

	<p><b>Positron Emission Tomography (Positron Emission Tomography (PET Scan Guidelines)</b></p>	
<p><b>Guideline #</b> 6196</p>	<p><b>Categories</b> Clinical → Care Management CM, TCHP Guidelines, Utilization Management UM</p>	<p><b>This Guideline Applies To:</b> Texas Children's Health Plan</p>
		<p><b>Document Owner</b> Bhavana Babber</p>

**GUIDELINE STATEMENT:**

Texas Children's Health Plan (TCHP) performs authorization of all PET scans.

**DEFINITIONS:**

- Positron Emission Tomography (PET) is an imaging modality that produces an image of the body's soft structures, including metabolic and/or chemical information.

**PRIOR AUTHORIZATION GUIDELINES**

1. All requests for prior authorization for PET scans are received via online submission, fax, phone or mail by the Utilization Management Department and processed during normal business hours.
2. The Utilization Management professional receiving the request evaluates the submitted information to determine if the documentation supports the PET scan request as an eligible service.
3. To request prior authorization for PET scan, the following documentation must be provided:
  - 3.1. Diagnosis
  - 3.2. Treatment history
  - 3.3. Treatment plan
  - 3.4. Medications that the member is currently taking
  - 3.5. Previous imaging results
  - 3.6. Signed physician order for the ordered test
4. PET scan is considered medically necessary in the following situations:
  - 4.1. Neurological:

4.1.1. Identification or localization of seizure foci in individuals who are surgical candidates for neurosurgical treatment of intractable epilepsy.

4.2. Musculoskeletal:

4.2.1. To diagnose chronic osteomyelitis of the axial skeleton.

4.3. Infectious:

4.3.1. Evaluation of fever of unknown origin using 18F fluorodeoxyglucose positron emission with computed tomography in adults when diagnosis is not evident based on a diagnostic workup that has already included:

4.3.1.1. Comprehensive history and examination

4.3.1.2. Comprehensive laboratory testing to include: complete blood count, urinalysis and culture; electrolyte panel, liver enzymes, erythrocyte sedimentation rate, and C-reactive protein level testing, blood cultures, lactate dehydrogenase, creatine kinase, rheumatoid factor, antinuclear antibodies, Human immunodeficiency virus and appropriate region-specific serologic testing (e.g., cytomegalovirus, Epstein-Barr virus, tuberculosis)

4.3.1.3. Imaging that may include chest radiography, abdominal and pelvic ultrasonography or computed tomography

4.3.2. Evaluation of fever of unknown origin using 18F fluorodeoxyglucose positron emission with computed tomography in critically ill children with complex underlying disease when diagnosis is not evident based on a diagnostic workup that has already included:

4.3.2.1. Comprehensive history and examination

4.3.2.2. Comprehensive laboratory testing to include: complete blood count, urinalysis and culture; electrolyte panel, liver enzymes, erythrocyte sedimentation rate, and C-reactive protein level testing, blood cultures, lactate dehydrogenase, creatinine kinase, rheumatoid factor, antinuclear antibodies, Human immunodeficiency virus and appropriate region-specific serologic testing (e.g., cytomegalovirus, Epstein-Barr virus, tuberculosis)

4.3.2.3. Imaging that may include chest radiography, abdominal and pelvic ultrasonography or computed tomography

4.4. Cardiac

4.4.1. PET is considered **medically necessary** for the following cardiac conditions when results of the PET scan can reasonably be expected to influence clinical management of the individual's condition:

4.4.1.1. To assess myocardial viability in those with severe global left ventricular dysfunction to determine candidacy for a cardiac surgery procedure including coronary artery bypass grafting (CABG), percutaneous

transluminal coronary angioplasty (PTCA) and transplantation;  
**OR**

4.4.1.2. To assess myocardial perfusion in the diagnosis of coronary artery disease when any of the following are present:

4.4.1.2.1. Unavailable or inconclusive single photon emission computed tomography (SPECT) or stress echocardiogram; or

4.4.1.2.2. Body habitus or other conditions for which SPECT or stress echocardiogram may have attenuation problems, (for example, body mass index [BMI] of greater than or equal to 40 kg/m<sup>2</sup>, large breasts, left mastectomy, breast implant, chest wall deformity, left pleural or pericardial effusion, circulatory problems in inferior-septal areas of the heart) or other technical difficulty (extensive prior myocardial infarction);  
 or

4.4.1.2.3. Conditions for which angiography may be associated with high risk for morbidity (for example, allergy to contrast medium, poor arterial access, significant renal dysfunction).

**OR**

4.4.1.3. To assess suspected cardiac sarcoidosis when magnetic resonance imaging (MRI) is contraindicated.

4.5. Oncologic

4.5.1. PET scan is considered medically necessary when used for **diagnosis** or **staging** of cancer when ALL (1, 2, and 3) of the following criteria are met:

4.5.1.1. Imaging results are required to determine at least one of the following:

4.5.1.1.1. Whether the individual is a candidate for an invasive diagnostic or therapeutic procedure of an internal body structure (for example, biopsy of a pancreas lesion not merely a superficial lymph node); or

4.5.1.1.2. The appropriate anatomic location for an invasive procedure; or

4.5.1.1.3. The extent of malignancy when recommended therapy, (for example, local vs. systemic therapy, use of neo-adjuvant therapy) reasonably depends upon the extent of malignancy;  
 AND

4.5.1.2. More standard imaging modalities, (for example, CT, MRI, or ultrasound) are either not indicated or unable to conclusively provide the required information;  
 AND

4.5.1.3. The tumor in question is a suspected or proven malignancy from any of the following primary locations:

- Anal cancer

- Appendix
- Brain
- Breast (except initial staging of axillary lymph nodes); or
- Cervix
- Chordoma
- Colorectal
- Esophageal
- Ewing sarcoma and osteosarcoma
- Fallopian tube
- Gastric
- Gastrointestinal stromal tumors
- Head and neck cancers (excluding cancers of the central nervous system and thyroid cancer)
- Lung
- Lymphoma
- Melanoma
- Merkel cell carcinoma
- Mesothelioma
- Multiple myeloma and plasmacytomas
- Musculoskeletal o
- Neuroblastoma
- Neuroendocrine tumors
- Non-small cell lung carcinoma
- Occult primary cancers
- Ovarian cancer
- Pancreatic cancer
- Paraneoplastic syndrome
- Penile cancer
- Primary peritoneal cancer
- Small cell lung carcinoma
- Small bowel adenocarcinoma
- Soft tissue sarcoma
- Solitary pulmonary nodules
- Testicular cancer
- Thymic malignancies
- Thyroid cancer (excluding metastatic thyroid cancer).
- Cancer of Unknown Primary;
- Suspected Paraneoplastic Syndrome.

4.5.2. PET scan is considered medically necessary when used for **restaging** or **monitoring** of cancer when ALL (1, 2, 3, 4 and 5) of the following criteria are met:

4.5.2.1. Initial therapy has been completed.  
AND

- 4.5.2.2. Imaging results are required to assess therapeutic success, in order to establish the need for, or scope of, any subsequent therapy, by determining at least one of the following:
- 4.5.2.2.1. Presence or extent of residual disease; or
  - 4.5.2.2.2. Presence or extent of recurrent disease; or
  - 4.5.2.2.3. Presence or extent of metastasis; or
  - 4.5.2.2.4. Other assessment of tumor response.
- AND
- 4.5.2.3. More standard imaging modalities (for example, CT, MRI, or ultrasound) are either not indicated or provided inconclusive results.
- AND
- 4.5.2.4. The tumor in question is a primary malignancy from any of the following locations:
- Brain; or
  - Breast; or
  - Cervix; or
  - Colorectal; or
  - Esophageal; or
  - Head and Neck (excluding Central Nervous System & Thyroid); or
  - Lung – Non-Small Cell (NSCLC); or
  - Lymphoma: Hodgkin's or Non-Hodgkin's; or
  - Melanoma; or
  - Myeloma; or
  - Musculoskeletal (including Soft Tissue Sarcoma); or
  - Neuroblastoma; or
  - Neuroendocrine Tumor, poorly differentiated; or
  - Ovarian; or
  - Testicular; or
  - Thyroid.
- AND
- 4.5.2.5. When prior PET scan has been performed, the results demonstrated hypermetabolic uptake by the tumor (if no prior PET or prior PET positive, then this criterion is met).
- 4.5.3. PET scan, with or without PET/CT fusion, is considered medically necessary for ***other (not included in the lists in section A or B) malignancies*** if ALL of the following criteria are met:
- 4.5.3.1. Imaging results are required to determine at least one of the following:

- 4.5.3.1.1. Whether the individual is a candidate for an invasive diagnostic or therapeutic procedure of an internal body structure (for example, biopsy of a pancreas lesion not merely a superficial lymph node); or
- 4.5.3.1.2. The appropriate anatomic location for an invasive procedure; or
- 4.5.3.1.3. The extent of malignancy when recommended therapy, (for example, local vs. systemic therapy, use of neo-adjuvant therapy) reasonably depends upon the extent of malignancy; or
- 4.5.3.1.4. When major surgery or curative local high-dose radiation is being recommended, and a PET or PET/CT scan may identify the presence of metastatic disease that may change management of the individual; or
- 4.5.3.1.5. After completion of initial therapy for malignancy, imaging results are required to assess therapeutic success, in order to establish the need for, or scope of, any subsequent therapy, by determining at least one of the following:
  - 4.5.3.1.5.1. Presence or extent of residual disease; or
  - 4.5.3.1.5.2. Presence or extent of recurrent disease; or
  - 4.5.3.1.5.3. Presence or extent of metastasis; or
  - 4.5.3.1.5.4. Other assessment of tumor response.AND
- 4.5.3.2. More standard imaging modalities, (for example, CT, MRI, or ultrasound) are either not indicated or unable to conclusively provide the required information.  
AND
- 4.5.3.3. Imaging is NOT for any of the following clinical situations (or scenarios):
  - 4.5.3.3.1. Diagnosis or staging for ovarian cancer or testicular cancer; or
  - 4.5.3.3.2. Restaging or monitoring for small cell lung cancer (SCLC) or pancreatic cancer.
- 4.5.4. Interim Scanning is considered medically necessary in the following situations
  - 4.5.4.1. Non-Hodgkin's lymphoma (NHL), other than follicular lymphoma, is considered medically necessary no more frequently than every two cycles of chemotherapy to a maximum of 3 times during a treatment course when needed to guide treatment decision making.
  - 4.5.4.2. For Hodgkin's lymphoma (HL), other than stage Ia HL, interim PET is considered medically necessary no more frequently than every two cycles of chemotherapy to a maximum of 3 times during a treatment course when needed to guide treatment decision making.

- 4.5.5. **Intermittent surveillance** (see Definitions section) scanning for Ewing Sarcoma is considered medically necessary.
5. All other uses of PET scan with or without PET/CT fusion, other than as set forth above, are considered **investigational and not medically necessary** including, but not limited to, the following:
- 5.1. Malignancies that do not meet the criteria in the Medically Necessary sections above; or
  - 5.2. Interim PET scanning to evaluate response to treatment during a course of treatment except when criteria above are met; (Note: Interim PET scanning is not considered restaging.); or
  - 5.3. Screening for any malignancies in an individual not yet diagnosed with cancer, other than as described in the criteria for "Solitary Pulmonary Nodule" above; or
  - 5.4. Surveillance of asymptomatic individuals, except for Ewing Sarcoma (without abnormal physical findings, lab tests, or other imaging findings related to malignancy recurrence) after completion of therapy for malignancy; or
  - 5.5. Alzheimer's disease and other dementias (for example, multi-infarct dementia, fronto-temporal dementia) using beta amyloid ( $\beta$ -amyloid) or other PET tracers; or
  - 5.6. Cerebrovascular disease, (for example, carotid artery disease, aneurysms, arteriovascular malformations, ischemic cerebrovascular disease or assessment of arterial vasospasm subsequent to subarachnoid hemorrhage); or
  - 5.7. Autism Spectrum Disorders; or
  - 5.8. Parkinson's Disease.
  - 5.9. PET scanning of the bone using Sodium fluoride F 18 (NaF-18) is considered **investigational and not medically necessary** for all applications including, but not limited to, the evaluation of suspected metastasis to bone.
  - 5.10. PET scanning of the prostate using C-11 choline radiotracer or any other radiopharmaceutical, (such as FDG-PET) is considered **investigational and not medically necessary** for all applications, including, but not limited to, initial staging, confirming the diagnosis, restaging or monitoring for recurrence of prostate cancer.
  - 5.11. The use of PET Mammography (PEM) for the detection of breast cancer or subsequent monitoring of breast cancer is considered **investigational and not medically necessary**.
6. Requests that do not meet the criteria established by this procedure will be referred to a TCHP Medical Director/Physician Reviewer for review and the Denial Policy will be followed.
7. Preauthorization is based on medical necessity and not a guarantee of benefits or eligibility. Even if preauthorization is approved for treatment or a particular service, that authorization applies only to the medical necessity of treatment or service. All services are subject to benefit limitations and

exclusions. Providers are subject to State and Federal Regulatory compliance and failure to comply may result in retrospective audit and potential financial recoupment.

## REFERENCES:

### Peer Reviewed Publications:

- Aizenstein HJ, Nebes RD, Saxton JA, et al. Frequent amyloid deposition without significant cognitive impairment among the elderly. *Arch Neurol*. 2008; 65:1509-1517.
- Albin RL, Koeppe RA, Burke JF, et al. Comparing fluorodeoxyglucose F18-PET assessment of regional cerebral glucose metabolism and [11C]dihydrotetrabenazine-PET in evaluation of early dementia and mild cognitive impairment. *Arch Neurol*. 2010; 67(4):440-446.
- André M, Vander Borght T, Bosly A. Interim FDG-PET scan in Hodgkin's lymphoma: hopes and caveats. *Adv Hematol*. 2011; 2011:430679.
- Avigdor A, Bulvik S, Levi I, et al. Two cycles of escalated BEACOPP followed by four cycles of ABVD utilizing early-interim PET/CT scan is an effective regimen for advanced high-risk Hodgkin's lymphoma. *Ann Oncol*. 2010; 21(1):126-132.
- Avril NE, Weber WA. Monitoring response to treatment in patients utilizing PET. *Radiol Clin North Am*. 2005; 43(1):189-204.
- Bastiaannet E, Groen H, Jager PL, et al. The value of FDG-PET in the detection, grading and response to therapy of soft tissue and bone sarcomas; a systematic review and meta-analysis. *Cancer Treat Rev*. 2004; 30(1):83-101.
- Beheshti M, Vali R, Waldenberger P, et al. Detection of bone metastases in patients with prostate cancer with F-18 fluorocholine and F-18 fluoride PET-CT: a comparative study. *Eur J Nucl Med Mol Imaging*. 2008; 35(10):1766-1774.
- Berg WA, Madsen KS, Schilling K, et al. Breast cancer: Comparative effectiveness of positron emission mammography and MR imaging in presurgical planning for the ipsilateral breast. *Radiology*. 2011; 258(1):59-72.
- Berg WA, Weinberg IN, Narayanan D, et al. High-resolution fluorodeoxyglucose positron emission tomography with compression ("positron emission mammography") is highly accurate in depicting primary breast cancer. *Breast J*. 2006; 12(4):309-323.
- Birdwell RL, Mountford CE, Iglehart JD. Molecular imaging of the breast. *AJR Am J Roentgenol*. 2009; 193(2):367-376.
- Bleeker-Rovers CP, Vos FJ, de Kleijn EM, et al. A prospective multicenter study on fever of unknown origin: the yield of a structured diagnostic protocol. *Medicine (Baltimore)*. 2007;86(1):26–38.
- Cerci JJ, Pracchia LF, Linardi CC, et al. 18F-FDG PET after 2 cycles of ABVD predicts event-free survival in early and advanced Hodgkin lymphoma. *J Nucl Med*. 2010; 51(9):1337-1343.
- Chang L, Cheng MF, Jou ST, et al. Search of Unknown Fever Focus Using PET in Critically Ill Children With Complicated Underlying Diseases. *Pediatr Crit Care Med*. 2016 Feb;17(2):e58-65
- Chen YM, Pan XF, Tong LJ, et al. Can 18F-fluorodeoxyglucose positron emission tomography predict responses to neoadjuvant therapy in esophageal cancer patients? A meta-analysis. *Nucl Med Commun*. 2011; 32(11):1005-1010.



- Cheson BD. Role of functional imaging in the management of lymphoma. *J Clin Oncol*. 2011; 29(14):1844-1854.
- Clark CM, Pontecorvo MJ, Beach TG, et al. Cerebral PET with florbetapir compared with neuropathology at autopsy for detection of neuritic amyloid- $\beta$  plaques: a prospective cohort study. *Lancet Neurol*. 2012; 11(8):669-678.
- Dann EJ, Bar-Shalom R, Tamir A, et al. Risk-adapted BEACOPP regimen can reduce the cumulative dose of chemotherapy for standard and high-risk Hodgkin lymphoma with no impairment of outcome. *Blood*. 2007; 109(3):905-909.
- Doraiswamy PM, Sperling RA, Coleman RE, et al. Amyloid- $\beta$  assessed by florbetapir F 18 PET and 18 month cognitive decline: a multicenter study. *Neurology*. 2012; 79(16):1636-1644.
- Durand-Martel P, Tremblay D, Brodeur C, et al. Autopsy as gold standard in FDG-PET studies in dementia. *Can J Neurol Sci*. 2010; 37(3):336-342.
- Even-Sapir E. Imaging of malignant bone involvement by morphologic, scintigraphic, and hybrid modalities. *J Nucl Med*. 2005; 46(8):1356-1367.
- Even-Sapir E, Metser U, Flusser G, et al. Assessment of malignant skeletal disease: initial experience with [F-18]fluoride PET/CT and comparison between [F-18]fluoride PET and [F-18]fluoride PET/CT. *J Nucl Med*. 2004; 45(2):272-278.
- Even-Sapir E, Metser U, Mishani E, et al. The detection of bone metastases in patients with high-risk prostate cancer: Tc-99m-MDP planar bone scintigraphy, single and multi-field-of-view SPECT, F-18-fluoride PET, and F-18-fluoride PET/CT. *J Nucl Med*. 2006; 47(2):287-297.
- Fleisher AS, Chen K, Liu X, et al. Using positron emission tomography and florbetapir F 18 to image cortical amyloid in patients with mild cognitive impairment or dementia due to Alzheimer disease. *Arch Neurol*. 2011; 68(11):1404-1411.
- Ghesani M, Depuey E, Rozanski A. Role of F-18 FDG positron emission tomography (PET) in the assessment of myocardial viability. *Echocard*. 2005; 22(2):165-177.
- Goldstein D, Tan BS, Rossleigh M, et al. Gastrointestinal stromal tumors: correlation of F-FDG gamma camera-based coincidence positron emission tomography with CT for the assessment of treatment response – an AGITG Study. *Oncology*. 2005; 69(4):326-332.
- Gould MK, Maclean CC, Kuschner WG, et al. Accuracy of positron emission tomography for diagnosis of pulmonary nodules and mass lesions. *JAMA*. 2001; 285(7):914-924.
- Grant FD, Fahey FH, Packard AB, et al. Skeletal PET with 18-F Fluoride: applying new technology to an old tracer. *J Nucl Med*. 2008; 49(1):68-78.
- Greco M, Crippa F, Agresti R, et al. Axillary lymph node staging in breast cancer by 2-fluoro-2-deoxy-Dglucose-positron emission tomography: clinical evaluation and alternative management. *J Natl Cancer Inst*. 2001; 93(8):630-635.
- Gyorke T, Zajic T, Lange A, et al. Impact of FDG PET for staging of Ewing sarcomas and primitive neuroectodermal tumors. *Nucl Med Commun*. 2006; 27(1):17-24.
- Hartmann A, Eid K, Dora C, et al. Diagnostic value of 18F-FDG PET/CT in trauma patients with suspected chronic osteomyelitis. *Eur J Nucl Med Mol Imaging*. 2006 34(5):704-714.
- Hetzel M, Arslanemir C, Koenig HH, et al. F-18 NaF-18 PET for detection of bone metastases in lung cancer: accuracy, cost-effectiveness, and impact on patient management. *J Bone Miner Res*. 2003; 18(12):2206-2214.
- Heusner TA, Hahn S, Jonkmanns C, et al. Diagnostic accuracy of fused positron emission tomography/magnetic resonance mammography: initial results. *Br J Radiol*. 2011; 84(998):126-135.

- Iagaru A, Mittra E, Yaghoubi SS, et al. Novel strategy for a cocktail 18F-fluoride and 18F-FDG PET/CT scan for evaluation of malignancy: results of the pilot phase study. *J Nucl Med*. 2009; 50(4):501-505.
- Isohashi K, Tatsumi M, Higuchi I, et al. 18F-FDG-PET in patients with malignant lymphoma having long-term follow-up: staging and restaging, and evaluation of treatment response and recurrence. *Ann Nucl Med*. 2008; 22(9):795-802.
- Jagust WJ, Bandy D, Chen K, et al. The Alzheimer's Disease Neuroimaging Initiative positron emission tomography core. *Alzheimers Dement*. 2010 May;6(3):221-229.
- Joshi AD, Pontecorvo MJ, Clark CM, et al. Performance characteristics of amyloid PET with florbetapir F 18 in patients with Alzheimer disease and cognitively normal subjects. *J Nucl Med*. 2012; 53(3):378-384.
- Juweid ME, Cheson BD. Positron-emission tomography and assessment of cancer therapy. *N Engl J Med*. 2006; 354(5):496-507.
- Juweid ME. FDG-PET/CT in lymphoma. *Methods Mol Biol*. 2011;727:1-19.
- Kadir A, Marutle A, Gonzalez D, et al. Positron emission tomography imaging and clinical progression in relation to molecular pathology in the first Pittsburgh Compound B positron emission tomography patient with Alzheimer's disease. *Brain*. 2011; 134(Pt 1):301-317.
- Kasamon YL. Prognostication and risk-adapted therapy of Hodgkin's lymphoma using positron emission tomography. *Adv Hematol*. 2011; 271595.
- Kjölhede H, Ahlgren G, Almquist H, et al. Combined 18F-fluorocholine and 18F-fluoride positron emission tomography/computed tomography imaging for staging of high-risk prostate cancer. *BJU Internat*. 2012; 110(10):1501-1506.
- Kostakoglu L, Leonard JP, Kuji I, et al. Comparison of fluorine-18 fluorodeoxyglucose positron emission tomography and Ga-67 scintigraphy in evaluation of lymphoma. *Cancer*. 2002; 94(4):879-888.
- Kovacs GG, Alafuzoff I, Al-Sarraj S, et al. Mixed brain pathologies in dementia: the BrainNet Europe consortium experience. *Dement Geriatr Cogn Disord*. 2008; 26(4):343-350.
- Kubota K, Nakamoto Y, Tamaki N, et al. FDG-PET for the diagnosis of fever of unknown origin: a Japanese multi-center study. *Ann Nucl Med*. 2011;25(5):355–364.
- Kumar R, Chauhan A, Zhuang H, et al. Clinicopathologic factors associated with false negative FDG-PET in primary breast cancer. *Breast Can Res Treat*. 2006; 98(3):267-274.
- Laforce R Jr, Buteau JP, Paquet N, et al. The value of PET in mild cognitive impairment, typical and atypical/unclear dementias: A retrospective memory clinic study. *Am J Alzheimers Dis Other Demen*. 2010; 25(4):324-332.
- Lardinois D, Weder W, Hany TF, et al. Staging of non-small-cell lung cancer with integrated positron emission tomography and computed tomography. *N Engl J Med*. 2003; 348(25):2500-2507.
- Le Roux PY, Gastinne T, Le Gouill S, et al. Prognostic value of interim FDG PET/CT in Hodgkin's lymphoma patients treated with interim response-adapted strategy: comparison of International Harmonization Project (IHP), Gallamini and London criteria. *Eur J Nucl Med Mol Imaging*. 2011; 38(6):1064-1071.
- Mavi A, Lakhani P, Zhuang H, et al. Fluorodeoxyglucose-PET in characterizing solitary pulmonary nodules, assessing pleural diseases, and the initial staging, restaging, therapy planning and monitoring response of lung cancer. *Radiol Clin North Am*. 2005; 43(1):1-21.
- Maziak DE, Darling GE, Incelet RI, et al. Positron emission tomography in staging early lung cancer. *Ann Int Med*. 2009; 151(4):221-228.

- McCarville MB, Christie R, Daw NC, et al. PET/CT in the evaluation of childhood sarcomas. *AJR Am J Roentgenol*. 2005; 184(4):1293-1304.
- McKeon A, Apiwattanakul M, LaChance DH, et al. Positron emission tomography-computed tomography in paraneoplastic neurologic disorders. *Arch Neurol*. 2010; 67(3):322-329.
- Mechac J. Cardiac positron emission tomography imaging. *Semin Nucl Med*. 2005; 35:17-36.
- Mehta D, Lubitz SA, Frankel A, et al. Cardiac involvement in patients with sarcoidosis: Diagnostic and prognostic value of outpatient testing. *Chest*. 2008; 133:1426-1435.
- Michallet AS, Trotman J, Tychyj-Pinel C. Role of early PET in the management of diffuse large B-cell lymphoma. *Curr Opin Oncol*. 2010; 22(5):414-418.
- Moadel RM. Breast cancer imaging devices. *Semin Nucl Med*. 2011; 41(3):229-241.
- Mosconi L, Berti V, Glodzik L, et al. Pre-clinical detection of Alzheimer's disease using FDG-PET, with or without amyloid imaging. *J Alzheimers Dis*. 2010; 20(3):843-854.
- Mosconi L, Tsui WH, Herholz K, et al. Multicenter standardized 18F-FDG PET diagnosis of mild cognitive impairment, Alzheimer's disease, and other dementias. *J Nucl Med*. 2008; 49(3):390-398.
- Ohira H, Tsujino I, Ishimaru S, et al. Myocardial imaging with 18F-fluoro-a-deoxyglucose positron emission tomography and magnetic imaging in sarcoidosis. *Eur J Nucl Med Mol Imag*. 2008; 35(5):933-941.
- Ost D, Fein AM, Feinsilver SH. The solitary pulmonary nodule. *N Engl J Med*. 2003; 348(25):2535-2542.
- Pelosi E, Skanjeti A, Penna D, Arena V. Role of integrated PET/CT with [18F]-FDG in the management of patients with fever of unknown origin: a single-centre experience. *Radiol Med*. 2011;116(5):809–820
- Raylman RR, Majewski S, Smith MF, et al. The positron emission mammography/tomography breast imaging and biopsy system (PEM/PET): design, construction and phantom-based measurements. *Phys Med Biol*. 2008; 53(3):637-653.
- Reinhardt MJ, Herkel C, Althoefer C, et al. Computed tomography and 18F-FDG positron emission tomography for therapy control of Hodgkin's and non-Hodgkin's lymphoma patients: when do we really need FDG-PET? *Ann Oncol*. 2005; 16(9):1524-1529.
- Schilling K, Narayanan D, Kalinyak JE, et al. Positron emission mammography in breast cancer presurgical planning: Comparisons with magnetic resonance imaging. *Eur J Nucl Med Mol Imaging*. 2011; 38(1):23-36.
- Schirrmeister H, Buck A, Guhlmann A, Reske SN. Anatomical distribution and sclerotic activity of bone metastases from thyroid cancer assessed with F-18 NaF-18 positron emission tomography. *Thyroid*. 2001b; 11(7):677-683.
- Schirrmeister H, Glatting G, Hetzel J, et al. Prospective evaluation of the clinical value of planar bone scans, SPECT, and 18F-labeled NaF-18 PET in newly diagnosed lung cancer. *J Nucl Med*. 2001a; 42(12):1800-1804.
- Schirrmeister H, Guhlmann A, Elsner K, et al. Sensitivity in detecting osseous lesions depends on anatomic localization: planar bone scintigraphy versus 18F PET. *J Nucl Med*. 1999b; 40(10):1623-1629.
- Schirrmeister H, Guhlmann A, Kotzerke J, et al. Early detection and accurate description of extent of metastatic bone disease in breast cancer with fluoride ion and positron emission tomography. *J Clin Oncol*. 1999a; 17(8):2381-2389.

- Schirrmester H, Kuhn T, Guhlmann A, et al. Fluorine-18 2-deoxy-2-fluoro-D-glucose PET in the preoperative staging of breast cancer: comparison with the standard staging procedures. *Eur J Nucl Med*. 2001c; 28(3):351-358.
- Schoder H, Larson SM, Yeung HW. PET/CT in oncology: integration into clinical management of lymphoma, melanoma, and gastrointestinal malignancies. *J Nucl Med*. 2004a; 45(1):72S-81S.
- Schoder H, Yeung HW, Gonen M, et al. Head and neck cancer: clinical usefulness and accuracy of PET/CT image fusion. *Radiology*. 2004b; 231(1):65-72.
- Silverman DH, Small GW, Chang CY, et al. Positron emission tomography in evaluation of dementia: Regional brain metabolism and long-term outcome. *JAMA*. 2001; 286(17):2120-2127.
- Tafra L, Cheng Z, Uddo J, et al. Pilot clinical trial of 18F-fluorodeoxyglucose positron-emission mammography in the surgical management of breast cancer. *Am J Surg*. 2005; 190(4):628-632.
- Tafreshi NK, Kumar V, Morse DL, et al. Molecular and functional imaging of breast cancer. *Cancer Control*. 2010; 17(3):143-155.
- Tahara N, Tahara A, Nitta Y, et al. Heterogeneous myocardial FDG uptake and the disease activity in cardiac sarcoidosis. *JACC: Cardiovasc Imag*. 2010; 3(12):1219-1228.
- Termaat MF, Raijmakers PG, Scholten HJ, et al. The accuracy of diagnostic imaging for the assessment of chronic osteomyelitis: a systematic review and meta-analysis. *J Bone Joint Surg Am*. 2005; 87(11):2464-2471.
- Tillisch J, Brunken R, Marshall R, et al. Reversibility of cardiac wall-motion abnormalities predicted by positron tomography. *N Engl J Med*. 1986; 314(14):884-888.
- Treglia G, Ceriani L, Sadeghi R, et al. Relationship between prostate-specific antigen kinetics and detection rate of radiolabelled choline PET/CT in restaging prostate cancer patients: a meta-analysis. *Clin Chem Lab Med*. 2014; 52(5):725-733.
- Treglia G, Salsano M, Stefanelli, A et al. Diagnostic accuracy of (18) F-FDG-PET and PET/CT in patients with Ewing sarcoma family tumors: a systematic review and a meta-analysis. *Skeletal Radiol*. 2012; 41(3):249-256.
- Umbehr MH, Muntener M, Hany T, et al. The role of 11-C choline and 18F-fluorocholine positron emission tomography (PET and PET/CT) in prostate cancer: a systematic review and meta-analysis. *Eur Urol*. 2013; 64:106-117.
- Vansteenkiste JF, Fischer BM, Doooms C, Mortensen J. Positron-emission tomography in prognostic and therapeutic assessment of lung cancer: systematic review. *Lancet Oncol*. 2004a; 5(9):531-540.
- Vansteenkiste JF, Stroobants SG. Positron emission tomography in the management of non-small cell lung cancer. *Hematol Oncol Clin North Am*. 2004b; 18(1):269-288.
- Wahl RL, Siegel BA, Coleman RE, Gatsonis CG. Prospective multicenter study of axillary nodal staging by positron emission tomography in breast cancer: a report of the staging breast cancer with PET study group. *J Clin Oncol*. 2004; 22(2):277-285.
- Withofs N, Grayet B, Tancredi T, et al. 18F-fluoride PET/CT for assessing bone involvement in prostate and breast cancers. *Nucl Med Commun*. 2011; 32(3):168-176.
- Wolfort RM, Papillion PW, Turnage RH, et al. Role of FDG-PET in the evaluation and staging of hepatocellular carcinoma with comparison of tumor size, AFP level, and histologic grade. *Int Surg*. 2010; 95(1):67-75.
- Wu LM, Hu JN, Hua J, et al. (18) F-fluorodeoxyglucose positron emission tomography to evaluate recurrent gastric cancer: A systematic review and meta-analysis. *J Gastroenterol Hepatol*. 2012; 27(3):472-480.

- Yang L, Rieves D, Ganley C. Brain amyloid imaging - -FDA approval of florbetapir F18 injection. N Engl J Med. 2012; 367(10):885-887.
- Zhao J, Qiao W, Wang C, et al. Therapeutic evaluation and prognostic value of interim hybrid PET/CT with (18)F-FDG after three to four cycles of chemotherapy in non-Hodgkin's lymphoma. Hematology. 2007; 12(5):423-430.

**Government Agency, Medical Society, and Other Publications:**

- Texas Medicaid Provider Procedures Manual Accessed June 9, 2020  
[http://www.tmhp.com/Manuals\\_PDF/TMPPM/TMPPM\\_Living\\_Manual\\_Current/2\\_Med\\_Specs\\_and\\_Phys\\_Srvs.pdf](http://www.tmhp.com/Manuals_PDF/TMPPM/TMPPM_Living_Manual_Current/2_Med_Specs_and_Phys_Srvs.pdf)
- American College of Radiology (ACR) Appropriateness Criteria®. 2020. Available at: <https://www.acr.org/Clinical-Resources/ACR-Appropriateness-Criteria>

Last Approval date by the Clinic & Administrative Advisory Committee (CAAC): 07/16/2020

Original Document Creation Date: 10/21/2016	This Version Creation Date: 07/24/2020	Effective/Publication Date: 07/28/2020
---	--	--