Evolent Clinical Guideline ~~071~~ 2013 for Brain Positron Emission Tomography (PET) Scan

Guideline ~~or Policy~~ Number:	Applicable Codes	
Evolent_CG_~~071~~2013		
"Evolent" refers to Evolent Health LLC and Evolent Specialty Services, Inc.		
© 1999 - ~~2025~~ 2026 Evolent. All rights Reserved.		
Original Date:	**Last Revised Date:**	**Implementation Date:**
July 1999	~~August 2024~~June 2025	January ~~2025~~2026

TABLE OF CONTENTS

STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Special Note

NOTE: When PET is used to image the brain using amyloid or dotatate (SSTR) tracers, it should be reordered as an oncologic PET using CPT codes 78811 and 78814 (see Evolent_CG_~~070-1~~2046 for Positron Emission Tomography (PET) Scan).

See Legislative Language section for legislation for the State of Washington.

INDICATIONS FOR BRAIN PET SCAN

Known Brain Tumor or Cancer (1,2) ~~(1,2)~~

FDG-PET indications for brain tumor imaging **after** brain MRI is indeterminant or insufficient to:

- Differentiate radiation necrosis or post-treatment change from residual/recurrent tumor
- Differentiate low from high grade glioma
- Evaluation of primary brain lymphoma
- To guide intervention/biopsy

Refractory Seizures

- To determine operability of refractory seizures (3) ~~(3,4,5)~~

~~Post-Treatment/Procedural Evaluation~~

- ~~A follow-up study may be needed to help evaluate a patient's progress after treatment, procedure, intervention, or surgery. Documentation requires a medical reason that~~

~~clearly indicates why additional imaging is needed~~

Mild Cognitive Impairment or Dementia (4,5) ~~(6,7,8,9,10,11,12)~~

FDG PET for ~~E~~evaluation of mild cognitive impairment or dementia in the following situations:

- ~~FDG PET for either:~~
- Detection of early Alzheimer's disease ~~OR~~
- To ~~D~~differentiat~~e~~ion ~~between~~ Alzheimer's, dementia with Lewy body disease (DLB) and frontotemporal lobal degeneration (FTD)

  AND ALL ~~of~~ the following criteria are met (criteria apply to either ~~both~~ of the above indications):

  - Brain MRI is insufficient or indeterminant ~~AND~~
  - Objective measures demonstrate objective impairment (MMSE/MoCA < 26 or mild cognitive impairment on neuropsychological testing) ~~AND~~
  - Full lab evaluation (thyroid function tests, CBC, CMP including LFTs and B12) has been completed and if abnormal, have been treated and cognitive difficulty persists ~~AND~~
  - Medication side effect ~~(9)~~ and medical causes, such as vascular or traumatic or inflammatory etiologies have been excluded

NOTE: Brain CT is acceptable if brain MRI is contraindicated

POST-TREATMENT/PROCEDURAL EVALUATION

- A follow-up study may be needed to help evaluate a patient's progress after treatment, procedure, intervention, or surgery. Documentation requires a medical reason that clearly indicates why additional imaging is needed

FURTHER EVALUATION OF INDETERMINATE FINDINGS

On prior imaging (unless follow-up is otherwise specified within the guideline):

- For initial evaluation of an inconclusive finding on a prior imaging report that requires further clarification
- One follow-up exam of a prior indeterminate MR/CT finding to ensure no suspicious interval change has occurred. (No further surveillance unless specified as highly suspicious or change was found on last follow-up exam.)

LEGISLATIVE LANGUAGE

~~State of~~ Washington

*20150116A – Functional Neuroimaging for Primary Degenerative Dementia or Mild Cognitive Impairment** [6]~~*WSHCA 20150116A* [13]~~

~~**Number and Coverage Topic:**~~

~~20150116A – **Functional Neuroimaging for Primary Degenerative Dementia or Mild Cognitive Impairment***~~

Washington State Health Care Authority

Health Technology Clinical Committee

Final Findings and Decision

HTCC Coverage Determination:

Functional neuroimaging for primary degenerative dementia or mild cognitive impairment is **not covered.**

HTCC Reimbursement Determination:

Limitations of Coverage: N/A

Non-covered Indicators:

Functional imaging technologies including: fludeoxyglucose (FDG) Positron Emission Tomography (PET), (11)C-dihydrotetrabenazine (C-DTBZ) PET, Single Photon Emission Computed Tomography (SPECT), Functional Magnetic Resonance Imaging (fMRI) for the diagnosis of primary degenerative dementia or mild cognitive impairment.

* Beta-amyloid PET imaging is outside the scope of this coverage determination.

CODING AND STANDARDS

Cod~~e~~es~~ing~~

~~*CPT Codes*~~

78608, 78609

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial

☒	Exchange/Marketplace
☒	Medicaid
☒~~☐~~	Medicare Advantage

BACKGROUND

Positron Emission Tomography (PET) scanning can be used to assesses brain metabolism and perfusion. Uses include identifying epileptic foci prior to surgery, differentiation of residual tumor versus scar, helping differentiate inconclusive findings on Brain MRI and identifying causes of cognitive decline.[1,2,4] ~~[14]~~

Contraindication and Preferred Studies

- Contraindications and reasons why a CT/CTA cannot be performed may include: impaired renal function, significant allergy to IV contrast, pregnancy (depending on trimester).
- Contraindications and reasons why an MRI/MRA cannot be performed may include: impaired renal function, claustrophobia, non-MRI compatible devices (such as non-compatible defibrillator or pacemaker), metallic fragments in a high-risk location, patient exceeds wight limit/dimensions of MRI machine.

SUMMARY OF EVIDENCE

ACR Appropriateness Criteria® Brain Tumors [2]

Study Design: The guidelines are based on a systematic review of the literature and expert consensus. The recommendations are categorized by clinical scenarios, such as primary brain tumor screening, secondary or metastatic brain tumor screening, pretreatment evaluation, posttreatment surveillance, and evaluation of new or enlarging lesions on posttreatment surveillance.

Target Population: The target population includes adults with various clinical scenarios related to brain tumors:

- **Primary brain tumor screening**: Adults with genetic risk factors for primary CNS tumors.
- **Secondary or metastatic brain tumor screening**: Adults with extracranial malignancies at risk for brain metastases.
- **Pretreatment evaluation**: Adults with suspected intraaxial or extraaxial brain tumors based on prior imaging.
- **Posttreatment surveillance**: Adults with a known history of brain tumors undergoing routine surveillance.

- **Evaluation of new or enlarging lesions**: Adults with a known history of brain tumors presenting with new or enlarging lesions on posttreatment surveillance.

Key Factors:

- **Imaging Modalities**: The guidelines emphasize the use of MRI with and without IV contrast as the primary imaging modality for most clinical scenarios. Advanced imaging techniques such as MR spectroscopy, perfusion MRI, and PET imaging (including FDG-PET and amino acid PET) are also discussed for specific scenarios.
- **Genetic Risk Factors**: Specific genetic conditions associated with primary CNS tumors are identified, including Lynch syndrome, neurofibromatosis, Li-Fraumeni syndrome, and others. Screening recommendations vary based on the genetic condition.
- **Clinical Scenarios**: The guidelines provide detailed recommendations for different clinical scenarios, including the appropriateness of various imaging modalities and the relative radiation levels associated with each procedure.
- **Expert Panel**: The guidelines were developed by an expert panel on neurological imaging, including representatives from various medical institutions and organizations.

EANM practice guidelines for an appropriate use of PET and SPECT for patients with epilepsy [3]

Study Design: The study design involves guidelines for the appropriate use of Nuclear Medicine (NM) imaging procedures for patients with epilepsy. The guidelines are written and authorized by the European Association of Nuclear Medicine (EANM) to promote optimal epilepsy imaging, especially in the presurgical setting for children, adolescents, and adults with focal epilepsy.

Target Population: The target population includes patients with epilepsy, specifically those with drug-resistant focal epilepsy. The guidelines aim to assist NM healthcare professionals and specialists such as neurologists, neurophysiologists, neurosurgeons, psychiatrists, psychologists, and others involved in epilepsy management.

Key Factors:

- The prevalence of epilepsy, with an estimated prevalence of more than 50 million people worldwide and an annual incidence of two million.
- The challenges of drug-resistant epilepsy, where approximately 30% of patients do not respond to anti-seizure medication (ASM) and become drug-resistant.
- The role of epilepsy surgery as a treatment option for patients with drug-resistant focal epilepsy, depending on the localization of the seizure focus.
- The use of various imaging modalities such as scalp video/electroencephalography (EEG) telemetry, structural and functional magnetic resonance imaging (MRI), single-photon emission computed tomography (SPECT), and positron emission tomography (PET) to influence and impact therapy decisions.
- The lack of literature-based recommendations for the use of NM imaging procedures in epilepsy, which these guidelines aim to address.

ACR Appropriateness Criteria® Dementia [4]

Study Design: The document outlines the ACR Appropriateness Criteria for various dementia-related conditions, including mild cognitive impairment (MCI), Alzheimer's disease (AD), frontotemporal dementia (FTD), dementia with Lewy bodies (DLB), vascular dementia (VaD), normal pressure hydrocephalus (NPH), and rapidly progressive dementia (RPD). The criteria are based on a thorough review of the literature and expert panel recommendations.

Target Population: The target population includes adults with cognitive impairments and suspected dementia. Specific variants address different clinical presentations, such as:

- Adults with mild cognitive impairment not meeting criteria for dementia.
- Adults with cognitive impairment and memory deficits, suspecting Alzheimer's disease.
- Adults with cognitive impairment and behavioral abnormalities or progressive aphasia, suspecting frontotemporal dementia.
- Adults with cognitive impairment and visual hallucinations or Parkinsonian symptoms, suspecting dementia with Lewy bodies.
- Adults with cognitive impairment and recent stroke or stepwise decline, suspecting vascular dementia.
- Adults with cognitive impairment and gait disturbance or urinary incontinence, suspecting normal pressure hydrocephalus.
- Adults with rapidly progressive dementia.

Key Factors:

- **Imaging Procedures**: The document discusses various imaging procedures, including MRI, CT, PET/CT, and SPECT/CT, and their appropriateness for different dementia variants.
- **Radiation Levels**: The relative radiation levels associated with each imaging procedure are provided to help assess the risk-benefit ratio.
- **Clinical Presentation**: The criteria consider typical and atypical clinical presentations of dementia and the role of imaging in diagnosis and management.
- **Biomarkers**: The use of biomarkers, such as amyloid and tau PET/CT, is discussed for their role in diagnosing and monitoring dementia.
- **Treatment Considerations**: The document includes recommendations for imaging in the context of treatment with antiamyloid monoclonal antibodies for Alzheimer's disease.

ANALYSIS OF EVIDENCE

Shared Conclusions [2–4]**:**

Imaging Techniques: All three articles emphasize the importance of advanced imaging techniques in diagnosing and managing neurological conditions. They discuss the use of

MRI, PET, and SPECT imaging to provide detailed insights into brain structure and function.

Role of PET Imaging: PET imaging is highlighted across all articles as a crucial tool for identifying metabolic abnormalities in the brain. The articles discuss the use of various PET tracers, such as FDG, amyloid, and tau, to detect changes associated with different neurological conditions.

Clinical Utility: The articles agree on the clinical utility of imaging in guiding treatment decisions. They emphasize how imaging can help in the localization of lesions, assessment of disease progression, and evaluation of treatment efficacy.

POLICY HISTORY~~SUMMARY~~

Date	Summary
June 2025	• Guideline name changed from Brain PET to Brain Positron Emission Tomography (PET) • Guideline number changed from 071 to 2013 • Added new bullet-point to the General Statement section • Checked the Medicare Advantage box in the Applicable Lines of Business table • Added a Summary of Evidence and Analysis of Evidence • Updated references
August 2024	• All Amyloid PET indications were removed from Brain PET and moved to oncologic PET guideline for CPT coding reasons • Updated indications for Known Brain Tumor or Cancer • Added a Special Note about using oncologic PET for brain PET tracer requests

July 2024	• Added special Trace PET and moved Meningioma there
	• Mild Cognitive Impairment PET section: expanded the indications to include if Brain MRI is insufficient, objective measures, labs, and medication side effects or medical causes
	• Treatment Planning section
	  ○ Expanded indications to include Beta-amyloid treatment, Brain MRI is insufficient, objective measures, Neuropsychological testing, labs, and medical causes
	  ○ Removed Aduhelm (as it is off market)
	• Added Contraindications and Preferred Studies section to Background

	• Updated References • Added Legislative Language for Washington
~~May 2023~~	• ~~Added that dotatate is now FDA approved for meningioma imaging~~ • ~~General Information moved to beginning of guideline with added statement on clinical indications not addressed in this guideline~~ • ~~Added statement regarding further evaluation of indeterminate findings on prior imaging~~ • ~~Additional resources removed~~

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

REFERENCES

1. Galldiks N, Albert N, Sommerauer M, Grosu A, Ganswindt U et al. PET imaging in patients with meningioma-report of the RANO/PET Group. Neuro Oncol. Nov 29 2017; 19: 1576-1587. 10.1093/neuonc/nox112.

2. NCCN. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) Central Nervous System Cancers. March 24, 2023; 2023: Version 1.2023.

3. Govil-Dalela T, Kumar A, Behen M, Chugani H, Juhász C. Evolution of lobar abnormalities of cerebral glucose metabolism in 41 children with drug-resistant epilepsy. Epilepsia. Jul 2018; 59: 1307-1315. 10.1111/epi.14404.

4. Jones A, Cascino G. Evidence on Use of Neuroimaging for Surgical Treatment of Temporal Lobe Epilepsy: A Systematic Review. JAMA Neurol. Apr 2016; 73: 464-70. 10.1001/jamaneurol.2015.4996.

5. Tang Y, Liow J, Zhang Z, Li J, Long T et al. The Evaluation of Dynamic FDG-PET for Detecting Epileptic Foci and Analyzing Reduced Glucose Phosphorylation in Refractory Epilepsy. Front Neurosci. 2018; 12: 993. 10.3389/fnins.2018.00993.

6. Albert M S, DeKosky S T, Dickson D, Dubois B, Feldman H H et al. The diagnosis of mild cognitive impairment due to Alzheimer's disease: recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease. Alzheimer's Dement. 2011; 7: 270-9. 10.1016/j.jalz.2011.03.008.

7. Bohnen N, Djang D, Herholz K, Anzai Y, Minoshima S. Effectiveness and safety of 18F-FDG PET in the evaluation of dementia: a review of the recent literature. J Nucl Med. Jan 2012; 53: 59-71. 10.2967/jnumed.111.096578.

8. Caminiti S, Ballarini T, Sala A, Cerami C, Presotto L et al. FDG-PET and CSF biomarker accuracy in prediction of conversion to different dementias in a large multicentre MCI cohort. Neuroimage Clin. 2018; 18: 167-177. 10.1016/j.nicl.2018.01.019.

9. Campbell N, Boustani M, Lane K, Gao S, Hendrie H et al. Use of anticholinergics and the risk of cognitive impairment in an African American population. Neurology. Jul 13 2010; 75: 152-9. 10.1212/WNL.0b013e3181e7f2ab.

10. Davis D, Creavin S, Yip J, Noel-Storr A, Brayne C. Montreal Cognitive Assessment for the diagnosis of Alzheimer's disease and other dementias. Cochrane Database Syst Rev. Oct 29 2015; 2015: Cd010775. 10.1002/14651858.CD010775.pub2.

11. Frey K, Lodge M, Meltzer C, Peller P, Wong T et al. ACR-ASNR Practice Parameter for Brain PET/CT Imaging Dementia. Clin Nucl Med. Feb 2016; 41: 118-25. 10.1097/rlu.0000000000001037.

12. Motara H, Olusoga T, Russell G, Jamieson S, Ahmed S et al. Clinical impact and diagnostic accuracy of 2-[(18)F]-fluoro-2-deoxy-d-glucose positron-emission tomography/computed tomography (PET/CT) brain imaging in patients with cognitive impairment: a tertiary centre experience in the UK. Clin Radiol. Jan 2017; 72: 63-73. 10.1016/j.crad.2016.08.003.

13. Washington State Health Care Authority. WSHCA 20150116A Functional Neuroimaging for Primary Degenerative Dementia or Mild Cognitive Impairment. 2015; https://www.hca.wa.gov/about-hca/programs-and-initiatives/health-technology-assessment/functional-neuroimaging-primary-degenerative-dementia-or-mild-cognitive-impairment.

14. Wippold F 2, Brown D, Broderick D, Burns J, Corey A et al. ACR Appropriateness Criteria Dementia and Movement Disorders. J Am Coll Radiol. Jan 2015; 12: 19-28. 10.1016/j.jacr.2014.09.025.

1. Referenced with permission from the National Comprehensive Cancer Network Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Central Nervous System Cancers Version 5.2024. © National Comprehensive Cancer Network, Inc. 2025. All rights reserved. To view the most recent and complete version of the guideline, go online to NCCN.org.
2. American College of Radiology. *ACR Appropriateness Criteria® Brain Tumors*.; 2024.
3. Traub-Weidinger T, Arbizu J, Barthel H, et al. EANM practice guidelines for an appropriate use of PET and SPECT for patients with epilepsy. *Eur J Nucl Med Mol Imaging*. 2024;51(7):1891-1908. doi:10.1007/s00259-024-06656-3
4. American College of Radiology. *ACR Appropriateness Criteria® Dementia*.; 2024.
5. McCollum L, Karlawish J. Cognitive Impairment Evaluation and Management. *Medical Clinics of North America*. 2020;104(5):807-825. doi:10.1016/j.mcna.2020.06.007
6. Washington State Health Care Authority. *Functional Neuroimaging for Primary Degenerative Dementia or Mild Cognitive Impairment*. 20150116A; 2015. https://www.hca.wa.gov/about-hca/programs-and-initiatives/health-technology-assessment/functional-neuroimaging-primary-degenerative-dementia-or-mild-cognitive-impairment