HEALTH PLANS
UNIVERSITY OF UTAH

Medical Policy

Cardiac Fludeoxyglucose-Positron Emission Tomography (FDG-PET) Scans

Policy MP-082

Origination Date: 05/28/2025

Reviewed/Revised Date: 05/28/2025

Next Review Date: 05/28/2026

Current Effective Date: 07/28/2025

Disclaimer:

1. Policies are subject to change in accordance with State and Federal notice requirements.
2. Policies outline coverage determinations for U of U Health Plans Commercial, CHIP and Healthy U (Medicaid) plans. Refer to the "Policy" section for more information.
3. Services requiring prior-authorization may not be covered, if prior-authorization is not obtained.
4. This Medical Policy does not guarantee coverage or payment of the service. The service must be a benefit in the member's plan and the member must be eligible for coverage at the time of service. Additional payment guidelines may be applied that are not included in this policy.

Description:

Cardiac Positron Emission Tomography (PET) is a minimally invasive diagnostic imaging procedure that can be used to identify coronary artery disease by identifying perfusion defects, to assess myocardial viability in patients with left ventricular dysfunction as a technique to determine candidacy for a revascularization procedure, and potentially to measure myocardial blood flow and blood flow reserve. A radiopharmaceutical is injected into the patient that gives off sub-atomic particles, known as positrons, as it decays. PET uses a positron camera (tomograph) to measure the decay of the radiopharmaceutical. The rate of decay provides biochemical information on the metabolism of the tissue being studied.

The identification of members with partial loss of heart muscle movement or hibernating myocardium is important in selecting candidates with compromised ventricular function to determine appropriateness for re-vascularization. Diagnostic tests such as Fludeoxyglucose-Positron Emission Tomography (FDG-PET) distinguish between dysfunctional but viable myocardial tissue and scar tissue in order to affect the management decisions in members with ischemic cardiomyopathy and left ventricular dysfunction.

Policy Statement and Criteria

1. **Commercial Plans/CHIP**

U of U Health Plans considers cardiac fludeoxyglucose-positron emission tomography (FDG-PET) scanning medically necessary to assess myocardial perfusion and thus diagnose coronary artery disease in individuals with indeterminate single photon emission computed tomography (SPECT) scan; or in individuals for whom SPECT could be reasonably expected to be suboptimal in quality on the basis of body habitus.

U of U Health Plans may consider cardiac FDG-PET scanning medically necessary to assess myocardial viability in individuals with severe left ventricular dysfunction as a technique to determine candidacy for a revascularization procedure.

U of U Health Plans considers cardiac FDG-PET scanning medically necessary for diagnosing cardiac sarcoidosis in individuals who are unable to undergo magnetic resonance imaging (MRI). Examples of individuals who are unable to undergo MRI include, but are not limited to, individuals with pacemakers, automatic implanted cardioverter defibrillators, or other metal implants.

U of U Health Plans considers absolute quantitation of myocardial blood flow (AQMBF) a medically necessary adjunct to cardiac FDG-PET when criteria for rest/stress perfusion for coronary artery disease are met.

U of U Health Plans considers cardiac FDG-PET scanning investigational for quantification of myocardial blood flow for cardiac event risk stratification in individuals diagnosed with coronary artery disease.

2. Medicaid Plans

Coverage is determined by the State of Utah Medicaid program; if Utah State Medicaid has no published coverage position and InterQual criteria are not available, the U of U Health Plans Commercial criteria will apply. For the most up-to-date Medicaid policies and coverage, please visit their website at: https://medicaid.utah.gov/utah-medicaid-official-publications/ or the Utah Medicaid code Look-Up tool

CPT/HCPCS codes covered by Utah State Medicaid may still require further evaluation to determine medical necessity for coverage.

Clinical Rationale:

In a 2021 a systematic review and meta-analysis Xu et al compared cardiac magnetic resonance (CMR), single-photon emission computerized tomography (SPECT), and positron emission tomography (PET) in detecting coronary artery disease (CAD). The review included 203 articles involving 23,942 patients,

covering literature up to July 31, 2020. The pooled sensitivity values for CMR, SPECT, and PET were 0.86, 0.83, and 0.85, respectively, while their overall specificity values were 0.83, 0.77, and 0.86.). The authors concluded that PET and CMR performed better in diagnosing CAD compared to SPECT, although significant heterogeneities among the studies were noted as a limitation.

In 2019, Patel et al conducted a single-center randomized controlled trial (RCT) to compare the post-test clinical effectiveness of pharmacologic stress myocardial perfusion imaging (MPI) using PET versus attenuation-corrected SPECT in patients with known coronary artery disease (CAD) and symptoms suggestive of ischemia. A total of 322 patients were randomized to undergo either PET or SPECT MPI. The primary endpoint was diagnostic failure, while secondary endpoints included post-test escalation of antianginal therapy, referral for angiography, coronary revascularization, and health status at three, six, and twelve months. Diagnostic failure within 60 days occurred in seven patients (2.2%), with no significant difference between the PET (1.9%) and SPECT (2.5%) groups ($p = 0.70$). There were no significant differences in rates of coronary angiography, revascularization, or health status at follow-up (all $p \geq 0.20$). However, post hoc analysis revealed that patients with high-risk MPI on PET had higher rates of angiography and revascularization compared to those with SPECT MPI, while those with low-risk PET studies had lower rates of both procedures than those with SPECT (interaction $p = 0.001$ for 12-month catheterization and $p = 0.09$ for revascularization). The authors concluded that PET and SPECT MPI showed no distinct differences in diagnostic failure, revascularization, subsequent coronary angiography, or patient health status at one year. They recommend larger, multi-center RCTs to further investigate these findings, noting the limitations of the single-center study and small sample size.

A 2025 UpToDate (Chareonthaitawee et al.) overview of stress radionuclide myocardial perfusion imaging (rMPI), stated that “If available, PET rMPI has the added benefits of reducing patient radiation exposure due to the short physical half-lives of the PET perfusion tracers and of absolute quantification of myocardial blood flow. PET rMPI appears to have higher diagnostic accuracy than SPECT MPI, but literature is more limited for PET than for SPECT”.

In 2023, the American College of Cardiology (ACC) and several other medical societies authored a guideline on the management of **chronic coronary disease** (Viranini et al). The guideline recommends PET or SPECT MPI, cardiovascular magnetic resonance imaging, or stress echocardiography, in patients with chronic coronary disease and a change in symptoms or functional capacity despite guideline-directed medical therapy (strong recommendation, moderate quality evidence). This testing facilitates detection of myocardial ischemia, estimation of the risk of major cardiovascular events, and therapeutic decisions. Preference is given to PET (over SPECT) due to greater diagnostic accuracy.

In 2021, the American College of Cardiology (ACC) in collaboration with several other medical societies published a guideline on the evaluation and diagnosis of **chest pain**. Per the guideline, after an acute coronary syndrome has been ruled out, PET or SPECT myocardial perfusion imaging (MPI) allows for detection of perfusion abnormalities, measures of left ventricular function, and high-risk findings, such as transient ischemic dilation.

In 2009, the American College of Cardiology (ACC) Foundation and American Heart Association (AHA) collaborated with 6 other imaging societies to publish updated guidelines for cardiac radionuclide imaging (Hendel et al). Sixty-seven clinical scenarios were developed by a writing group and scored by a separate technical panel on a scale of 1 to 9, to designate appropriate use, inappropriate use, or uncertain use. The authors found that In general, use of cardiac radionuclide imaging for diagnosis and risk assessment in intermediate- and high-risk patients with coronary artery disease (**CAD**) was viewed favorably, while testing in low-risk patients, routine repeat testing, and general screenings in certain clinical scenarios were viewed less favorably. Additionally, use for perioperative testing was found to be inappropriate except for high selected groups of patients.

The Positron Emission Tomography and Recovery Following Revascularization (PARR-2) study (Mc Ardle et al., 2016) evaluated the impact of F-18-fluorodeoxyglucose PET imaging on the management of patients with severe left ventricular dysfunction due to coronary artery disease. The study randomized patients to either PET-assisted management or standard care. Overall, PET-assisted management did not significantly reduce cardiac events compared to standard care (hazard ratio [HR] = 0.82; 95% CI, 0.62-1.07; P = 0.15). However, significant benefits were observed in patients who adhered to PET recommendations, with a hazard ratio of 0.73 (95% CI, 0.54-0.99; P = 0.042).

The Ottawa-FIVE sub-study of PARR-2 (Abraham et al., 2010) demonstrated that in an experienced center with integrated clinical teams, PET-assisted management significantly reduced cardiac events compared to standard care (HR = 0.34; 95% CI, 0.16-0.72; P = 0.005). This suggests that the effectiveness of PET-assisted management may be enhanced in settings with high adherence to PET recommendations and integrated care teams.

In a 2022 systematic review, Aitken et al evaluated the diagnostic performance of fluorine 18 (F-18) fluorodeoxyglucose (FDG) positron emission tomography (PET) and MRI for cardiac sarcoidosis. Cardiac MRI was evaluated in 17 studies (n=1031) and F-18 FDG PET in 26 studies (n=1363). Results showed similar specificity for MRI and PET (85% vs. 82%; p=.85), but MRI had higher sensitivity (95% vs. 84%; p=.002).

A 2020 systematic review (Kim et al) assessed the diagnostic performance of F-18 FDG PET and PET/CT for cardiac sarcoidosis, including 17 studies (n=891). The pooled sensitivity and specificity across all studies were 84% and 83%, respectively. For F-18 FDG PET alone, sensitivity was 92% and specificity 66%. For PET/CT, sensitivity was 72% and specificity 89%. The overall positive likelihood ratio was 4.9, negative likelihood ratio was 0.2, and diagnostic odds ratio was 27. The area under the curve was 0.90. The authors concluded that larger multicenter studies are needed to confirm the diagnostic accuracy of F-18 FDG PET for cardiac sarcoidosis.

Blankstein et al. (2014) investigated cardiac positron emission tomography (PET) in patients with known or suspected cardiac sarcoidosis (CS), involving 118 patients. Over a mean follow-up of 1.5 years, 31 patients (26%) experienced death or ventricular tachycardia (VT) requiring therapy. Patients with both abnormal fluorodeoxyglucose (FDG) uptake by the myocardium and a resting perfusion defect had a fourfold increase in the annual rate of VT or death compared to those with normal imaging. These findings remained significant even after adjusting for the Japanese Ministry of Health and Welfare (JMHW) criteria and left ventricular ejection fraction (LVEF). Additionally, individuals with focal FDG uptake involving the right ventricle had the highest rate of death or VT, while extracardiac inflammation was not associated with adverse events, suggesting it should not influence decisions regarding implantable cardioverter-defibrillator (ICD) therapy.

A joint position paper from SNMMI/ASNC (Murthy et al., 2018) discussed the clinical quantification of myocardial blood flow (MBF) and myocardial flow reserve (MFR) for cardiac sarcoidosis. Stress MBF and MFR are associated with improved diagnostic sensitivity, but specificity has varied across studies. The paper noted that there are currently no randomized data supporting the use of any stress imaging modality for selecting patients for revascularization or guiding medical therapy. Observational data suggest that patients with greater degrees of ischemia on relative myocardial perfusion imaging (MPI) are more likely to benefit from revascularization, a concept extended to include MFR and stress MBF, though not yet evaluated prospectively. Stress MBF and MFR diagnosis is complex, as factors like diabetes, hypertension, age, and smoking can decrease these measures without focal epicardial stenosis. The paper calls for further data on quantifying MBF and MFR in suspected or established CAD, emphasizing the need to standardize measures across laboratories, radiotracers, equipment, and

software, and to gather data supporting improved clinical outcomes when treatment selection is based on these measures.

Applicable Coding

CPT Codes

Possibly Covered CPT Codes

78429 Myocardial imaging, positron emission tomography (PET), metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), single study; with concurrently acquired computed tomography transmission scan

78430 Myocardial imaging, positron emission tomography (PET), perfusion study (including ventricular wall motion[s] and/or ejection fraction[s], when performed); single study, at rest or stress (exercise or pharmacologic), with concurrently acquired computed tomography transmission scan

78431 Myocardial imaging, positron emission tomography (PET), perfusion study (including ventricular wall motion[s] and/or ejection fraction[s], when performed); multiple studies at rest and stress (exercise or pharmacologic), with concurrently acquired computed tomography transmission scan

78432 Myocardial imaging, positron emission tomography (PET), combined perfusion with metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), dual radiotracer (eg, myocardial viability);

78433 Myocardial imaging, positron emission tomography (PET), combined perfusion with metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), dual radiotracer (eg, myocardial viability); with concurrently acquired computed tomography transmission scan

78434 Absolute quantitation of myocardial blood flow (AQMBF), positron emission tomography (PET), rest and pharmacologic stress (List separately in addition to code for primary procedure)

78491 Myocardial imaging, positron emission tomography (PET), perfusion study (including ventricular wall motion[s] and/or ejection fraction[s], when performed); single study, at rest or stress (exercise or pharmacologic)

78492 Myocardial imaging, positron emission tomography (PET), perfusion study (including ventricular wall motion[s] and/or ejection fraction[s], when performed); multiple studies at rest and stress (exercise or pharmacologic)

78459 Myocardial imaging, positron emission tomography (PET), metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), single study;

HCPCS Codes

Possibly Covered HCPCS Codes

A9526	Nitrogen N-13 ammonia, diagnostic, per study dose, up to 40 mCi
A9552	Fluorodeoxyglucose F-18 FDG, diagnostic, per study dose, up to 45 mCi
A9555	Rubidium Rb-82, diagnostic, per study dose, up to 60 mCi

Not Covered HCPCS Codes

A9598	Positron emission tomography radiopharmaceutical, diagnostic, for nontumor identification, not otherwise classified

ICD-10 Codes

D86.85	Sarcoid myocarditis (includes cardiomyopathy in sarcoidosis)
I25.10-I25.119	Atherosclerotic heart disease of coronary (code range)
I25.700-I25.739	Atherosclerosis of autologous or nonautologous vein or artery coronary artery graft(s) with angina pectoris (code range)
I25.810	Atherosclerosis of coronary artery bypass graft(s) without angina pectoris
I51.9	Heart disease unspecified
I50.1	Left ventricular failure
I52.9	Other heart disorders in diseases classified elsewhere

References:

1. Abraham, A., G. Nichol, K. A. Williams, A. Guo, R. A. deKemp, L. Garrard, R. A. Davies, L. Duchesne, H. Haddad, B. Chow, J. DaSilva, R. S. Beanlands and P. Investigators (2010). "18F-FDG PET imaging of myocardial viability in an experienced center with access to 18F-FDG and integration with clinical management teams: the Ottawa-FIVE substudy of the PARR 2 trial." J Nucl Med 51(4): 567-574.
2. Aitken M, Chan MV, Urzua Fresno C, et al. Diagnostic Accuracy of Cardiac MRI versus FDG PET for Cardiac Sarcoidosis: A Systematic Review and Meta-Analysis. Radiology. Sep 2022; 304(3): 566-579. PMID 35579526
3. American College of Radiology (ACR). ACR Appropriateness Criteria: Chronic Chest Pain -- High Probability of Coronary Artery Disease. 2021; Accessed: April 24, 2025. Available at: https://acsearch.acr.org/list. Accessed July 28, 2024.
4. Blankstein, R., M. Osborne, M. Naya, A. Waller, C. K. Kim, V. L. Murthy, P. Kazemian, R. Y. Kwong, M. Tokuda, H. Skali, R. Padera, J. Hainer, W. G. Stevenson, S. Dorbala and M. F. Di Carli (2014). "Cardiac positron emission tomography enhances prognostic assessments of patients with suspected cardiac sarcoidosis." J Am Coll Cardiol 63(4): 329-336.
5. Chareonthaitawee P, MD, FACC, FAHAJ, Askew W, MD, Reddy P, MD. UpToDate®. (2025). "Overview of stress radionuclide myocardial perfusion imaging". Last review: March 2025. Last topic update: March 20, 2025. Accessed: April 24, 2025. Available at: https://www.uptodate.com/
6. Kawano S, Kato J, Kawano N, et al. Sarcoidosis manifesting as cardiac sarcoidosis and massive splenomegaly. Intern Med. 2012;51(1):65-69.Kim SJ, Pak K, Kim K. Diagnostic performance of F-18 FDG PET for detection of cardiac sarcoidosis; A systematic review and meta-analysis. J Nucl Cardiol. Dec 2020; 27(6): 2103-2115. PMID 30603894
7. Mc Ardle, B., T. Shukla, G. Nichol, R. A. deKemp, J. Bernick, A. Guo, S. P. Lim, R. A. Davies, H. Haddad, L. Duchesne, P. Hendry, R. Masters, H. Ross, M. Freeman, K. Gulenchyn, N. Racine, D. Humen, F. Benard, T. D. Ruddy, B. J. Chow, L. Mielniczuk, J. N. DaSilva, L. Garrard, G. A. Wells, R. S. Beanlands and P.-. Investigators (2016). "Long-Term Follow-Up of Outcomes With F-18-Fluorodeoxyglucose Positron Emission Tomography Imaging-Assisted Management of Patients With Severe Left Ventricular Dysfunction Secondary to Coronary Disease." Circ Cardiovasc Imaging 9(9).
8. Murthy, V. L., T. M. Bateman, R. S. Beanlands, D. S. Berman, S. Borges-Neto, P. Chareonthaitawee, M. D. Cerqueira, R. A. deKemp, E. G. DePuey, V. Dilsizian, S. Dorbala, E. P. Ficaro, E. V. Garcia, H. Gewirtz, G. V. Heller, H. C. Lewin, S. Malhotra, A. Mann, T. D. Ruddy, T. H. Schindler, R. G. Schwartz, P. J. Slomka, P. Soman, M. F. Di Carli, S. C. C. B. o. Directors and A. B. o. Directors (2018). "Clinical Quantification of Myocardial Blood Flow Using PET: Joint Position Paper of the SNMMI Cardiovascular Council and the ASNC." J Nucl Med 59(2): 273-293.
9. Patel KK, Al Badarin F, Chan PS, et al. Randomized comparison of clinical effectiveness of pharmacologic SPECT and PET MPI in symptomatic CAD patients. JACC Cardiovasc Imaging. 2019 Sep;12(9):1821-1831.

10. Virani SS, Newby LK, Arnold SV, et al. 2023 AHA/ACC/ACCP/ASPC/NLA/PCNA Guideline for the Management of Patients with Chronic Coronary Disease: A Report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. J Am Coll Cardiol. Aug 29 2023; 82(9): 833-955. PMID 37480922Xu J, Cai F, Geng C, Wang Z, Tang X. Diagnostic performance of CMR, SPECT, and PET imaging for the identification of coronary artery disease: a meta-analysis. Front Cardiovasc Med. 2021 May 7;8:621389.Hendel RC, Berman DS, Di Carli MF, et al. ACCF/ASNC/ACR/AHA/ASE/SCCT/SCMR/SNM 2009 Appropriate Use Criteria for Cardiac Radionuclide Imaging: A Report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, the American Society of Nuclear Cardiology, the American College of Radiology, the American Heart Association, the American Society of Echocardiography, the Society of Cardiovascular Computed Tomography, the Society for Cardiovascular Magnetic Resonance, and the Society of Nuclear Medicine. J Am Coll Cardiol. Jun 09 2009; 53(23): 2201-29. PMID 19497454