in some cases. For example in a study by Yen et al (38) of 55 patients whose recurrences were initially considered curable with radical surgical treatment, 27 instead underwent palliative therapy based on PET results. An NCCN Task Force Report on PET (20) also identifies several studies that support use of PET for initial staging and identification and staging of recurrent disease.

Colorectal Cancer

- Two clinical applications of PET scanning were considered in the TEC Assessment: 1) To detect hepatic or extrahepatic metastases and to assess their resectability in patients with colorectal cancer, either as part of initial staging or after primary resection, and 2) to evaluate the presence of postoperative scar versus recurrent disease as a technique to determine the necessity of tissue biopsy.
- The body of evidence indicates that PET scanning adds useful information to conventional imaging in detecting hepatic and extrahepatic metastases. In particular, PET can detect additional metastases leading to more identification of non-resectable disease, allowing patients to avoid surgery. The strongest evidence comes from a study that directly assessed the additional value of PET. In a group of 37 patients thought to have solitary liver metastases by conventional imaging, PET correctly upstaged 4 patients and falsely overstaged 1 patient. This study and another further found that, when PET is discordant with conventional imaging, PET is correct in 88% and 97%, respectively, of patients. When PET affects management decisions, it is more often used to recommend against surgery.
- When used to distinguish between local recurrence and scar, the comparison is between performing histologic sampling in all patients with a suspected local recurrence and avoiding sampling in patients whose PET scans suggest the presence of postoperative scar. The key concern is whether the negative predictive value for PET is sufficiently high to influence decision making, specifically to avoid tissue biopsy when the PET scan is negative. The available studies suggest a probability of false negative results of 8%, making it unlikely that patients and physicians would be willing to forgo histologic sampling and delay potentially curative repeat resection.
- Further support for the indication of staging and detection of recurrence of colon cancer was reviewed in an NCCN review on the use of PET scanning (19) . A rising carcinoembryonic antigen (CEA) level is another indication that may be considered medically necessary.
- A systematic review of different imaging techniques for radiotherapy treatment planning of rectal cancer concluded that additional studies are needed to validate use of PET in this setting. (25)

Esophageal Cancer

- Regarding initial diagnosis, PET is generally not considered a test for detecting primary esophageal tumors, and evidence is lacking on its use to differentiate between esophageal cancer and benign conditions.

An NCCN Task Force report found studies showing that PET is more sensitive than other diagnostic imaging in detecting stage IV disease with distant lymph node involvement. A meta-analysis described in the report found a 67% pooled sensitivity, 97% specificity, and small added value after conventional staging in detecting distant metastasis. (20)

Another use of PET in esophageal cancer is in determining whether to continue chemotherapy for potential curative resection. The NCCN Task Force Report describes several studies in which response to chemotherapy as defined as a decline in standardized uptake values (SUV) correlated with long-term survival. (20) Patients who do not respond to chemotherapy may benefit by this test by being spared futile and toxic chemotherapy. However, this treatment strategy of PET-directed chemotherapy does not appear to have been validated with randomized clinical trials showing improved overall health outcomes.

Gastric Cancer

A systematic review and meta-analysis pooled 9 studies on evaluating recurrent gastric cancer. (34) The meta-analysis used methods that do not adequately account for dependence of sensitivity and specificity, nor do they adequately handle covariates that might explain between-study heterogeneity. It concluded that PET combined with CT may be more effective than either modality alone, but the data presented do not support this conclusion.

Head and Neck Cancer

- Among the 3 studies identified in the TEC Assessment that used other diagnostic modalities to attempt to identify a primary tumor in patients with positive cervical lymph nodes, PET found more primary tumors than other modalities in 2 studies and identified similar proportions in 1 study. (6) When data from these 3 studies are pooled, PET was found to identify tumor in 38% of cases and other modalities found tumor in 21% of cases.
- When PET is used to initially stage the cervical lymph nodes (i.e., the status of the cervical nodes is unknown), the addition of PET to other imaging modalities increased the proportion of patients who were correctly staged, as confirmed histologically. When compared head to head with other imaging modalities, the pooled data from a variety of studies suggested that PET had a better diagnostic performance compared to CT and MRI.
- Of 8 studies focusing on the use of PET to detect residual or recurrent disease, 5 found PET to be more specific and sensitive, 2 reported mixed or equivalent results, and 1 reported worse results compared to CT.

Lung Cancer

- PET scanning may have a clinical role in patients with solitary pulmonary lung nodules in whom the diagnosis is uncertain after prior CT scan and chest x-ray. Patients who are relatively young and have no smoking history are at a relatively low risk for lung cancer, and in this setting the negative predictive value of a PET scan is relatively high. If presented with a negative PET scan and information about the very low probability of undetected malignancy, it is quite likely that some patients would choose to avoid the harms of an invasive sampling procedure (i.e., biopsy). A meta-analysis on evaluating pulmonary nodules using dual-time PET (a second scan added after a delay) found that its additive value relative to a single PET scan is questionable. (35)
- In patients with known non-small cell lung cancer, the clinical value of PET scanning relates to improved staging information regarding the involvement of mediastinal lymph nodes, which generally excludes patients from surgical excision. The TEC Assessment (1) cited a decision-analysis study that suggested that the use of CT plus PET scanning in staging the mediastinal lymph nodes resulted in fewer surgeries and an average gain in life expectancy of 2.96 days. The gain in life expectancy suggests that avoidance of surgery was not harmful to the patients in that potentially beneficial surgery was not withheld on the basis of false-positive imaging results.
- A NCCN report on the use of PET scanning (19) supports an indication for patients who are suspected to have solitary metastases who may be candidates for surgical resection. In such patients, the test may detect additional metastases, which would rule out or change the extent of planned surgery.
- Six studies of patients with small cell lung cancer (SCLC) reported evidence suggesting that for non-brain metastases, PET added to conventional staging is more sensitive in detecting disease than conventional staging alone. (2) PET may correctly upstage and downstage disease, and studies reported very high occurrence of patient management changes that were attributed to PET. However, the quality of these studies is consistently poor, and insufficient detail in reporting was the norm, especially with respect to the reference standard. A systematic review of staging SCLC found PET to be more effective than conventional staging methods; however, this review was heavily flawed by not conducting a quality assessment of individual studies, so its conclusions may not be sound. (27) It is not possible from the limited and poor quality evidence that is available to determine whether the use of PET adds value relative to conventional staging tests for SCLC.

Lymphoma, including Hodgkin's disease

- Of the 14 available studies reviewed in the TEC Assessment, (4) 3 compared PET with anatomic imaging in initial staging and restaging of patients with Hodgkin's disease and non-Hodgkin's lymphoma. Two of these studies included data from both diseased and nondiseased sites for PET and CT. Both studies found PET to have better overall diagnostic accuracy than CT. The third study addressed detection of diseased sites only and found PET to have the same sensitivity as use of CT or MRI. Among the 6 studies that reported on concordance between PET and other imaging modalities, PET was discordant with other modalities in 11% to 50%, PET was correct among discordances in 40% to 75%. PET has been reported to affect patient management decisions in 8–20% of patients in 5 studies mainly by correctly upstaging disease, but also by correctly

downstaging disease. Thus when PET is added to conventional imaging, it can provide useful information for selective effective treatment that is appropriate to the correct stage of disease.

Melanoma

- Surgical resection for melanoma is limited to those with local disease. Patients with widespread disease are not candidates for resection. Frequently, there is microscopic spread to the proximal lymph nodes. Therefore, patients with a high risk of nodal spread, as assessed by the thickness of the primary melanoma, may be candidates for lymph node sampling, termed sentinel node biopsy. PET scanning has been investigated both as a technique to detect widespread disease as part of an initial staging procedure, and also to evaluate the status of the local lymph nodes to determine the necessity of sentinel node biopsy.
- To consider PET a useful alternative to sentinel node biopsy, it must have high sensitivity and specificity when either sentinel node biopsy or lymph node dissection serves as the reference standard. In the only study of this kind, PET had a sensitivity of only 17%, suggesting that PET rarely detects small metastases that can be discovered by sentinel node biopsy. Thus the TEC Assessment concluded that PET is not as beneficial as sentinel node biopsy in assessing regional lymph nodes. (3)
- The intent of using PET to detect extranodal metastases is to aid in selecting treatment appropriate to the patient's extent of disease. For example, surgical resection is typically not appropriate for widespread disease. A prospective blinded study of 100 patients found that PET was much more sensitive and specific than conventional imaging. Another prospective study of 76 patients found that, compared to CT, PET had much higher sensitivity and equivalent specificity. A third comparative study of 35 patients found that PET was much more sensitive than CT. It may be inferred from these studies that PET was usually correct when discordant with other modalities. PET affects management in approximately 18% of patients.

Multiple Myeloma

Two systematic reviews, one of which also conducted a meta-analysis, addressed PET for staging of multiple myeloma. (26, 32) Neither report compared the diagnostic performance of PET with other imaging modalities, so they do not support conclusions about comparative effectiveness.

Neuroendocrine Tumors

Two meta-analyses from the same investigators addressed use of PET in patients with neuroendocrine tumors (NETs). (29, 30) One report included patients with thoracic and gastroenteropancreatic NETs who had imaging with PET using gallium-68 somatostatin receptor (SMSR) radiotracers. (29) The other article included studies of paragangliomas scanned by PET with fluorine-18 dihydroxyphenylalanine (DOPA). (30) Neither study compared PET with other imaging modalities, precluding conclusions about comparative diagnostic performance.

Ovarian Cancer

- For primary evaluation, i.e., in patients with suspected ovarian cancer, the ability to rule out malignancy with a high negative predictive value would change management by avoiding unnecessary exploratory surgery. However, available studies suggest that PET scanning has poorer negative predictive value compared to other options, including transvaginal ultrasound (TVUS), Doppler studies, or MRI. Adding PET scanning to TVUS or MRI did not improve results.
- Positive predictive value is of greatest importance in evaluating patients with known ovarian cancer, either to detect disease recurrence or progression or monitor response to treatment. While the 2004 AHRQ systematic review (12) suggested that PET may have value for detecting recurrence when CA125 is elevated and conventional imaging does not clearly show recurrence, this had not been demonstrated in an adequately powered prospective study. A 2008 AHRQ systematic review found that the evidence supported the use of PET/CT in detecting recurrent ovarian cancer. (21) The evidence for initial diagnosis and staging of ovarian cancer was still inconclusive.

Pancreatic Cancer

- Both the 2004 AHRQ systematic review (12) and the 1999 TEC Assessment (11) focused on 2 clinical applications of PET scanning in patients with known or suspected pancreatic cancer: the use of PET to distinguish between benign or malignant pancreatic masses, and the use of PET as a staging technique in patients with known pancreatic cancer.
- In terms of distinguishing between benign and malignant disease, the gold standard is percutaneous or open biopsy. If PET were to be used to allow patients with scans suggesting benign masses to avoid biopsy, a very high negative predictive value would be required. The key statistic underlying the negative predictive value is the false-negative rate. Patients with false-negative results are incorrectly assumed to have benign disease and are thus not promptly treated for pancreatic cancer. Based on the literature review, the negative predictive value ranged between 75% and 92%, depending on an underlying prevalence of disease ranging from 50–75%. The Assessment concluded that this level of diagnostic performance would not be adequate to recommend against biopsy. The 2004 AHRQ report found that PET was sometimes found to be more accurate than other modalities, but the meta-analysis stated that it is unclear whether PET's diagnostic performance surpasses decision thresholds for biopsy or laparotomy. (12)
- In both the TEC Assessment and AHRQ systematic review, there were inadequate data to permit conclusions regarding the role of PET scanning as a technique to stage known pancreatic cancer.
- The AHRQ review published in 2008 and NCCN guidelines on pancreatic carcinoma suggest that PET/CT may be useful for staging in certain patients when the standard staging protocol is inconclusive. (20, 21)

Penile Cancer

A systematic review and meta-analysis of PET focused on staging inguinal lymph nodes among patients with penile squamous cell carcinoma. No comparisons were made with other imaging modalities. The report found that PET had low sensitivity and authors concluded that PET is not suited for routine clinical use. (28)

Prostate Cancer

Both an NCCN Task Force Report (20) and an AHRQ systematic review (21) do not find sufficient evidence to support use of PET for any indication in patients with prostate cancer. Reports show significant overlap between benign prostatic hyperplasia, malignant tumor, local recurrence, and postoperative scarring. PET may have limited sensitivity in detecting distant metastatic disease. The AHRQ report identified only 4 studies of PET for the indications of restaging and recurrence, none of which addressed the effect of PET on management decisions.

Soft Tissue Sarcoma

- A 2002 AHRQ systematic review on use of PET for soft tissue sarcoma (13) evaluated 5 applications: distinguishing between benign lesions and malignant soft tissue sarcoma, distinguishing between low-grade and high-grade soft tissue sarcoma, detecting locoregional recurrence, detecting distant metastases, and evaluating response to therapy.
- The review found that PET has low diagnostic accuracy in distinguishing low-grade tumors from benign lesions. PET performs better at differentiating high- or intermediate-grade tumors from low-grade tumors; however, it is unclear whether this will have an impact on management decisions and health outcomes. Evidence is insufficient on the comparative diagnostic performance of PET and alternative diagnostic modalities in the diagnosis of soft tissue sarcoma, detection of locoregional recurrence, detection of distant metastasis, and evaluating response to therapy.
- A systematic review looked at PET for evaluating response to imatinib and other treatments for gastrointestinal stromal tumors. (31) The report lacked a fundamental feature of well-performed systematic review: appraisal of the methodologic quality of individual studies. The review also lacked comparison of decision making and outcomes of PET-guided management with management guided without PET.

Testicular Cancer

- The 2004 AHRQ systematic review (12) found 1 prospective study and 4 retrospective studies that generally showed higher sensitivity and specificity for PET over CT. However these studies were small in size and failed to report separate results for patients with seminoma versus those with non-seminoma. Studies also failed to report separate results by clinical stage of disease. Thus, it is unclear whether this evidence translates to changes in patient management and improved health outcomes.
- Studies on distinguishing between viable tumor and necrosis/fibrosis after treatment of testicular cancer were flawed in 2 main ways. First, most studies did not compare the diagnostic accuracy of PET with other imaging modalities. Second, studies that did compare PET and CT did not state a clear threshold for a positive CT test, making study

results difficult to interpret. Therefore, it is uncertain whether use of PET leads to different patient management decisions and health outcomes than other imaging modalities.

An AHRQ technology assessment published in 2008 (21) and studies evaluating residual masses in patients after chemotherapy for seminoma support the use of PET. (39, 40) NCCN guidelines support the use of PET for this indication. (40)

Thyroid Cancer, Differentiated

The NCCN Task Force Report on PET reviewed studies which showed that PET can localize recurrent disease when other imaging tests are negative. (20) In addition, PET is a predictor of prognosis in this setting. More metabolically active lesions on PET are strongly correlated with survival.

Thyroid Cancer, Poorly Differentiated

A meta-analysis of studies on detecting recurrent or metastatic medullary thyroid carcinoma did not compare PET with other imaging modalities and did not clearly perform quality assessment of individual studies or incorporate study quality concerns into conclusions. (23)

Unknown Primary

- The 2002 TEC Assessment (7) concluded that the TEC criteria were met for the limited indication of the workup and management of patients with unknown primaries and a single site of metastatic disease. Specifically, local or regional therapy may be offered to these patients. In this setting, PET scanning may be used to verify the absence of disseminated disease.
- Regarding this application, the TEC Assessment identified 4 reports, including a total of 47 patients referred for imaging with a single known metastatic site from an unknown primary. In 13 (28%) of these patients, PET scanning identified previously undetected metastases that were confirmed by biopsy. Therefore, the use of PET can contribute to optimal decision making regarding the appropriateness of local or regional therapy.

Cancer Surveillance

The clinical utility for PET scanning in surveillance, i.e., in performing follow-up PET scans in asymptomatic patients to detect early disease recurrence, is not well-studied. (For this policy, a scan is considered a surveillance scan if performed more than 6 months following therapy, but 12 months for lymphoma.) The most recent NCCN publication (20) indicates, “The use of PET as a surveillance tool should only be used in clinical trials.” In addition, the NCCN guidelines for various malignancies often note that PET scans are not recommended in asymptomatic patients. For example the NCCN breast cancer guidelines comment that PET scans (as well as many other modalities) provide no advantage in survival or ability to palliate recurrent disease and are not recommended. (41)

Other Malignancies

There are inadequate scientific data to permit conclusions regarding the role of PET scanning in other malignancies.

Clinical Input from Academic Medical Centers and Specialty Societies

None

Summary

The utility of positron emission tomography (PET) scanning for the diagnosis and staging of malignancies varies by specific type of cancer. In general, PET scanning can be useful for distinguishing benign from malignant masses in certain circumstances and for increasing the accuracy of staging by detecting additional disease not detected by other imaging modalities. Therefore, PET scanning for diagnosis and staging of malignancies can be considered medically necessary when specific criteria are met for specific cancers, as outlined in the policy statement. For follow-up after the initial diagnosis and staging has been performed, or for tumor surveillance, the clinical utility is uncertain and this use of PET scanning is considered investigational.

CODING

The following codes for treatment and procedures applicable to this policy are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

CPT/HCPCS

78811	Positron emission tomography (PET) imaging; limited area (e.g. Chest, head/neck)
78812	Positron emission tomography (PET) imaging; skull base to mid-thigh
78813	Positron emission tomography (PET) imaging; whole body
78814	Tumor imaging, positron emission tomography (PET) with concurrently acquired computed tomography (CT) for attenuation correction and anatomical localization; limited area (e.g. chest, head/neck)
78815	Tumor imaging, positron emission tomography (PET) with concurrently acquired computed tomography (CT) for attenuation correction and anatomical localization; skull base to mid-thigh
78816	Tumor imaging, positron emission tomography (PET) with concurrently acquired computed tomography (CT) for attenuation correction and anatomical localization; whole body
A9526	Nitrogen N-13 ammonia, diagnostic, per study dose, up to 40 millicuries
A9552	Fluorodeoxyglucose F-18 FDG, diagnostic, per study dose, up to 45 millicuries
A9580	Sodium fluoride F-18, diagnostic, per study dose, up to 30 millicuries
G0219	PET imaging whole body; melanoma for noncovered indications
G0235	PET imaging, any site, not otherwise specified

DIAGNOSES

144.0-144.9 Malignant neoplasm of floor of mouth

145.0-145.9 Malignant neoplasm of other and unspecified parts of mouth

146.0-146.9 Malignant neoplasm of oropharynx

147.0-147.9 Malignant neoplasm of nasopharynx

148.0-148.9 Malignant neoplasm of hypopharynx

149.0-149.9 Malignant neoplasm of other and ill-defined sites within the lip, oral cavity, and pharynx

150.0-150.9 Malignant neoplasm of esophagus

151.0-151.9 Malignant neoplasm of stomach

153.0-153.9 Malignant neoplasm of colon

154.0-154.8 Malignant neoplasm of rectum, rectosigmoid junction, and anus

157.0-157.9 Malignant neoplasm of pancreas

159.0-159.9 Malignant neoplasm of other and ill-defined states within the digestive organs and peritoneum

160.0-160.9 Malignant neoplasm of nasal cavities, middle ear, and accessory sinuses

161.0-161.9 Malignant neoplasm of larynx

162.0-162.9 Malignant neoplasm of trachea, bronchus, and lung

170.0-170.9 Malignant neoplasm of bone and articular cartilage

171.0-171.9 Malignant neoplasm of connective and other soft tissue

172.0-172.9 Malignant melanoma of skin

174.0-174.9 Malignant neoplasm of female breast

175.0-175.9 Malignant neoplasm of male breast

180.0-180.9 Malignant neoplasm of cervix uteri

183.0 Malignant neoplasm of ovary and other uterina adnexa; ovary

183.8 Malignant neoplasm of ovary and other uterina adnexa; other specified sites of uterine adnexa

184.8 Malignant neoplasm of other and unspecified female genital organs; other specified sites of female genital organs
186.0-186.9 Malignant neoplasm of testis
189.0 Malignant neoplasm of kidney and other and unspecified urinary organs; kidney, except pelvis
189.1 Malignant neoplasm of kidney and other and unspecified urinary organs; renal pelvis
191.0-191.9 Malignant neoplasm of brain
192.0-192.9 Malignant neoplasm of other and unspecified parts of nervous system
193 Malignant neoplasm of thyroid gland
194.0 Malignant neoplasm of other endocrine glands and related structures; adrenal gland
194.3 Malignant neoplasm of other endocrine glands and related structures; pituitary gland and craniopharyngeal duct
194.4 Malignant neoplasm of other endocrine glands and related structures; pineal gland
194.5 Malignant neoplasm of other endocrine glands and related structures; carotid body
194.6 Malignant neoplasm of other endocrine glands and related structures; aortic body and other paraganglia
195.0 Malignant neoplasm of other and ill-defined sites; head, face, and neck
197.0 Secondary malignant neoplasm, lung
197.5 Secondary malignant neoplasm, large intestine and rectum
197.8 Secondary malignant neoplasm of respiratory and digestive systems; other digestive organs and spleen
198.3 Secondary malignant neoplasm of other specified sites; brain and spinal cord
198.6 Secondary malignant neoplasm of other specified sites; ovary
198.81 Secondary malignant neoplasm of other specified sites; other specified sites; breast
198.82 Secondary malignant neoplasm of other specified sites; other specified sites; genital organs
200.00-200.08 Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue; reticulosarcoma
200.10-200.18 Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue; lymphosarcoma
200.20-200.28 Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue; Burkitt's tumor or lymphoma
200.30-200.38 Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue; Marginal zone lymphoma
200.40-200.48 Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue; Mantle cell lymphoma
200.50-200.58 Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue; Primary central nervous system lymphoma
200.60-200.68 Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue; Anaplastic large cell lymphoma
200.70-200.78 Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue; Large cell lymphoma
200.80-200.88 Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue; Other names variants

201.00-201.08 Hodgkin's disease; Hodgkin's paragranuloma
201.10-201.18 Hodgkin's disease; Hodgkin's granuloma
201.20-201.28 Hodgkin's disease; Hodgkin's sarcoma
201.40-201.48 Hodgkin's disease; lymphocytic-histiocytic predominance
201.50-201.58 Hodgkin's disease; nodular sclerosis
201.60-201.68 Hodgkin's disease; mixed cellularity
201.70-201.78 Hodgkin's disease; lymphocytic depletion
201.90-201.98 Hodgkin's disease; Hodgkin's disease, unspecified
202.00-202.08 Other malignant neoplasms of lymphoid and histiocytic tissue; nodular lymphoma
202.10-202.18 Other malignant neoplasms of lymphoid and histiocytic tissue; mycosis fungoides
202.20-202.28 Other malignant neoplasms of lymphoid and histiocytic tissue; Sézary's disease
202.30-202.38 Other malignant neoplasms of lymphoid and histiocytic tissue; malignant histiocytosis
202.40-202.48 Other malignant neoplasms of lymphoid and histiocytic tissue; leukemic reticuloendotheliosis
202.50-202.58 Other malignant neoplasms of lymphoid and histiocytic tissue; Letterer-Siwe disease
202.60-202.68 Other malignant neoplasms of lymphoid and histiocytic tissue; malignant mast cell tumors
202.70-202.78 Other malignant neoplasms of lymphoid and histiocytic tissue; peripheral T-cell lymphoma
202.80-202.88 Other malignant neoplasms of lymphoid and histiocytic tissue; other lymphomas
202.90-202.98 Other and unspecified malignant neoplasms of lymphoid and histiocytic tissue
203.00-203.02 Multiple myeloma and immunoproliferative neoplasms; multiple myeloma
203.80-203.82 Multiple myeloma and immunoproliferative neoplasms; other immunoproliferative neoplasms
209.00-209.69 Neuroendocrine tumors
211.0 Benign neoplasm of other parts of digestive system; esophagus
211.3 Benign neoplasm of other parts of digestive system; colon
211.4 Benign neoplasm of other parts of digestive system; rectum and anal canal
212.3 Benign neoplasm of respiratory and intrathoracic organs, bronchus and lung
227.0 Benign neoplasm of other endocrine glands and related structures; adrenal gland
230.1 Carcinoma in situ of digestive organs; esophagus

230.3 Carcinoma in situ of digestive organs; colon
230.4 Carcinoma in situ of digestive organs; rectum
230.5 Carcinoma in situ of digestive organs; anal canal
230.9 Carcinoma in situ of digestive organs; other and unspecified digestive organs
231.2 Carcinoma in-situ of respiratory system, bronchus and lung
233.1 Carcinoma in situ of breast and genitourinary system; cervix uteri
233.39 Carcinoma in situ of breast and genitourinary system; other female genital organ
234.8 Carcinoma in situ of other and unspecified sites; other specified sites (endocrine gland [any])
235.2 Neoplasm of uncertain behavior, stomach, intestines, rectum
235.5 Neoplasm of uncertain behavior of digestive and respiratory systems; other and unspecified digestive organs
235.7 Neoplasm of uncertain behavior, trachea, bronchus and lung
237.3 Neoplasm of uncertain behavior of endocrine glands and nervous system; paraganglia
237.5 Neoplasm of uncertain behavior; brain and spinal cord
238.1 Neoplasm of uncertain behavior of other and unspecified sites and tissues; connective and other soft tissue
238.6 Neoplasm of uncertain behavior of other and unspecified sites and tissues; plasma cells
239.0 Neoplasm of unspecified nature, digestive system
239.1 Neoplasm of unspecified nature, respiratory system
239.6 Neoplasm of unspecified nature; brain
518.89 Other diseases of lung (solitary lung nodule)
784.2 Swelling, mass or lump in head and neck
785.6 Enlargement of lymph nodes
793.1 Nonspecific abnormal findings on radiological and other examinations of body structure, lung field
795.79 Other and unspecified no specific immunological findings (elevated CEA)
V10.01 Personal history of malignant neoplasm; tongue
V10.02 Personal history of malignant neoplasm; other and unspecified oral cavity and pharynx
V10.03 Personal history of malignant neoplasm; esophagus
V10.05 Personal history of malignant neoplasm; large intestine
V10.06 Personal history of malignant neoplasm; rectum, rectosigmoid junction and anus
V10.11 Personal history of malignant neoplasm; trachea, bronchus, and lung; bronchus and lung
V10.12 Personal history of malignant neoplasm; trachea, bronchus, and lung; trachea
V10.20 Personal history of malignant neoplasm; other respiratory and intrathoracic organs; respiratory organ, unspecified
V10.21 Personal history of malignant neoplasm; other respiratory and intrathoracic organs; larynx
V10.22 Personal history of malignant neoplasm; other respiratory and intrathoracic organs; nasal cavities, middle ear, and accessory sinuses
V10.29 Personal history of malignant neoplasm; other respiratory and intrathoracic organs; other
V10.43 Personal history of ovarian carcinoma
V10.72 Personal history of Hodgkin's disease
V10.79 Personal history of other lymphatic and hematopoietic neoplasms
V10.82 Personal history of malignant melanoma of skin

V10.87 Personal history of malignant neoplasm of other sites, thyroid

ICD-10 Diagnosis Codes *(Effective October 1, 2014)*

C04.0 Malignant neoplasm of anterior floor of mouth
C04.1 Malignant neoplasm of lateral floor of mouth
C04.8 Malignant neoplasm of overlapping sites of floor of mouth
C06.0 Malignant neoplasm of cheek mucosa
C06.1 Malignant neoplasm of vestibule of mouth
C05.0 Malignant neoplasm of hard palate
C05.1 Malignant neoplasm of soft palate
C05.2 Malignant neoplasm of uvula
C05.8 Malignant neoplasm of overlapping sites of palate
C06.2 Malignant neoplasm of retromolar area
C06.89 Malignant neoplasm of overlapping sites of other parts of mouth
C09.8 Malignant neoplasm of overlapping sites of tonsil
C09.0 Malignant neoplasm of tonsillar fossa
C09.1 Malignant neoplasm of tonsillar pillar (anterior) (posterior)
C10.0 Malignant neoplasm of vallecula
C10.1 Malignant neoplasm of anterior surface of epiglottis
C10.8 Malignant neoplasm of overlapping sites of oropharynx
C10.2 Malignant neoplasm of lateral wall of oropharynx
C10.3 Malignant neoplasm of posterior wall of oropharynx
C10.4 Malignant neoplasm of branchial cleft
C11.0 Malignant neoplasm of superior wall of nasopharynx
C11.1 Malignant neoplasm of posterior wall of nasopharynx
C11.2 Malignant neoplasm of lateral wall of nasopharynx
C11.3 Malignant neoplasm of anterior wall of nasopharynx
C11.8 Malignant neoplasm of overlapping sites of nasopharynx
C13.0 Malignant neoplasm of postcricoid region
C12 Malignant neoplasm of pyriform sinus
C13.1 Malignant neoplasm of aryepiglottic fold, hypopharyngeal aspect
C13.2 Malignant neoplasm of posterior wall of hypopharynx
C13.8 Malignant neoplasm of overlapping sites of hypopharynx
C14.2 Malignant neoplasm of Waldeyer's ring
C14.8 Malignant neoplasm of overlapping sites of lip, oral cavity and pharynx
C15.3 Malignant neoplasm of upper third of esophagus
C15.4 Malignant neoplasm of middle third of esophagus
C15.5 Malignant neoplasm of lower third of esophagus
C15.8 Malignant neoplasm of overlapping sites of esophagus
C16.0 Malignant neoplasm of cardia
C16.4 Malignant neoplasm of pylorus
C16.3 Malignant neoplasm of pyloric antrum
C16.1 Malignant neoplasm of fundus of stomach
C16.2 Malignant neoplasm of body of stomach
C16.8 Malignant neoplasm of overlapping sites of stomach
C18.3 Malignant neoplasm of hepatic flexure
C18.4 Malignant neoplasm of transverse colon
C18.6 Malignant neoplasm of descending colon

C18.7 Malignant neoplasm of sigmoid colon
C18.0 Malignant neoplasm of cecum
C18.1 Malignant neoplasm of appendix
C18.2 Malignant neoplasm of ascending colon
C18.5 Malignant neoplasm of splenic flexure
C18.8 Malignant neoplasm of overlapping sites of colon
C19 Malignant neoplasm of rectosigmoid junction
C20 Malignant neoplasm of rectum
C21.1 Malignant neoplasm of anal canal
C21.2 Malignant neoplasm of cloacogenic zone
C21.8 Malignant neoplasm of overlapping sites of rectum, anus and anal canal
C25.0 Malignant neoplasm of head of pancreas
C25.1 Malignant neoplasm of body of pancreas
C25.2 Malignant neoplasm of tail of pancreas
C25.3 Malignant neoplasm of pancreatic duct
C25.4 Malignant neoplasm of endocrine pancreas
C25.7 Malignant neoplasm of other parts of pancreas
C25.8 Malignant neoplasm of overlapping sites of pancreas
C26.1 Malignant neoplasm of spleen
C26.9 Malignant neoplasm of ill-defined sites within the digestive system
C30.0 Malignant neoplasm of nasal cavity
C30.1 Malignant neoplasm of middle ear
C31.0 Malignant neoplasm of maxillary sinus
C31.1 Malignant neoplasm of ethmoidal sinus
C31.2 Malignant neoplasm of frontal sinus
C31.3 Malignant neoplasm of sphenoid sinus
C31.8 Malignant neoplasm of overlapping sites of accessory sinuses
C32.0 Malignant neoplasm of glottis
C32.1 Malignant neoplasm of supraglottis
C32.2 Malignant neoplasm of subglottis
C32.3 Malignant neoplasm of laryngeal cartilage
C32.8 Malignant neoplasm of overlapping sites of larynx
C33 Malignant neoplasm of trachea
C34.01 Malignant neoplasm of right main bronchus
C34.02 Malignant neoplasm of left main bronchus
C34.10 Malignant neoplasm of upper lobe, unspecified bronchus or lung
C34.11 Malignant neoplasm of upper lobe, right bronchus or lung
C34.12 Malignant neoplasm of upper lobe, left bronchus or lung
C34.2 Malignant neoplasm of middle lobe, bronchus or lung
C34.31 Malignant neoplasm of lower lobe, right bronchus or lung
C34.32 Malignant neoplasm of lower lobe, left bronchus or lung
C34.81 Malignant neoplasm of overlapping sites of right bronchus and lung
C34.82 Malignant neoplasm of overlapping sites of left bronchus and lung
C34.91 Malignant neoplasm of unspecified part of right bronchus or lung
C34.92 Malignant neoplasm of unspecified part of left bronchus or lung
C41.0 Malignant neoplasm of bones of skull and face
C41.1 Malignant neoplasm of mandible
C41.2 Malignant neoplasm of vertebral column

C41.3 Malignant neoplasm of ribs, sternum and clavicle
C40.01 Malignant neoplasm of scapula and long bones of right upper limb
C40.02 Malignant neoplasm of scapula and long bones of left upper limb
C40.11 Malignant neoplasm of short bones of right upper limb
C40.12 Malignant neoplasm of short bones of left upper limb
C41.4 Malignant neoplasm of pelvic bones, sacrum and coccyx
C40.21 Malignant neoplasm of long bones of right lower limb
C40.22 Malignant neoplasm of long bones of left lower limb
C40.31 Malignant neoplasm of short bones of right lower limb
C40.32 Malignant neoplasm of short bones of left lower limb
C40.81 Malignant neoplasm of overlapping sites of bone and articular cartilage of right limb
C40.82 Malignant neoplasm of overlapping sites of bone and articular cartilage of left limb
C40.91 Malignant neoplasm of unspecified bones and articular cartilage of right limb
C40.92 Malignant neoplasm of unspecified bones and articular cartilage of left limb
C47.0 Malignant neoplasm of peripheral nerves of head, face and neck
C49.0 Malignant neoplasm of connective and soft tissue of head, face and neck
C47.10 Malignant neoplasm of peripheral nerves of unspecified upper limb, including shoulder
C47.11 Malignant neoplasm of peripheral nerves of right upper limb, including shoulder
C47.12 Malignant neoplasm of peripheral nerves of left upper limb, including shoulder
C49.10 Malignant neoplasm of connective and soft tissue of unspecified upper limb, including shoulder
C49.11 Malignant neoplasm of connective and soft tissue of right upper limb, including shoulder
C49.12 Malignant neoplasm of connective and soft tissue of left upper limb, including shoulder
C47.20 Malignant neoplasm of peripheral nerves of unspecified lower limb, including hip
C47.21 Malignant neoplasm of peripheral nerves of right lower limb, including hip
C47.22 Malignant neoplasm of peripheral nerves of left lower limb, including hip
C49.20 Malignant neoplasm of connective and soft tissue of unspecified lower limb, including hip
C49.21 Malignant neoplasm of connective and soft tissue of right lower limb, including hip
C49.22 Malignant neoplasm of connective and soft tissue of left lower limb, including hip
C47.3 Malignant neoplasm of peripheral nerves of thorax
C49.3 Malignant neoplasm of connective and soft tissue of thorax
C47.4 Malignant neoplasm of peripheral nerves of abdomen
C49.4 Malignant neoplasm of connective and soft tissue of abdomen
C47.5 Malignant neoplasm of peripheral nerves of pelvis
C49.5 Malignant neoplasm of connective and soft tissue of pelvis
C47.8 Malignant neoplasm of overlapping sites of peripheral nerves and autonomic nervous system
C49.8 Malignant neoplasm of overlapping sites of connective and soft tissue
C43.0 Malignant melanoma of lip
D03.0 Melanoma in situ of lip
C43.11 Malignant melanoma of right eyelid, including canthus
C43.12 Malignant melanoma of left eyelid, including canthus
D03.11 Melanoma in situ of right eyelid, including canthus
D03.12 Melanoma in situ of left eyelid, including canthus
C43.21 Malignant melanoma of right ear and external auricular canal
C43.22 Malignant melanoma of left ear and external auricular canal

D03.21 Melanoma in situ of right ear and external auricular canal
D03.22 Melanoma in situ of left ear and external auricular canal
C43.31 Malignant melanoma of nose
C43.39 Malignant melanoma of other parts of face
D03.39 Melanoma in situ of other parts of face
C43.4 Malignant melanoma of scalp and neck
D03.4 Melanoma in situ of scalp and neck
C43.51 Malignant melanoma of anal skin
C43.52 Malignant melanoma of skin of breast
C43.59 Malignant melanoma of other part of trunk
D03.51 Melanoma in situ of anal skin
D03.52 Melanoma in situ of breast (skin) (soft tissue)
D03.59 Melanoma in situ of other part of trunk
C43.61 Malignant melanoma of right upper limb, including shoulder
C43.62 Malignant melanoma of left upper limb, including shoulder
D03.61 Melanoma in situ of right upper limb, including shoulder
D03.62 Melanoma in situ of left upper limb, including shoulder
C43.71 Malignant melanoma of right lower limb, including hip
C43.72 Malignant melanoma of left lower limb, including hip
D03.71 Melanoma in situ of right lower limb, including hip
D03.72 Melanoma in situ of left lower limb, including hip
C43.8 Malignant melanoma of overlapping sites of skin
D03.8 Melanoma in situ of other sites
C50.011 Malignant neoplasm of nipple and areola, right female breast
C50.012 Malignant neoplasm of nipple and areola, left female breast
C50.111 Malignant neoplasm of central portion of right female breast
C50.112 Malignant neoplasm of central portion of left female breast
C50.211 Malignant neoplasm of upper-inner quadrant of right female breast
C50.212 Malignant neoplasm of upper-inner quadrant of left female breast
C50.311 Malignant neoplasm of lower-inner quadrant of right female breast
C50.312 Malignant neoplasm of lower-inner quadrant of left female breast
C50.411 Malignant neoplasm of upper-outer quadrant of right female breast
C50.412 Malignant neoplasm of upper-outer quadrant of left female breast
C50.511 Malignant neoplasm of lower-outer quadrant of right female breast
C50.512 Malignant neoplasm of lower-outer quadrant of left female breast
C50.611 Malignant neoplasm of axillary tail of right female breast
C50.612 Malignant neoplasm of axillary tail of left female breast
C50.811 Malignant neoplasm of overlapping sites of right female breast
C50.812 Malignant neoplasm of overlapping sites of left female breast
C50.911 Malignant neoplasm of unspecified site of right female breast
C50.912 Malignant neoplasm of unspecified site of left female breast
C50.021 Malignant neoplasm of nipple and areola, right male breast
C50.022 Malignant neoplasm of nipple and areola, left male breast
C50.121 Malignant neoplasm of central portion of right male breast
C50.122 Malignant neoplasm of central portion of left male breast
C50.221 Malignant neoplasm of upper-inner quadrant of right male breast
C50.222 Malignant neoplasm of upper-inner quadrant of left male breast
C50.321 Malignant neoplasm of lower-inner quadrant of right male breast

C50.322 Malignant neoplasm of lower-inner quadrant of left male breast
C50.421 Malignant neoplasm of upper-outer quadrant of right male breast
C50.422 Malignant neoplasm of upper-outer quadrant of left male breast
C50.521 Malignant neoplasm of lower-outer quadrant of right male breast
C50.522 Malignant neoplasm of lower-outer quadrant of left male breast
C50.621 Malignant neoplasm of axillary tail of right male breast
C50.622 Malignant neoplasm of axillary tail of left male breast
C50.821 Malignant neoplasm of overlapping sites of right male breast
C50.822 Malignant neoplasm of overlapping sites of left male breast
C50.921 Malignant neoplasm of unspecified site of right male breast
C50.922 Malignant neoplasm of unspecified site of left male breast
C53.0 Malignant neoplasm of endocervix
C53.1 Malignant neoplasm of exocervix
C53.8 Malignant neoplasm of overlapping sites of cervix uteri
C56.1 Malignant neoplasm of right ovary
C56.2 Malignant neoplasm of left ovary
C57.4 Malignant neoplasm of uterine adnexa, unspecified
C51.8 Malignant neoplasm of overlapping sites of vulva
C57.8 Malignant neoplasm of overlapping sites of female genital organs
C62.01 Malignant neoplasm of undescended right testis
C62.02 Malignant neoplasm of undescended left testis
C62.11 Malignant neoplasm of descended right testis
C62.12 Malignant neoplasm of descended left testis
C62.91 Malignant neoplasm of right testis, unspecified whether descended or undescended
C62.92 Malignant neoplasm of left testis, unspecified whether descended or undescended
C64.1 Malignant neoplasm of right kidney, except renal pelvis
C64.2 Malignant neoplasm of left kidney, except renal pelvis
C65.1 Malignant neoplasm of right renal pelvis
C65.2 Malignant neoplasm of left renal pelvis
C71.0 Malignant neoplasm of cerebrum, except lobes and ventricles
C71.1 Malignant neoplasm of frontal lobe
C71.2 Malignant neoplasm of temporal lobe
C71.3 Malignant neoplasm of parietal lobe
C71.4 Malignant neoplasm of occipital lobe
C71.5 Malignant neoplasm of cerebral ventricle
C71.6 Malignant neoplasm of cerebellum
C71.7 Malignant neoplasm of brain stem
C71.8 Malignant neoplasm of overlapping sites of brain
C71.9 Malignant neoplasm of brain, unspecified
C72.21 Malignant neoplasm of right olfactory nerve
C72.22 Malignant neoplasm of left olfactory nerve
C72.31 Malignant neoplasm of right optic nerve
C72.32 Malignant neoplasm of left optic nerve
C72.41 Malignant neoplasm of right acoustic nerve
C72.42 Malignant neoplasm of left acoustic nerve
C72.59 Malignant neoplasm of other cranial nerves
C70.0 Malignant neoplasm of cerebral meninges
C72.0 Malignant neoplasm of spinal cord

C72.1 Malignant neoplasm of cauda equina
C70.1 Malignant neoplasm of spinal meninges
C72.9 Malignant neoplasm of central nervous system, unspecified
C73 Malignant neoplasm of thyroid gland
C74.01 Malignant neoplasm of cortex of right adrenal gland
C74.02 Malignant neoplasm of cortex of left adrenal gland
C74.11 Malignant neoplasm of medulla of right adrenal gland
C74.12 Malignant neoplasm of medulla of left adrenal gland
C74.91 Malignant neoplasm of unspecified part of right adrenal gland
C74.92 Malignant neoplasm of unspecified part of left adrenal gland
C75.1 Malignant neoplasm of pituitary gland
C75.2 Malignant neoplasm of craniopharyngeal duct
C75.3 Malignant neoplasm of pineal gland
C75.4 Malignant neoplasm of carotid body
C75.5 Malignant neoplasm of aortic body and other paraganglia
C76.0 Malignant neoplasm of head, face and neck
C78.01 Secondary malignant neoplasm of right lung
C78.02 Secondary malignant neoplasm of left lung
C78.5 Secondary malignant neoplasm of large intestine and rectum
C78.7 Secondary malignant neoplasm of liver and intrahepatic bile duct
C78.89 Secondary malignant neoplasm of other digestive organs
C79.31 Secondary malignant neoplasm of brain
C79.49 Secondary malignant neoplasm of other parts of nervous system
C79.61 Secondary malignant neoplasm of right ovary
C79.62 Secondary malignant neoplasm of left ovary
C79.81 Secondary malignant neoplasm of breast
C79.82 Secondary malignant neoplasm of genital organs
C83.39 Diffuse large B-cell lymphoma, extranodal and solid organ sites
C83.31 Diffuse large B-cell lymphoma, lymph nodes of head, face, and neck
C83.32 Diffuse large B-cell lymphoma, intrathoracic lymph nodes
C83.33 Diffuse large B-cell lymphoma, intra-abdominal lymph nodes
C83.34 Diffuse large B-cell lymphoma, lymph nodes of axilla and upper limb
C83.35 Diffuse large B-cell lymphoma, lymph nodes of inguinal region and lower limb
C83.36 Diffuse large B-cell lymphoma, intrapelvic lymph nodes
C83.37 Diffuse large B-cell lymphoma, spleen
C83.38 Diffuse large B-cell lymphoma, lymph nodes of multiple sites
C83.59 Lymphoblastic (diffuse) lymphoma, extranodal and solid organ sites
C83.51 Lymphoblastic (diffuse) lymphoma, lymph nodes of head, face, and neck
C83.52 Lymphoblastic (diffuse) lymphoma, intrathoracic lymph nodes
C83.53 Lymphoblastic (diffuse) lymphoma, intra-abdominal lymph nodes
C83.54 Lymphoblastic (diffuse) lymphoma, lymph nodes of axilla and upper limb
C83.55 Lymphoblastic (diffuse) lymphoma, lymph nodes of inguinal region and lower limb
C83.56 Lymphoblastic (diffuse) lymphoma, intrapelvic lymph nodes
C83.57 Lymphoblastic (diffuse) lymphoma, spleen
C83.58 Lymphoblastic (diffuse) lymphoma, lymph nodes of multiple sites
C83.79 Burkitt lymphoma, extranodal and solid organ sites
C83.71 Burkitt lymphoma, lymph nodes of head, face, and neck
C83.72 Burkitt lymphoma, intrathoracic lymph nodes

C83.73 Burkitt lymphoma, intra-abdominal lymph nodes
C83.74 Burkitt lymphoma, lymph nodes of axilla and upper limb
C83.75 Burkitt lymphoma, lymph nodes of inguinal region and lower limb
C83.76 Burkitt lymphoma, intrapelvic lymph nodes
C83.77 Burkitt lymphoma, spleen
C83.78 Burkitt lymphoma, lymph nodes of multiple sites
C83.89 Other non-follicular lymphoma, extranodal and solid organ sites
C88.4 Extranodal marginal zone B-cell lymphoma of mucosa-associated lymphoid tissue [MALT-lymphoma]
C83.81 Other non-follicular lymphoma, lymph nodes of head, face, and neck
C83.82 Other non-follicular lymphoma, intrathoracic lymph nodes
C83.83 Other non-follicular lymphoma, intra-abdominal lymph nodes
C83.84 Other non-follicular lymphoma, lymph nodes of axilla and upper limb
C83.85 Other non-follicular lymphoma, lymph nodes of inguinal region and lower limb
C83.86 Other non-follicular lymphoma, intrapelvic lymph nodes
C83.87 Other non-follicular lymphoma, spleen
C83.88 Other non-follicular lymphoma, lymph nodes of multiple sites
C83.19 Mantle cell lymphoma, extranodal and solid organ sites
C83.11 Mantle cell lymphoma, lymph nodes of head, face, and neck
C83.12 Mantle cell lymphoma, intrathoracic lymph nodes
C83.13 Mantle cell lymphoma, intra-abdominal lymph nodes
C83.14 Mantle cell lymphoma, lymph nodes of axilla and upper limb
C83.15 Mantle cell lymphoma, lymph nodes of inguinal region and lower limb
C83.16 Mantle cell lymphoma, intrapelvic lymph nodes
C83.17 Mantle cell lymphoma, spleen
C83.18 Mantle cell lymphoma, lymph nodes of multiple sites
C84.69 Anaplastic large cell lymphoma, ALK-positive, extranodal and solid organ sites
C84.70 Anaplastic large cell lymphoma, ALK-negative, unspecified site
C84.79 Anaplastic large cell lymphoma, ALK-negative, extranodal and solid organ sites
C84.61 Anaplastic large cell lymphoma, ALK-positive, lymph nodes of head, face, and neck
C84.71 Anaplastic large cell lymphoma, ALK-negative, lymph nodes of head, face, and neck
C84.62 Anaplastic large cell lymphoma, ALK-positive, intrathoracic lymph nodes
C84.72 Anaplastic large cell lymphoma, ALK-negative, intrathoracic lymph nodes
C84.63 Anaplastic large cell lymphoma, ALK-positive, intra-abdominal lymph nodes
C84.73 Anaplastic large cell lymphoma, ALK-negative, intra-abdominal lymph nodes
C84.64 Anaplastic large cell lymphoma, ALK-positive, lymph nodes of axilla and upper limb
C84.74 Anaplastic large cell lymphoma, ALK-negative, lymph nodes of axilla and upper limb
C84.65 Anaplastic large cell lymphoma, ALK-positive, lymph nodes of inguinal region and lower limb
C84.75 Anaplastic large cell lymphoma, ALK-negative, lymph nodes of inguinal region and lower limb
C84.66 Anaplastic large cell lymphoma, ALK-positive, intrapelvic lymph nodes
C84.76 Anaplastic large cell lymphoma, ALK-negative, intrapelvic lymph nodes
C84.67 Anaplastic large cell lymphoma, ALK-positive, spleen
C84.77 Anaplastic large cell lymphoma, ALK-negative, spleen
C84.68 Anaplastic large cell lymphoma, ALK-positive, lymph nodes of multiple sites
C84.78 Anaplastic large cell lymphoma, ALK-negative, lymph nodes of multiple sites
C85.29 Mediastinal (thymic) large B-cell lymphoma, extranodal and solid organ sites

C85.21 Mediastinal (thymic) large B-cell lymphoma, lymph nodes of head, face, and neck
C85.22 Mediastinal (thymic) large B-cell lymphoma, intrathoracic lymph nodes
C85.23 Mediastinal (thymic) large B-cell lymphoma, intra-abdominal lymph nodes
C85.24 Mediastinal (thymic) large B-cell lymphoma, lymph nodes of axilla and upper limb
C85.25 Mediastinal (thymic) large B-cell lymphoma, lymph nodes of inguinal region and lower limb
C85.26 Mediastinal (thymic) large B-cell lymphoma, intrapelvic lymph nodes
C85.27 Mediastinal (thymic) large B-cell lymphoma, spleen
C85.28 Mediastinal (thymic) large B-cell lymphoma, lymph nodes of multiple sites
C83.09 Small cell B-cell lymphoma, extranodal and solid organ sites
C83.99 Non-follicular (diffuse) lymphoma, unspecified, extranodal and solid organ sites
C86.5 Angioimmunoblastic T-cell lymphoma
C86.6 Primary cutaneous CD30-positive T-cell proliferations
C83.01 Small cell B-cell lymphoma, lymph nodes of head, face, and neck
C83.91 Non-follicular (diffuse) lymphoma, unspecified, lymph nodes of head, face, and neck
C83.02 Small cell B-cell lymphoma, intrathoracic lymph nodes
C83.92 Non-follicular (diffuse) lymphoma, unspecified, intrathoracic lymph nodes
C83.03 Small cell B-cell lymphoma, intra-abdominal lymph nodes
C83.93 Non-follicular (diffuse) lymphoma, unspecified, intra-abdominal lymph nodes
C83.04 Small cell B-cell lymphoma, lymph nodes of axilla and upper limb
C83.94 Non-follicular (diffuse) lymphoma, unspecified, lymph nodes of axilla and upper limb
C83.05 Small cell B-cell lymphoma, lymph nodes of inguinal region and lower limb
C83.95 Non-follicular (diffuse) lymphoma, unspecified, lymph nodes of inguinal region and lower limb
C83.06 Small cell B-cell lymphoma, intrapelvic lymph nodes
C83.96 Non-follicular (diffuse) lymphoma, unspecified, intrapelvic lymph nodes
C83.07 Small cell B-cell lymphoma, spleen
C83.97 Non-follicular (diffuse) lymphoma, unspecified, spleen
C83.08 Small cell B-cell lymphoma, lymph nodes of multiple sites
C83.98 Non-follicular (diffuse) lymphoma, unspecified, lymph nodes of multiple sites

REVISIONS

10-30-2013	Oncologic Applications was originally part of the Positron Emission Tomography (PET) medical policy. Oncologic Applications has been pulled out and placed into a separate medical policy, Positron Emission Tomography (PET): Oncologic Applications. The medical policy language was unchanged.
	Updated Description section.
	Updated Rationale section.
	In Coding section: ▪ Added ICD-10 Diagnosis codes *(Effective October 1,2014)*
	Updated Reference section.

REFERENCES

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