Cardiac Single-Photon Emission Computed Tomography

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**Disclaimer** The Coverage Summaries are reviewed by the iCare Medicare Utilization Management Committee. Clinical policy is not intended to preempt the judgment of the reviewing medical director or dictate to health care providers how to practice medicine. Health care providers are expected to exercise their medical judgment in rendering appropriate care. Identification of selected brand names of devices, tests and procedures in a medical coverage policy is for reference only and is not an endorsement of any one device, test, or procedure over another. Clinical technology is constantly evolving, and we reserve the right to review and update this policy periodically. References to CPT® codes or other sources are for definitional purposes only and do not imply any right to reimbursement or guarantee of claims payment. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any shape or form or by any means, electronic, mechanical, photocopying or otherwise, without permission from iCare.

**Related Medical/Pharmacy Coverage Policies**

None

**Related Documents**

Please refer to [CMS website](https://www.cms.gov) for the most current applicable National Coverage Determination (NCD)/Local Coverage Determination (LCD)/Local Coverage Article (LCA)/CMS Online Manual System/Transmittals.
Cardiac single-photon emission computed tomography (SPECT) is a noninvasive nuclear imaging test used to evaluate myocardial perfusion (blood flow) and viability (cellular, metabolic and contractile function of the cells). Decreased cardiac blood flow or function may indicate conditions such as coronary artery disease or myocardial infarction (MI). This procedure is also known as myocardial perfusion imaging (MPI) or nuclear stress testing, and may be completed while the individual is resting, physically exercising or given a medication to simulate exercise.

SPECT scans use gamma ray-producing radioactive tracers which are injected into the blood. The tracer signals are then captured by a gamma camera and converted into images of the heart.
Absolute quantitation of myocardial blood flow, an adjunct to cardiac SPECT MPI, is purported to aid in analyzing coronary artery disease.

**Coverage Determination**

iCare follows the CMS requirement that only allows coverage and payment for services that are reasonable and necessary for the diagnosis or treatment of illness or injury or to improve the functioning of a malformed body member except as specifically allowed by Medicare.

In interpreting or supplementing the criteria above and in order to determine medical necessity consistently, iCare may consider the following criteria:

Cardiac single-photon emission computed tomography (SPECT) myocardial perfusion imaging (MPI) will be considered medically reasonable and necessary when one or more of the following requirements are met:

- Assessment of myocardial viability in an individual with significant ischemic ventricular dysfunction (suspected hibernating myocardium) and persistent symptoms; OR
- Heart failure such that revascularization would be considered; OR
- Asymptomatic individual with a coronary calcium Agatston score greater than 400; OR
- Cardiovascular stress testing may be performed in conjunction with additional cardiac diagnostic tests including echocardiography and nuclear cardiac imaging. However, selection of the test should be made within the context of other testing modalities so that the expected information does not become redundant; OR
- Chronic ischemic heart disease;

**AND one or more:**

- Assessment of drug therapy; OR
- Assessment of myocardial viability after revascularization or medical management; OR
- Assessment of symptoms suggesting ischemia following coronary artery bypass graft (CABG); OR
- Assessment of symptoms suggesting restenosis following percutaneous transluminal coronary angioplasty (PTCA); OR
- Diagnosis of coronary artery disease (CAD), especially in an individual with atypical chest pain; OR
- Evaluation of abnormal or suspected false positive stress electrocardiogram (ECG); OR
Evaluation of other symptoms suspicious for the diagnosis of CAD such as syncope and ventricular arrhythmia; OR
Evaluation of suspected or known CAD prior to high risk surgical procedure; OR
Follow up of symptomatic ischemic heart disease; OR
Identification of the presence, location, extent and severity of myocardial ischemia; OR
Planning PTCA to identify lesions causing ischemia, if unknown; OR

- Chronic mitral regurgitation in an individual with hypertrophic cardiomyopathy (HCM) when echocardiography is inconclusive or there are poor echocardiograph imaging windows; OR
- Congenital heart disease (CHD) - Echocardiography is the method of choice for evaluating an individual with known or suspected CHD; however, an individual may benefit from MPI when assessing for:
  - Diagnosis of anomalies of the coronary circulation; OR
  - Kawasaki’s disease; OR

- Evaluation of an individual in whom an accurate measure of the ejection fraction is needed to make a determination of whether to implant a defibrillator or biventricular pacemaker; OR
- Evaluation of an individual receiving chemotherapeutic drugs which are potentially cardiotoxic (e.g., adriamycin); OR
- Evaluation of ischemic versus non-ischemic cardiomyopathy when cardiac catheterization and/or coronary angiography are not planned; OR
- Evaluation of new, recurrent, or worsening left ventricular dysfunction and/or congestive heart failure; OR
- Evaluation of transplant coronary artery disease (TCAD), cardiac allograft vasculopathy (CAV) or ventricular dysfunction in an individual with a history of organ transplantation; OR
- Evaluation of ventricular function in an individual with non-ischemic myocardial disease; OR
- Individual is experiencing new, recurrent or worsening cardiac symptoms, including otherwise unexplained angina equivalent symptoms:

  AND one or more of the following:
  - ECG is uninterpretable for ischemia due to one or more of the following:
    - A greater than 1 mm ST segment depression (NOT nonspecific ST/T wave changes); OR
▪ Complete left bundle branch block (right bundle branch does **not** render ECG uninterpretable for ischemia)\(^3\); OR

▪ Individual on digoxin therapy\(^3\); OR

▪ Left ventricular hypertrophy (LVH) with repolarization abnormalities, also called LVH with strain (NOT without repolarization abnormalities or by voltage criteria)\(^3\); OR

▪ Pre-excitation pattern such as Wolff-Parkinson-White\(^3\); OR

▪ Ventricular paced rhythm\(^3\); OR

  o Evaluation of chest pain syndrome after revascularization or in an individual with intermediate to high pre-test probability for CAD (eg, **Pretest Probability of CAD [CAD Consortium]**) regardless of ECG interpretability or ability to exercise\(^3\); OR

  o Evidence or high suspicion of ventricular arrhythmias\(^3\); OR

  o High pre-test probability for CAD (eg, **Pretest Probability of CAD [CAD Consortium]**) regardless of ECG interpretability or the ability to exercise, and a decision to perform cardiac catheterization or other angiography has not already been made\(^3\); OR

  o History of CAD based on a prior anatomic evaluation of the coronary arteries or a history of CABG or percutaneous coronary intervention (PCI)\(^3\); OR

  o History of false positive exercise stress test (eg, one that is abnormal, but the abnormality does not appear to be due to macrovascular CAD)\(^3\); OR

  o Individual on beta blocker, calcium channel blocker and/or antiarrhythmic medication when the documentation supports that an adequate workload may not be attainable to enable a fully diagnostic exercise study\(^3\); OR

  o Individual with HCM\(^3\); OR

  o Individual with recent equivocal or borderline testing where ischemia remains a concern\(^3\); OR

  o New or previously unrecognized uninterpretable ECG\(^3\); OR

  o Physical inability to perform a maximum exercise workload\(^3\); OR

  o Syncope and collapse (an abrupt, transient, complete loss of consciousness) for an individual with an intermediate or high CHD risk (using **ATP III risk criteria**) and where cardiac etiology is suspected based on an initial evaluation, including history, physical examination or ECG and individual is unable to exercise\(^3\); OR
o Worsening or continuing symptoms in an individual who had a normal or submaximal exercise stress test and there is suspicion of a false negative result\textsuperscript{31}; OR

- Individual will be treated with interleukin 2 products for various malignant disorders\textsuperscript{31}; OR

- Individual with disease conditions associated with CAD (eg, atherosclerotic abdominal aortic aneurysm, peripheral vascular disease, carotid artery disease, chronic renal failure) with no stress imaging evaluation performed within the preceding 2 years and are unable to exercise\textsuperscript{30}; OR

- Individual without cardiac symptoms who underwent a PCI (with stent) procedure more than 2 years prior or a CABG more than 5 years prior and have not undergone an evaluation for CAD within the past 2 years (stress echocardiogram, SPECT MPI, positron emission tomography [PET] MPI, cardiovascular magnetic resonance [CMR], coronary computed tomography angiography [CCTA], cardiac catheterization) and are unable to exercise\textsuperscript{30}; OR

- Individual without clear cardiac symptoms in the presence of an elevated cardiac troponin\textsuperscript{30}; OR

- Individual with recently demonstrated coronary stenosis of uncertain functional significance in a major coronary branch on an anatomic imaging study (coronary angiogram or CCTA) may have one stress test with imaging\textsuperscript{31}; OR

- MPI is appropriate in the evaluation of an acute myocardial infarction and one or more of the following:
  
  o Disease severity\textsuperscript{29}; OR
  o Efficacy of acute reperfusion therapy\textsuperscript{29}; OR
  o Evidence of myocardial salvage\textsuperscript{29}; OR
  o Risk assessment and/or prognosis\textsuperscript{29}; OR
  o Suspected infarction when the combination of history and other tests is not diagnostic\textsuperscript{29}; OR

- New-onset atrial fibrillation (with no prior cardiac evaluation)\textsuperscript{30}; OR

- Planned cardiac or other solid-organ transplant when no cardiac evaluation has been performed within the past year\textsuperscript{30}; OR

- Preoperative assessment for non-cardiac surgery, when used to determine risk for surgery and/or perioperative management in\textsuperscript{33}:
  
  o Individual with intermediate or high likelihood of coronary heart disease\textsuperscript{33}; OR
  
  o Individual with minor or intermediate clinical risk predictors (eg, ACS NSQIP calculator) and poor functional capacity\textsuperscript{33}; OR
  
  o Individual with poor functional capacity undergoing high risk non-cardiac surgery\textsuperscript{33}; OR
Stress echocardiography for the detection and quantification of dynamic left ventricular outflow tract (LVOT) obstruction in the absence of resting LVOT in an individual with HCM; OR

Stress echocardiography for the evaluation of moderate to severe valvular heart disease, suspected pulmonary artery hypertension, and re-evaluation of exercise-induced pulmonary hypertension to evaluate response to therapy; OR

Unstable angina when MPI is used as an adjunct to aid in the diagnosis or treatment of unstable angina and one or more of the following indications:

- Identification of ischemia in the distribution of a known lesion or in remote areas; OR

- Identification of the severity and/or extent of disease in an individual with medically unstable angina or ongoing ischemia; OR

- Measurement of left ventricular function (LVF); OR

Utilization of PET MPI in the determination of cardiac involvement using fluorodeoxyglucose (F-18 FDG) to diagnose cardiac sarcoidosis in an individual that is unable to undergo MRI, have inconclusive MRI findings or when high probability of disease exists even after a negative MRI. Examples of an individual that is unable to undergo MRI include, but are not limited to, an individual with metal implants; OR

Utilization of PET MPI using fluorodeoxyglucose (F-18 FDG) to determine response to immunosuppressive therapy in an individual diagnosed with cardiac sarcoidosis

The use of the criteria in this Medicare Advantage Medical Coverage Policy provides clinical benefits highly likely to outweigh any clinical harms. Services that do not meet the criteria above are not medically necessary and thus do not provide a clinical benefit. Medically unnecessary services carry risks of adverse outcomes and may interfere with the pursuit of other treatments which have demonstrated efficacy.

Coverage Limitations

US Government Publishing Office. Electronic code of federal regulations: part 411 – 42 CFR § 411.15 - Particular services excluded from coverage

Coding Information

Any codes listed on this policy are for informational purposes only. Do not rely on the accuracy and inclusion of specific codes. Inclusion of a code does not guarantee coverage and/or reimbursement for a service or procedure.
<table>
<thead>
<tr>
<th>CPT® Code(s)</th>
<th>Description</th>
<th>Comments</th>
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<tbody>
<tr>
<td>78429</td>
<td>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</td>
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<td>78432</td>
<td>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);</td>
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<td>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</td>
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<td>Myocardial perfusion imaging, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); multiple studies, at rest and/or stress (exercise or pharmacologic) and/or redistribution and/or rest reinjection</td>
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<td>78466</td>
<td>Myocardial imaging, infarct avid, planar; qualitative or quantitative</td>
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<td>78468</td>
<td>Myocardial imaging, infarct avid, planar; with ejection fraction by first pass technique</td>
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<td>78469</td>
<td>Myocardial imaging, infarct avid, planar; tomographic SPECT with or without quantification</td>
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<td>78472</td>
<td>Cardiac blood pool imaging, gated equilibrium; planar, single study at rest or stress (exercise and/or pharmacologic), wall motion study plus ejection fraction, with or without additional quantitative processing</td>
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<tr>
<td>78483</td>
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<td>78491</td>
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<td>Cardiac blood pool imaging, gated equilibrium, SPECT, at rest, wall motion study plus ejection fraction, with or without quantitative processing</td>
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<td>93015</td>
<td>Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; with supervision, interpretation and report</td>
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<tr>
<td>93016</td>
<td>Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; supervision only, without interpretation and report</td>
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<td>93017</td>
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<tr>
<td>93018</td>
<td>Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; interpretation and report only</td>
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<td>93350</td>
<td>Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report;</td>
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<td>93351</td>
<td>Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report; including performance of continuous electrocardiographic monitoring, with supervision by a physician or other qualified health care professional</td>
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<tr>
<td>93352</td>
<td>Use of echocardiographic contrast agent during stress echocardiography (List separately in addition to code for primary procedure)</td>
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<td>0742T</td>
<td>Absolute quantitation of myocardial blood flow (AQMBF), single-photon emission computed tomography (SPECT), with exercise or pharmacologic stress, and at rest, when performed (List separately in addition to code for primary procedure)</td>
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<td>A9500</td>
<td>Technetium Tc-99m sestamibi, diagnostic, per study dose</td>
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<td>A9501</td>
<td>Technetium Tc-99m teboroxime, diagnostic, per study dose</td>
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<td>A9502</td>
<td>Technetium Tc-99m tetrofosmin, diagnostic, per study dose</td>
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<td>A9505</td>
<td>Thallium Tl-201 thallous chloride, diagnostic, per mCi</td>
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<td>Technetium Tc-99m pertechnetate, diagnostic, per mCi</td>
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<td>A9520</td>
<td>Technetium Tc-99m, tilmanocept, diagnostic, up to 0.5 mCi</td>
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<td>A9538</td>
<td>Technetium Tc-99m pyrophosphate, diagnostic, per study dose, up to 25 mCi</td>
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<td>A9560</td>
<td>Technetium Tc-99m labeled red blood cells, diagnostic, per study dose, up to 30 mCi</td>
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<td>Injection, adenosine, 1 mg (not to be used to report any adenosine phosphate compounds)</td>
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<td>Injection, dipyridamole, per 10 mg</td>
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<td>J1250</td>
<td>Injection, dobutamine HCl, per 250 mg</td>
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<td>J2785</td>
<td>Injection, regadenoson, 0.1 mg</td>
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<td>J3490</td>
<td>Unclassified drugs</td>
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<tr>
<td>Q9969</td>
<td>Tc-99m from nonhighly enriched uranium source, full cost recovery add-on, per study dose</td>
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**References**


56. UpToDate, Inc. Stress testing for the diagnosis of obstructive coronary heart disease. 


Appendix

N/A

Change Summary

- 01/01/2024 New Policy.
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