Evolent Clinical Guideline 7294 for Heart Positron Emission Tomography (PET) Scan

Guideline Number: Evolent_CG_7294	**Applicable Codes**	
"Evolent" refers to Evolent Health LLC and Evolent Specialty Services, Inc. 		
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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

Indications for determining medical necessity for myocardial perfusion imaging (MPI) with appropriate preference for suitable alternatives, such as stress echocardiography (SE), when more suitable, unless otherwise stated (see **Definitions** section).

Indicated when all the criteria for MPI are met **AND** there is likely to be equivocal imaging results because of body mass index (BMI), large breasts or implants, mastectomy, chest wall deformity, pleural or pericardial effusion, or prior thoracic surgery or results of a prior MPI. [1,2] (**AUC Score 7**) [3]

See Legislative Language for specific mandates in **Washington**.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [4–8]

INDICATIONS FOR HEART PET [9]

Suspected Coronary Artery Disease (CAD) [10–12]

When neither SE nor MPI have provided or are expected to provide optimal imaging

- **Symptomatic patients without known CAD** (use **Diamond Forrester Table** [13,14] [13,14]) (**AUC Score 9**) [3]
  - Intermediate pretest probability and unable to exercise
  - High pretest probability
  - Repeat testing in a patient with new or worsening symptoms and negative result at least one year ago **AND** meets one of the criteria above
- **Asymptomatic patients without known CAD**
  - Previously unevaluated ECG evidence of possible myocardial ischemia including substantial ischemic ST segment or T wave abnormalities (see **Background** section) [12]
  - Previously unevaluated pathologic Q waves (**AUC Score 6**) [3] (see **Background** section)
  - Unevaluated complete left bundle branch block (**AUC Score 8**) [3]

Abnormal Calcium Scores (CAC) [3,10]

When neither SE nor MPI have provided, or are expected to provide, optimal imaging

- STABLE SYMPTOMS with a prior Coronary Calcium Agatston Score of >100. No prior MPI done within the last 12 months (**AUC Score 7**) [10]
- ASYMPTOMATIC high global CAD risk patient with a prior Coronary Calcium Agatston Score of >100. No prior MPI done within the last 12 months [15]
- ASYMPTOMATIC patient with Coronary Calcium Agatston Score > 400 (or a qualitative assessment where 'severe' coronary artery calcification is stated in a report incidentally detected on CT imaging performed for other clinical indications) No prior stress imaging done within the last 12 months) [16]

Inconclusive CAD Evaluation and Obstructive CAD remain a Concern

When neither SE nor MPI have provided, or are expected to provide, optimal imaging

- Exercise stress ECG with low-risk Duke treadmill score (≥ 5) (see **Background** section) but patient's current symptoms indicate an intermediate or high pretest probability
- Exercise stress ECG with an intermediate Duke treadmill score (**AUC Score 8**) [3]
- Inconclusive/borderline coronary computed tomography angiography (CCTA) or Single Positron Emission Tomography (SPECT) nuclear stress testing (e.g., 40 - 70% lesions) (**AUC Score 8**) [3,10]

- Cardiac PET stress-rest perfusion and metabolic activity study (with ^{18}F-FDG PET) is appropriate in patients with ischemic cardiomyopathy to determine myocardial viability prior to revascularization following an inconclusive SPECT [10] (**AUC Score 9**) [3]
- Non-diagnostic exercise stress test with physical inability to achieve target heart rate (THR)
- An intermediate evaluation by prior stress imaging
- Coronary stenosis of unclear significance on previous coronary angiography [10] (**AUC Score 8**) [3]

Follow-Up Of Patient's Post Coronary Revascularization Percutaneous Coronary Intervention (PCI) or Coronary Artery Bypass Graft (CABG)

When neither SE nor MPI have provided, or are expected to provide, optimal imaging and any of the following [10]:

- **Asymptomatic, follow-up stress imaging** at a minimum of 2 years post coronary artery bypass grafting (CABG), or percutaneous coronary intervention (PCI), (whichever is later), is appropriate only for patients with:
  - High risk: diabetes with accelerated progression of CAD, Chronic Kidney Disease (CKD), peripheral artery disease (PAD), prior brachytherapy, in-stent restinosis (ISR), or saphenous venous graft (SVG) intervention.
  - A history of silent ischemia or
  - A history of a prior left main stent
- For patients with high occupational risk (e.g., associated with public safety, airline and boat pilots, bus and train drivers, bridge and tunnel workers/toll collectors, police officers, and firefighters)

New, recurrent, or worsening symptoms post coronary revascularization are an indication for stress imaging, if it will alter management

Follow-Up Of Known CAD [10]

When neither SE nor MPI have provided, or are expected to provide, optimal imaging

- **Follow-up of asymptomatic or stable symptoms** when last invasive or non-invasive assessment of coronary disease showed hemodynamically significant CAD (ischemia on stress test or FFR ≤ 0.80 or significant stenosis in a major vessel (≥ 50% left main coronary artery or ≥ 70% left anterior descending (LAD), left circumflex (LCX) or right coronary artery (RCA))), over two years ago, without intervening coronary revascularization is an appropriate indication for stress imaging in patients if it will alter management
- When there is a change in symptoms or functional capacity that persists despite guideline directed medical therapy [11]

Special Diagnostic Conditions Requiring Coronary Evaluation

When neither SE nor MPI have provided, or are expected to provide, optimal imaging

- **Unevaluated Acute Coronary Syndrome**
  - Prior acute coronary syndrome (as documented in MD notes), without subsequent invasive or non-invasive coronary evaluation within the last 12 months
  - Has ventricular wall motion abnormality demonstrated by another imaging modality and myocardial perfusion imaging is being performed to determine if the patient has myocardial ischemia. No imaging stress test within the last 12 months
- **Heart Failure**
  - Newly diagnosed systolic heart failure or diastolic heart failure, with *reasonable suspicion of cardiac ischemia (prior events, risk factors)*, unless invasive coronary angiography is immediately planned or adequate stress imaging has been done within the last 12 months [10] (**AUC Score 9**) [3]
- **Viability**
  - Reduced left ventricular ejection fraction (LVEF) ≤ 50% requiring myocardial viability assessment to assist with decisions regarding coronary revascularization. (Diversion from PET not required when LVEF less than or equal to 40%) (**AUC Score 9**) [3]
- **Ischemia and Nonobstructive Coronary Artery Disease (INOCA)**
  - To diagnose microvascular dysfunction in patients with persistent stable anginal chest pain with suspected ischemia and nonobstructive coronary artery disease (INOCA), as documented in provider notes (*no MPI diversion required*).
- **Arrhythmias**
  - Ventricular arrhythmias
    - Sustained ventricular tachycardia (VT) > 100 bpm, ventricular fibrillation (VF), or exercise-induced VT, when invasive coronary arteriography is not the immediately planned test (**AUC Score 7**) [10]
    - Non-sustained VT, multiple episodes, each ≥ 3 beats at ≥ 100 bpm, frequent premature ventricular contractions (PVC) (defined as greater than or equal to 30/hour on remote monitoring) without known cause or associated cardiac pathology, when an exercise ECG cannot be performed [3,10]
- **Anti-arrhythmic Drug Therapy**
  - Class IC antiarrhythmic drug
    - In the intermediate (**AUC Score 6**) [3] and high (**AUC Score 7**) [3] global risk patient prior to initiation of Class IC antiarrhythmic drug initiation (Propafenone or Flecainide) (**AUC Score 7**) [10]
    - Annually for intermediate and high global risk patients taking Class IC antiarrhythmic drug (Propafenone or Flecainide) (**AUC Score 7**) [3]

- **Coronary Anomaly and Aneurism**
  - Assessment of hemodynamic significance of one of the following documented conditions:
    - Anomalous coronary arteries [17] (**AUC Score 7**) [3]
    - Muscle bridging of coronary artery [18]
  - Coronary aneurysms in Kawasaki's disease [19] (**AUC Score 8**) [3] or due to atherosclerosis
- **Radiation**
  - Following radiation therapy to the anterior or left chest, at 5 years post initiation and every 5 years thereafter [20]
- **Cardiac Sarcoidosis**
  - May be approved as a combination study with MPI for the evaluation and treatment of sarcoidosis [3,21]
    - Evaluation and therapy monitoring in patients with sarcoidosis, after documentation of suspected cardiac involvement by echo or ECG, when cardiac magnetic resonance imaging (CMR) has not been performed
    - Evaluation of suspected cardiac sarcoid, after CMR has shown equivocal or negative findings in the setting of a high clinical suspicion
    - Evaluation of CMR findings showing highly probable cardiac sarcoidosis, when PET could serve to identify inflammation and the consequent potential role for immunosuppressive therapy [22] (**AUC Score 9**) [3]
    - Initial and follow-up PET in monitoring therapy for cardiac sarcoid with immunosuppressive therapy, typically about 4 times over 2 years
- **Infective Endocarditis**
  - In suspected infective endocarditis with moderate to high probability (i.e., staph bacteremia, fungemia, prosthetic heart valve, or intracardiac device), when transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) have been inconclusive with respect to diagnosis of infective endocarditis or characterization of paravalvular invasive complications [23]
- **Aortitis**
  - For diagnosis and surveillance of Aortitis, PET/CT or PET/MRI hybrid imaging [24]
  - **NOTE**: If PET/MRI study is requested, there is no specific CPT Code for this imaging study and a Health Plan review will be required. study is requested, there is no specific CPT Code for this imaging study and a Health Plan review will be required.

Prior To Elective Non-Cardiac Surgery

When neither SE nor MPI have provided or are expected to provide optimal imaging

- An intermediate or high-risk surgery with of one or more risk factors (see below), **AND** documentation of an inability to walk (or < 4 METs) **AND** there has not been an imaging

stress test within 1 year [25–28]

- **Risk factors**: history of ischemic heart disease, history of congestive heart failure, history of cerebrovascular disease, preoperative treatment with insulin, and preoperative serum creatinine > 2.0 mg/dL.
- **Surgical Risk**:
  - **High risk surgery**: Aortic and other major vascular surgery, peripheral vascular surgery, anticipated prolonged surgical procedures associated with large fluid shifts and/or blood loss
  - **Intermediate risk surgery**: Carotid endarterectomy, head and neck surgery, intraperitoneal and intrathoracic surgery, orthopedic surgery, prostate surgery
  - **Low risk surgery**: Endoscopic procedures, superficial procedure, cataract surgery, breast surgery

- Planning for any organ or stem cell transplantation is an indication for preoperative stress imaging, if there has not been a conclusive stress evaluation, computed tomography angiography (CTA), or heart catheterization within the past year, at the discretion of the transplant service [29]

Post Cardiac Transplant

- Annually, for the first five years post cardiac transplantation, in a patient not undergoing invasive coronary arteriography [30]

LEGISLATIVE LANGUAGE

Washington

20211105A – Noninvasive Cardiac Imaging for Coronary Artery Disease [31]

Number and coverage topic:

20211105A – Noninvasive Cardiac Imaging for Coronary Artery Disease

HTCC coverage determination:

Noninvasive cardiac imaging is a **covered benefit with conditions**.

HTCC reimbursement determination:

Limitations of coverage: The following noninvasive cardiac imaging technologies are **covered with conditions**:

- Stress echocardiography for:
  - Symptomatic adult patients (≥ 18 years of age) at intermediate or high risk of Coronary Artery Disease (CAD), or
  - Adult patients with known CAD who have new or worsening symptoms.

- Single Positron Emission Tomography (SPECT) for:
  - Patients under the same conditions as stress echocardiography when stress echocardiography is not technically feasible or clinically appropriate.
- Positron Emission Tomography (PET) for:
  - Patients under the same conditions as SPECT, when SPECT is not technically feasible or clinically appropriate.
- Coronary Computed Tomographic Angiography (CCTA) for:
  - Symptomatic adult patients (≥ 18 years of age) at intermediate or high risk of CAD, or
  - Adult patients with known CAD who have new or worsening symptoms.
- CCTA with Fractional Flow Reserve (FFR) for:
  - Patients under the same conditions as CCTA, when further investigation of functional significance of stenoses is clinically indicated.

Non-covered indicators:

N/A

CODING AND STANDARDS

Codes

+78434, 78459, 78472, 78491, 78492, 93015, 93016, 93017, 93018, A9555

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

General Overview [1,2]

A PET study is a diagnostic test used to evaluate blood flow to the heart. During the test, a small amount of radioactive tracer is injected into a vein. A special camera, called a gamma camera, detects the radiation released by the tracer to produce computer images of the heart. Combined with a medication, the test can help determine if there is adequate blood flow to the heart during activity versus at rest. The medication simulates exercise for patients unable to exercise on a treadmill or stationary cycle.

PET prefusion studies illustrate myocardial blood flow by demonstrating tracer uptake. PET metabolic evaluation studies are used to demonstrate inflammation produced by infiltrative disease such as sarcoidosis, but also enhance the detection of viable (hibernating) myocardium. Hybrid PET-CT scanning combines anatomical information with blood flow assessment and is useful for assessing viable myocardium, especially in chronic heart failure patients with global ischemia, or in patients with multivessel diffuse coronary artery disease as opposed to focal stenotic lesions.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [5]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Definitions

- Stable patients without known CAD fall into 2 categories [3,10,11]:
  - **Asymptomatic**, for whom global risk of CAD events can be determined from coronary risk factors, using calculators available online (see Websites for Global Cardiovascular Risk Calculators section).
  - **Symptomatic**, for whom we estimate the pretest probability that their chest-related symptoms are due to clinically significant CAD (below):
- The THREE Types of Chest Pain or Discomfort
  - **Typical Angina (Definite)** is defined as including all **3** characteristics:
    - Substernal chest pain or discomfort with characteristic quality and duration
    - Provoked by exertion or emotional stress
    - Relieved by rest and/or nitroglycerine
  - **Atypical Angina (Probable)** has only **2** of the above characteristics
  - **Nonanginal Chest Pain/Discomfort** has only **0 - 1** of the above characteristics

- The medical record should provide enough detail to establish the type of chest pain. From those details, the pretest probability of obstructive CAD is estimated from the Diamond Forrester Table below, recognizing that in some cases multiple additional coronary risk factors could increase pretest probability [3,10,11]:

Diamond Forrester Table [13,14]

Age (Years)	Gender	Typical/ Definite Angina Pectoris	Atypical/ Probable Angina Pectoris	Nonanginal Chest Pain
≤ 39	Men	Intermediate	Intermediate	Low
	Women	Intermediate	Very low	Very low
40-49	Men	High	Intermediate	Intermediate
	Women	Intermediate	Low	Very low
50-59	Men	High	Intermediate	Intermediate
	Women	Intermediate	Intermediate	Low
≥ 60	Men	High	Intermediate	Intermediate
	Women	High	Intermediate	Intermediate

Very low: < 5% pretest probability of CAD, usually not requiring stress evaluation

Low: 5 - 10% pretest probability of CAD

Intermediate: 10% - 90% pretest probability of CAD

High: > 90% pretest probability of CAD

- An uninterpretable baseline ECG includes [11]:
  - ST segment depression 1 mm or more; (not for non-specific ST- T wave changes)
  - Ischemic looking T waves; at least 2.5 mm inversions (excluding V1 and V2)
  - Bundle Branch Blocks (BBB)
    - Left BBB
    - Right BBB or intraventricular conduction delay (IVCD), either containing ST or T wave abnormalities (see above)
  - Left ventricular hypertrophy (LVH) with repolarization abnormalities
  - Ventricular paced rhythm
  - Digitalis use with associated ST segment abnormalities
  - Resting HR under 50 bpm on a medication, such as beta-blockers or calcium channel blockers, that is required for patient's treatment and cannot be stopped, with

an anticipated suboptimal workload

- Previously unevaluated pathologic Q waves (in two contiguous leads) defined as the following:
  - 40 ms (1 mm) wide
  - 2 mm deep
  - 25% of depth of QRS complex
- ECG Stress Test Alone versus Stress Testing with Imaging
  - Prominent scenarios suitable for an ECG stress test **WITHOUT** imaging (i.e., exercise treadmill ECG test) require that the patient can exercise for at least 3 minutes of Bruce protocol with achievement of near maximal heart rate **AND** has an interpretable ECG for ischemia during exercise [10]:
    - The (symptomatic) low or intermediate pretest probability patient who can exercise and has an interpretable ECG [10]
    - The patient who is under evaluation for exercise-induced arrhythmia
    - The patient who requires an entrance stress test ECG for a cardiac rehab program or for an exercise prescription
    - For the evaluation of syncope or presyncope during exertion [32]
- Duke Exercise ECG Treadmill Score [33]
  - Calculates risk from ECG treadmill alone:
    - The equation for calculating the Duke treadmill score (DTS) is: DTS = exercise time in minutes - (5 x ST deviation in mm or 0.1 mV increments) - (4 x exercise angina score), with angina score being 0 = none, 1 = non-limiting, and 2 = exercise-limiting
    - The score typically ranges from - 25 to + 15. These values correspond to low-risk (with a score of ≥ + 5), intermediate risk (with scores ranging from - 10 to + 4), and high-risk (with a score of ≤ - 11) categories
- Coronary application of PET includes evaluation of stable patients without known CAD, who fall into two categories [3,10,11]
  - **Asymptomatic**, for whom global risk of CAD events can be determined from coronary risk factors, using calculators available online (see Websites for Global Cardiovascular Risk Calculators section).
  - **Symptomatic**, for whom we estimate the pretest probability that their chest-related symptoms are due to clinically significant (≥ 50%) CAD (below)
- Global Risk of Cardiovascular Disease
  - **Global risk** of CAD is defined as the probability of manifesting cardiovascular disease over the next 10 years and refers to **asymptomatic** patients without known cardiovascular disease. It should be determined using one of the risk calculators below. A high risk is considered greater than a 20% risk of a cardiovascular event over the ensuing 10 years. **High global risk by itself generally lacks scientific**

support as an indication for stress imaging. There are rare exceptions, such as patients requiring IC antiarrhythmic drugs who might require coronary risk stratification prior to initiation of the drug.

- **CAD Risk—Low**
  - 10-year absolute coronary or cardiovascular risk less than 10%
- **CAD Risk—Moderate**
  - 10-year absolute coronary or cardiovascular risk between 10% and 20%
- **CAD Risk—High**
  - 10-year absolute coronary or cardiovascular risk of greater than 20%

*Websites for Global Cardiovascular Risk Calculators** [34–38]

Risk Calculator	Websites for Online Calculator
Framingham Cardiovascular Risk	**https://reference.medscape.com/calculator/framingham-cardiovascular-disease-risk**
Reynolds Risk Score Can use if no diabetes Unique for use of family history	**http://www.reynoldsriskscore.org/**
Pooled Cohort Equation	**http://clincalc.com/Cardiology/ASCVD/PooledCohort.aspx?example**
ACC/AHA Risk Calculator	**http://tools.acc.org/ASCVD-Risk-Estimator/**
MESA Risk Calculator With addition of Coronary Artery Calcium Score, for CAD-only risk	**https://www.mesa-nhlbi.org/MESACHDRisk/MesaRiskScore/RiskScore.aspx**

*Patients who have already manifested cardiovascular disease are already at high global risk and are not applicable to the calculators.

- Definitions of Coronary Artery Disease [11]
  - Percentage stenosis refers to the reduction in diameter stenosis when angiography is the method and can be estimated or measured using angiography or more

accurately measured with intravascular ultrasound (IVUS).

- Coronary artery calcification is a marker of risk, as measured by Agatston score on coronary artery calcium imaging. Its incorporation into global risk can be achieved by using the Multi-Ethnic Study of Atherosclerosis (MESA) risk calculator.
- Ischemia-producing disease (also called hemodynamically or functionally significant disease, for which revascularization might be appropriate) generally implies at least one of the following:
  - Suggested by percentage diameter stenosis ≥ 70% by angiography; intermediate lesions are 50 – 69%
  - For a left main artery, suggested by a percentage stenosis ≥ 50% or minimum lumen cross-sectional area on IVUS ≤ 6 square mm [11,39]
  - FFR (fractional flow reserve) ≤ 0.80 for a major vessel [39]
  - Demonstrable ischemic findings on stress testing (ECG or stress imaging), that are at least mild in degree
- A major vessel would be a coronary vessel that would be amenable to revascularization if indicated. This assessment is made based on the diameter of the vessel and/or the extent of myocardial territory served by the vessel.
- FFR (fractional flow reserve) is the distal to proximal pressure ratio across a coronary lesion during maximal hyperemia induced by either intravenous or intracoronary adenosine. Less than or equal to 0.80 is considered a significant reduction in coronary flow.
- Newer technology that estimates FFR from CCTA image is covered under the Evolent Clinical Guideline 7293 for Fractional Flow Reserve CT.

- Anginal Equivalent [11,32]
  - Development of an anginal equivalent (e.g., shortness of breath, fatigue, or weakness) either with or without prior coronary revascularization should be based upon the documentation of reasons to suspect that symptoms other than chest discomfort are not due to other organ systems (e.g., dyspnea due to lung disease, fatigue due to anemia), by presentation of clinical data, such as respiratory rate, oximetry, lung exam, etc. (as well as d-dimer, chest CT(A), and/or PFTs, when appropriate), and then incorporated into the evaluation of coronary artery disease as would chest discomfort. Most syncope per se is not an anginal equivalent.

Acronyms/Abbreviations

ADLs: Activities of daily living

BMI: Body mass index

CABG: Coronary artery bypass grafting

CAC: Coronary artery calcium

CAD: Coronary artery disease

CCTA: Coronary computed tomography angiography

CMR: Cardiac magnetic resonance imaging

CT(A): Computed tomography (angiography)

DTS: Duke Treadmill Score

ECG: Electrocardiogram

FFR: Fractional flow reserve

IVUS: Intravascular ultrasound

LBBB: Left bundle-branch block

LVEF: Left ventricular ejection fraction

LVH: Left ventricular hypertrophy

MESA: Multi-Ethnic Study of Atherosclerosis

MET: Estimated metabolic equivalent of exercise

MI: Myocardial infarction

MPI: Myocardial perfusion imaging

MR(I): Magnetic resonance (imaging)

PCI: Percutaneous coronary intervention

PET: Positron emission tomography

PFT: Pulmonary function test

PVCs: Premature ventricular contractions

SE: Stress echocardiography

TEE: Transesophageal echocardiography

THR: Target heart rate

TTE: Transthoracic echocardiography

VF: Ventricular fibrillation

VT: Ventricular tachycardia

WPW: Wolff-Parkinson-White

SUMMARY OF EVIDENCE

American Society of Nuclear Cardiology and Society of Nuclear Medicine and Molecular Imaging Joint Position Statement on the Clinical Indications for Myocardial Perfusion PET [1]

Study Design: The document is a joint position statement that summarizes the properties and clinical indications of myocardial perfusion PET. It is based on extensive clinical investigations

and meta-analyses that demonstrate the advantages of PET over other noninvasive cardiac imaging modalities.

Target Population: The target population includes patients with known or suspected coronary artery disease (CAD) who meet appropriate criteria for a stress imaging test. This includes:

- Patients unable to complete a diagnostic-level exercise stress imaging study.
- Patients with prior stress imaging studies of poor quality or inconclusive results.
- High-risk patients, such as those with chronic kidney disease, diabetes mellitus, or suspected high-risk CAD.
- Young patients with established CAD who require repeated radiation-associated cardiac imaging procedures.

Key Factors:

1. **High Diagnostic Accuracy**: Myocardial perfusion PET has high sensitivity and specificity for detecting obstructive CAD, outperforming other noninvasive approaches.
2. **Consistent High-Quality Images**: PET images have high myocardial counts, spatial and contrast resolution, and accurate correction for tissue attenuation and scatter.
3. **Low Radiation Exposure**: PET scans expose patients to less than 5 mSv, significantly lower than other radiation-based cardiac assessments.
4. **Short Acquisition Protocols**: Complete rest-stress studies can be acquired in less than one hour, making it convenient for acutely ill or high-risk patients.
5. **Quantification of Myocardial Blood Flow**: PET allows for the measurement of myocardial flow reserve, improving interpretation confidence and patient selection for interventions.
6. **Strong Prognostic Power**: PET provides high discrimination between different levels of risk in all patient populations, including obese and non-obese individuals, men and women, diabetics, and patients with renal dysfunction.

Appropriate Use Criteria for PET Myocardial Perfusion Imaging [3]

Study Design: The document is a consensus guideline developed by a multidisciplinary workgroup representing several medical specialty societies. It is based on a systematic review of the literature, expert opinion, and clinical practice guidelines. The study design includes the development of clinical scenarios, systematic synthesis of available evidence, individual and group ratings of clinical indications, and recommendations based on final group ratings and discussions.

Target Population: The target population includes patients with suspected or known coronary artery disease (CAD), asymptomatic patients, patients with diagnosed heart failure, patients with known or suspected cardiac sarcoidosis, patients with arrhythmias, patients with syncope, patients with coronary microvascular disease (CMD), specific populations such as those with advanced obesity or familial hypercholesterolemia, patients undergoing prior testing or procedures, patients undergoing preoperative evaluation for noncardiac surgery, and patients requiring determination of exercise level before initiation of exercise prescription or cardiac rehabilitation.

Key Factors

1. **Appropriate Use Criteria (AUC)**: The document outlines AUC for PET MPI in 11 sections, covering various clinical scenarios and patient populations.
2. **Diagnostic and Prognostic Value**: PET MPI is highlighted for its high diagnostic accuracy, sensitivity, and specificity in detecting CAD and CMD. It provides incremental prognostic information that affects clinical decision-making and treatment options.
3. **Clinical Scenarios**: The document includes detailed clinical scenarios with appropriateness scores, ranging from rarely appropriate to appropriate, based on the likelihood of PET MPI affecting clinical management and outcomes.
4. **Methodology**: The AUC development process follows the RAND/UCLA Appropriateness Method, including systematic review, evidence synthesis, individual and group ratings, and consensus recommendations.
5. **Outcome Data**: The document emphasizes the importance of outcome data in guiding the use of PET MPI, particularly in high-risk populations and specific clinical contexts.

ACC/AHA/ASE/ASNC/ASPC/HFSA/HRS/SCAI/SCCT/SCMR/STS 2023 Multimodality Appropriate Use Criteria for the Detection and Risk Assessment of Chronic Coronary Disease [10]

Study Design: The study is a report by the American College of Cardiology (ACC) Solution Set Oversight Committee, in collaboration with several other cardiovascular societies. It updates the prior AUC for various cardiovascular imaging modalities, including radionuclide imaging, stress echocardiography, calcium scoring, coronary computed tomography angiography (CCTA), stress cardiac magnetic resonance (CMR), and invasive coronary angiography.

Target Population: The target population includes patients with known or suspected CCD, which encompasses stable ischemic heart disease (SIHD). The clinical scenarios cover both symptomatic and asymptomatic patients, with and without prior testing or revascularization.

Key Factors:

Clinical Scenarios: The document outlines 64 clinical scenarios for the detection and risk assessment of CCD, drawn from common applications and current clinical practice guidelines.

Rating Process: The clinical scenarios were rated by an independent panel using a modified Delphi process. Ratings were categorized as Appropriate (7-9), May Be Appropriate (4-6), or Rarely Appropriate (1-3).

Updates and Changes: Key changes include the removal of preoperative testing scenarios, simplification of clinical scenario tables, and incorporation of new evidence and guidelines.

Assumptions: The study assumes that each test is performed and interpreted by trained professionals, and that patients are receiving optimal standard care.

Advantages and Limitations: The document provides a table outlining the advantages and limitations of various imaging modalities, such as echocardiography, SPECT, PET, CMR, CCTA, and invasive angiography.

ANALYSIS OF EVIDENCE

Shared Conclusions [1,3,10]**:**

1. **Importance of PET MPI**: All three articles emphasize the significance of PET myocardial perfusion imaging (MPI) in diagnosing and managing coronary artery disease (CAD). They highlight its high diagnostic accuracy, ability to quantify myocardial blood flow, and prognostic value.
2. **Diagnostic Accuracy**: The articles agree on the high sensitivity and specificity of PET MPI for detecting obstructive CAD. They also note its superiority over other noninvasive imaging modalities in certain clinical scenarios.
3. **Prognostic Value**: The prognostic power of PET MPI is a common theme. The ability to predict future cardiovascular events and guide clinical decision-making is emphasized across all three studies.
4. **Clinical Utility**: The articles discuss the clinical utility of PET MPI in various patient populations, including those with suspected or known CAD, heart failure, and other cardiovascular conditions.

POLICY HISTORY

Date	Summary
July 2025	● This guideline merges two Evolent guidelines with identical clinical criteria: ECG 7294-01 for Heart (Cardiac) PET and ECG 072 for Heart (Cardiac) PET into Evolent Clinical Guideline 7294 for Heart Positron Emission Tomography (PET) Scan ○ This guideline also merges Procedure Codes from these two Evolent guidelines ● Added new bullet-point to the General Statement section ● Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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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

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