

Cardiac Single-Photon Emission Computed Tomography



INDEPENDENT CARE HEALTH PLAN

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Medical Coverage Policy

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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](#) for the most current applicable National Coverage Determination (NCD)/Local Coverage Determination (LCD)/Local Coverage Article (LCA)/CMS Online Manual System/Transmittals.

Type	Title	ID Number	Jurisdiction Medicare Administrative	Applicable States/Territories
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			Contractors (MACs)	
NCD	Single Photon Emission Computed Tomography (SPECT)	220.12		
LCD (and pertinent LCA)	Cardiovascular Nuclear Medicine	L33560 A56743	J6 - National Government Services, Inc. (Part A/B MAC)	IL, MN, WI
LCD (and pertinent LCA)	Cardiovascular Nuclear Medicine	L33960 A56494	J15 - CGS Administrators, LLC (Part A/B MAC)	KY, OH
LCD (and pertinent LCA)	Cardiology Non-emergent Outpatient Stress Testing	L35083 A56423	JH - Novitas Solutions, Inc. (Part A/B MAC)	AR, CO, NM, OK, TX, LA, MS
LCD (and pertinent LCA)	Cardiac Radionuclide Imaging	L33457 A56476	JJ - Palmetto GBA (Part A/B MAC)	AL, GA, TN
LCD (and pertinent LCA)	Cardiology Non-emergent Outpatient Stress Testing	L35083 A56423	JL - Novitas Solutions, Inc. (Part A/B MAC)	DE, D.C., MD, NJ, PA
LCD (and pertinent LCA)	Cardiac Radionuclide Imaging	L33457 A56476	JM - Palmetto GBA (Part A/B MAC)	NC, SC, VA, WV
LCD (and pertinent LCA)	Cardiology Non-emergent Outpatient Stress Testing	L38396 A56952	JN - First Coast Service Options, Inc. (Part A/B MAC)	FL, PR, U.S. VI

Description

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 symptoms³¹; **OR**
- Heart failure such that revascularization would be considered³¹; **OR**
- Asymptomatic individual with a coronary calcium Agatston score greater than 400³¹; **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 redundant³¹; **OR**
- Chronic ischemic heart disease;

AND one or more:

- Assessment of drug therapy²⁹; **OR**
- Assessment of myocardial viability after revascularization or medical management²⁹; **OR**
- Assessment of symptoms suggesting ischemia following coronary artery bypass graft (CABG)²⁹; **OR**
- Assessment of symptoms suggesting restenosis following percutaneous transluminal coronary angioplasty (PTCA)²⁹; **OR**
- Diagnosis of coronary artery disease (CAD), especially in an individual with atypical chest pain²⁹; **OR**
- Evaluation of abnormal or suspected false positive stress electrocardiogram (ECG)²⁹; **OR**

- Evaluation of other symptoms suspicious for the diagnosis of CAD such as syncope and ventricular arrhythmia²⁹; **OR**
- Evaluation of suspected or known CAD prior to high risk surgical procedure²⁹; **OR**
- Follow up of symptomatic ischemic heart disease²⁹; **OR**
- Identification of the presence, location, extent and severity of myocardial ischemia²⁹; **OR**
- Planning PTCA to identify lesions causing ischemia, if unknown²⁹; **OR**
- Chronic mitral regurgitation in an individual with hypertrophic cardiomyopathy (HCM) when echocardiography is inconclusive or there are poor echocardiograph imaging windows³⁰; **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 for²⁹:
 - Diagnosis of anomalies of the coronary circulation²⁹; **OR**
 - Kawasaki's disease²⁹; **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 pacemaker³²; **OR**
- Evaluation of an individual receiving chemotherapeutic drugs which are potentially cardiotoxic (e.g., adriamycin)³²; **OR**
- Evaluation of ischemic versus non-ischemic cardiomyopathy when cardiac catheterization and/or coronary angiography are not planned³²; **OR**
- Evaluation of new, recurrent, or worsening left ventricular dysfunction and/or congestive heart failure³⁰; **OR**
- Evaluation of transplant coronary artery disease (TCAD), cardiac allograft vasculopathy (CAV) or ventricular dysfunction in an individual with a history of organ transplantation³⁰; **OR**
- Evaluation of ventricular function in an individual with non-ischemic myocardial disease³²; **OR**
- Individual is experiencing new, recurrent or worsening cardiac symptoms, including otherwise unexplained angina equivalent symptoms³¹:

AND one or more of the following:

- ECG is uninterpretable for ischemia due to **one or more** of the following³¹:
 - A greater than 1 mm ST segment depression (NOT nonspecific ST/T wave changes)³¹; **OR**

- Complete left bundle branch block (right bundle branch does **not** render ECG uninterpretable for ischemia)³¹; **OR**
- Individual on digoxin therapy³¹; **OR**
- Left ventricular hypertrophy (LVH) with repolarization abnormalities, also called LVH with strain (NOT without repolarization abnormalities or by voltage criteria)³¹; **OR**
- Pre-excitation pattern such as Wolff-Parkinson-White³¹; **OR**
- Ventricular paced rhythm³¹; **OR**
- 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 exercise³¹; **OR**
- Evidence or high suspicion of ventricular arrhythmias³¹; **OR**
- 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 made³¹; **OR**
- History of CAD based on a prior anatomic evaluation of the coronary arteries or a history of CABG or percutaneous coronary intervention (PCI)³¹; **OR**
- History of false positive exercise stress test (eg, one that is abnormal, but the abnormality does not appear to be due to macrovascular CAD)³¹; **OR**
- 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 study³¹; **OR**
- Individual with HCM³¹; **OR**
- Individual with recent equivocal or borderline testing where ischemia remains a concern³¹; **OR**
- New or previously unrecognized uninterpretable ECG³¹; **OR**
- Physical inability to perform a maximum exercise workload³¹; **OR**
- 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 exercise³¹; **OR**

- Worsening or continuing symptoms in an individual who had a normal or submaximal exercise stress test and there is suspicion of a false negative result³¹; **OR**
- Individual will be treated with interleukin 2 products for various malignant disorders³¹; **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 exercise³⁰; **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 exercise³⁰; **OR**
- Individual without clear cardiac symptoms in the presence of an elevated cardiac troponin³⁰; **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 imaging³¹; **OR**
- MPI is appropriate in the evaluation of an acute myocardial infarction and **one or more** of the following:
 - Disease severity²⁹; **OR**
 - Efficacy of acute reperfusion therapy²⁹; **OR**
 - Evidence of myocardial salvage²⁹; **OR**
 - Risk assessment and/or prognosis²⁹; **OR**
 - Suspected infarction when the combination of history and other tests is not diagnostic²⁹; **OR**
- New-onset atrial fibrillation (with no prior cardiac evaluation)³⁰; **OR**
- Planned cardiac or other solid-organ transplant when no cardiac evaluation has been performed within the past year³⁰; **OR**
- Preoperative assessment for non-cardiac surgery, when used to determine risk for surgery and/or perioperative management³³:
 - Individual with intermediate or high likelihood of coronary heart disease³³; **OR**
 - Individual with minor or intermediate clinical risk predictors (eg, [ACS NSQIP calculator](#)) and poor functional capacity³³; **OR**
 - Individual with poor functional capacity undergoing high risk non-cardiac surgery³³; **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 HCM³¹; **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 therapy³¹; **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 indications²⁹:
 - Identification of ischemia in the distribution of a known lesion or in remote areas²⁹; **OR**
 - Identification of the severity and/or extent of disease in an individual with medically unstable angina or ongoing ischemia²⁹; **OR**
 - Measurement of left ventricular function (LVF)²⁹; **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 implants³¹; **OR**
- Utilization of PET MPI using fluorodeoxyglucose (F-18 FDG) to determine response to immunosuppressive therapy in an individual diagnosed with cardiac sarcoidosis³¹

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.

Cardiac Single-Photon Emission Computed Tomography

CPT® Code(s)	Description	Comments
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	
78451	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); single study, at rest or stress (exercise or pharmacologic)	
78452	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	
78453	Myocardial perfusion imaging, planar (including qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); single study, at rest or stress (exercise or pharmacologic)	

Cardiac Single-Photon Emission Computed Tomography

78454	Myocardial perfusion imaging, planar (including 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	
78459	Myocardial imaging, positron emission tomography (PET), metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), single study;	
78466	Myocardial imaging, infarct avid, planar; qualitative or quantitative	
78468	Myocardial imaging, infarct avid, planar; with ejection fraction by first pass technique	
78469	Myocardial imaging, infarct avid, planar; tomographic SPECT with or without quantification	
78472	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	
78473	Cardiac blood pool imaging, gated equilibrium; multiple studies, wall motion study plus ejection fraction, at rest and stress (exercise and/or pharmacologic), with or without additional quantification	
78481	Cardiac blood pool imaging (planar), first pass technique; single study, at rest or with stress (exercise and/or pharmacologic), wall motion study plus ejection fraction, with or without quantification	
78483	Cardiac blood pool imaging (planar), first pass technique; multiple studies, at rest and with stress (exercise and/or pharmacologic), wall motion study plus ejection fraction, with or without quantification	
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)	
78494	Cardiac blood pool imaging, gated equilibrium, SPECT, at rest, wall motion study plus ejection fraction, with or without quantitative processing	

Cardiac Single-Photon Emission Computed Tomography

93015	Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; with supervision, interpretation and report	
93016	Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; supervision only, without interpretation and report	
93017	Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; tracing only, without interpretation and report	
93018	Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; interpretation and report only	
93350	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;	
93351	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	
93352	Use of echocardiographic contrast agent during stress echocardiography (List separately in addition to code for primary procedure)	
CPT® Category III Code(s)	Description	Comments
0742T	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)	
HCPCS Code(s)	Description	Comments
A9500	Technetium Tc-99m sestamibi, diagnostic, per study dose	
A9501	Technetium Tc-99m teboroxime, diagnostic, per study dose	

A9502	Technetium Tc-99m tetrofosmin, diagnostic, per study dose	
A9505	Thallium Tl-201 thallos chloride, diagnostic, per mCi	
A9512	Technetium Tc-99m pertechnetate, diagnostic, per mCi	
A9520	Technetium Tc-99m, tilmanocept, diagnostic, up to 0.5 mCi	
A9538	Technetium Tc-99m pyrophosphate, diagnostic, per study dose, up to 25 mCi	
A9560	Technetium Tc-99m labeled red blood cells, diagnostic, per study dose, up to 30 mCi	
J0153	Injection, adenosine, 1 mg (not to be used to report any adenosine phosphate compounds)	
J1245	Injection, dipyridamole, per 10 mg	
J1250	Injection, dobutamine HCl, per 250 mg	
J2785	Injection, regadenoson, 0.1 mg	
J3490	Unclassified drugs	
Q9969	Tc-99m from nonhighly enriched uranium source, full cost recovery add-on, per study dose	

References

1. Agency for Healthcare Research and Quality (AHRQ). Comparative Effectiveness Review (ARCHIVED). Noninvasive testing for coronary artery disease. <https://www.ahrq.gov>. Published March 2016. Accessed July 12, 2023.
2. American College of Cardiology (ACC). 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction. <https://www.acc.org>. Published January 29, 2013. Accessed July 14, 2023.
3. American College of Cardiology (ACC). 2014 AHA/ACC guideline for the management of patients with non-ST-elevation acute coronary syndromes. <https://www.acc.org>. Published December 23, 2014. Accessed July 14, 2023.
4. American College of Cardiology (ACC). 2018 ACC/AHA/HRS guideline on the evaluation and management of patients with bradycardia and cardiac conduction delay. <https://www.acc.org>. Published August 20, 2019. Accessed July 14, 2023.
5. American College of Cardiology (ACC). 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol. <https://www.acc.org>. Published June 25, 2019. Accessed July 14, 2023.
6. American College of Cardiology (ACC). 2018 AHA/ACC guideline for the management of adults with congenital heart disease. <https://www.acc.org>. Published April 2, 2019. Accessed July 14, 2023.

7. American College of Cardiology (ACC). 2019 ACC/AHA guideline on the primary prevention of cardiovascular disease. <https://www.acc.org>. Published September 10, 2019. Accessed August 3, 2023.
8. American College of Cardiology (ACC). 2020 ACC/AHA guideline for the management of patients with valvular heart disease. <https://www.acc.org>. Published February 2, 2021. Accessed July 14, 2023.
9. American College of Cardiology (ACC). 2020 AHA/ACC guideline for the diagnosis and treatment of patients with hypertrophic cardiomyopathy. <https://www.acc.org>. Published December 22, 2020. Accessed July 14, 2023.
10. American College of Cardiology (ACC). 2021 AHA/ACC/ASE/CHEST/SAEM/SCCT/SCMR guideline for the evaluation and diagnosis of chest pain. <https://www.acc.org>. Published May 3, 2022. Accessed July 14, 2023.
11. American College of Cardiology (ACC). 2022 AHA/ACC/HFSA guideline for the management of heart failure. <https://www.acc.org>. Published November 30, 2021. Accessed July 14, 2023.
12. American College of Cardiology (ACC). 2023 AHA/ACC/ACCP/ASPC/NLA/PCNA guideline for the management of patients with chronic coronary disease. <https://www.acc.org>. Published July 20, 2023. Accessed August 3, 2023.
13. American College of Cardiology (ACC). ACC/AATS/AHA/ASE/ASNC/HRS/SCAI/SCCT/SCMR/STS 2017 appropriate use criteria for multimodality imaging in valvular heart disease. <https://www.acc.org>. Published September 26, 2017. Accessed July 14, 2023.
14. American College of Cardiology (ACC). ACC/AATS/AHA/ASE/ASNC/HRS/SCAI/SCCT/SCMR/STS 2019 appropriate use criteria for multimodality imaging in the assessment of cardiac structure and function in nonvalvular heart disease. <https://www.acc.org>. Published February 5, 2019. Accessed July 14, 2023.
15. American College of Cardiology (ACC). ACC/AHA/ASE/ASNC/ASPC/HRS/SCAI/SCCT/SCMR/STS 2023 multimodality appropriate use criteria for the detection and risk assessment of chronic coronary disease. <https://www.acc.org>. Published June 27, 2023. Accessed July 14, 2023.
16. American College of Cardiology (ACC). ACC/AHA/ASE/HRS/ISACHD/SCAI/SCCT/SCMR/SOPE 2020 appropriate use criteria for multimodality imaging during the follow-up care of patients with congenital heart disease. <https://www.acc.org>. Published February 18, 2020. Accessed July 14, 2023.
17. American College of Cardiology (ACC). ACCF/ASNC/ACR/AHA/ASE/SCCT/SCMR/SNM 2009 appropriate use criteria for cardiac radionuclide imaging. <https://www.acc.org>. Published February 18, 2020. Accessed July 14, 2023.

18. American College of Cardiology (ACC). ACCF/ASNC appropriateness criteria for single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI). <https://www.acr.org>. Published October 18, 2005. Accessed July 14, 2023.
19. American College of Radiology (ACR). ACR Appropriateness Criteria. Acute nonspecific chest pain – low probability of coronary artery disease. <https://www.acr.org>. Published 2020. Accessed July 14, 2023.
20. American College of Radiology (ACR). ACR Appropriateness Criteria. Asymptomatic patient at risk for coronary artery disease. <https://www.acr.org>. Published 2020. Accessed July 14, 2023.
21. American College of Radiology (ACR). ACR Appropriateness Criteria. Chest pain – possible acute coronary syndrome. <https://www.acr.org>. Published 2019. Accessed July 14, 2023.
22. American College of Radiology (ACR). ACR Appropriateness Criteria. Chronic chest pain – high probability of coronary artery disease. <https://www.acr.org>. Published 2021. Accessed July 14, 2023.
23. American College of Radiology (ACR). ACR Appropriateness Criteria. Chronic chest pain – noncardiac etiology unlikely: low to intermediate probability of coronary artery disease. <https://www.acr.org>. Published 2018. Accessed July 14, 2023.
24. American College of Radiology (ACR). ACR Appropriateness Criteria. Dyspnea – suspected cardiac origin. <https://www.acr.org>. Published 2021. Accessed July 14, 2023.
25. American College of Radiology (ACR). ACR Appropriateness Criteria. Suspected new-onset and known nonacute heart failure. <https://www.acr.org>. Published 2018. Accessed July 14, 2023.
26. American College of Radiology (ACR). ACR Appropriateness Criteria. Syncope. <https://www.acr.org>. Published 2020. Accessed July 14, 2023.
27. American Heart Association (AHA). ASNC/AHA/ASE/EANM/ HFSA/ISA/SCMR/SNMMI expert consensus recommendations for multimodality imaging in cardiac amyloidosis: part 1 of 2 – evidence base and standardized methods of imaging. <https://www.heart.org>. Published July 2021. Accessed July 14, 2023.
28. American Society of Nuclear Cardiology (ASNC). Single photon-emission computed tomography (SPECT) myocardial perfusion imaging guidelines: instrumentation, acquisition, processing and interpretation. <https://www.asnc.org>. Published May 25, 2018. Accessed July 14, 2023.
29. Centers for Medicare & Medicaid Services (CMS). Local Coverage Determination (LCD). Cardiac radionuclide imaging (L33457). <https://www.cms.gov>. Published October 1, 2015. Updated March 23, 2023. Accessed August 29, 2023.
30. Centers for Medicare & Medicaid Services (CMS). Local Coverage Determination (LCD). Cardiology non-emergent outpatient stress testing (L35083). <https://www.cms.gov>. Published October 1, 2015. Updated April 25, 2021. Accessed August 29, 2023.

31. Centers for Medicare & Medicaid Services (CMS). Local Coverage Determination (LCD). Cardiology non-emergent outpatient stress testing (L38396). <https://www.cms.gov>. Published March 15, 2020. Updated April 25, 2021. Accessed August 29, 2023.
32. Centers for Medicare & Medicaid Services (CMS). Local Coverage Determination (LCD). Cardiovascular nuclear medicine (L33560). <https://www.cms.gov>. Published October 1, 2015. Updated October 1, 2019. Accessed August 29, 2023.
33. Centers for Medicare & Medicaid Services (CMS). Local Coverage Determination (LCD). Cardiovascular nuclear medicine (L33960). <https://www.cms.gov>. Published October 1, 2015. Updated January 26, 2023. Accessed August 29, 2023.
34. Centers for Medicare & Medicaid Services (CMS). National Coverage Determination (NCD). Single photon emission computed tomography (220.12). <https://www.cms.gov>. Published October 1, 2002. Accessed July 12, 2023.
35. ClinicalKey. Balady GJ, Ades PA. Exercise physiology and exercise electrocardiographic testing. In: Libby P, Bonow R, Mann D, Tomaselli GF, Bhatt DL, Solomon SD. *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine*. 12th ed. Elsevier; 2022:175-195. <https://www.clinicalkey.com>. Accessed August 10, 2023.
36. ClinicalKey. Boden W. Angina pectoris and stable ischemic heart disease. In: Goldman L, Schafer A. *Goldman-Cecil Medicine*. 26th ed. Elsevier; 2020:376-379.e.1. <https://www.clinicalkey.com>. Accessed July 12, 2023.
37. ClinicalKey. Brahmanandam V, Garcia M. Noninvasive evaluation: functional testing, multidetector computed tomography, and stress cardiac MRI. In: Topol E, Tierstein P. *Textbook of Interventional Cardiology*. 8th ed. Elsevier; 2020:70-89.e4. <https://www.clinicalkey.com>. Accessed July 12, 2023.
38. ClinicalKey. Bravo PE, Di Carli MF. Screening for transplant vasculopathy. In: Di Carli, MF. *Nuclear Cardiology and Multimodal Cardiovascular Imaging*. Elsevier; 2022:307-317. <https://www.clinicalkey.com>. Accessed July 12, 2023.
39. ClinicalKey. Case JA, Dekemp RA. Principles of myocardial blood flow quantification with SPECT and PET imaging. In: Di Carli, MF. *Nuclear Cardiology and Multimodal Cardiovascular Imaging*. Elsevier; 2022:25-36. <https://www.clinicalkey.com>. Accessed July 12, 2023.
40. ClinicalKey. Dorbala S, Di Carli MF. Nuclear cardiology. In: Libby P, Bonow R, Mann D, Tomaselli GF, Bhatt DL, Solomon SD. *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine*. 12th ed. Elsevier; 2022:277-313. <https://www.clinicalkey.com>. Accessed July 12, 2023.
41. ClinicalKey. Goldman, L. Approach to the patient with possible cardiovascular disease. In: Goldman L, Schafer A. *Goldman-Cecil Medicine*. 26th ed. Elsevier; 2020:228-237.e.1. <https://www.clinicalkey.com>. Accessed July 12, 2023.

42. Hayes, Inc. Medical Technology Directory (ARCHIVED). Single photon emission computed tomography (SPECT) for assessing myocardial viability. <https://evidence.hayesinc.com>. Published March 7, 2007. Updated May 12, 2011. Accessed July 7, 2023.
43. MCG Health. Myocardial perfusion imaging, exercise stress. 27th edition. <https://www.mcg.com>. Accessed June 29, 2023.
44. MCG Health. Myocardial perfusion imaging, pharmacologic stress. 27th edition. <https://www.mcg.com>. Accessed June 29, 2023.
45. Merck Manual: Professional Version. Radionuclide imaging of the heart. <https://www.merckmanuals.com>. Updated September 2022. Accessed July 12, 2023.
46. Souza AC, Harms HJ, Martell L, et al. Accuracy and reproducibility of myocardial blood flow quantification by single photon emission computed tomography imaging in patients with known or suspected coronary artery disease. *Circ Cardiovasc Interv*. 2022;15(6):386-397. <https://www.ahajournals.org>. Accessed July 14, 2023.
47. UpToDate, Inc. Artifacts in SPECT radionuclide myocardial perfusion imaging. <https://www.uptodate.com>. Updated June 2023. Accessed July 10, 2023.
48. UpToDate, Inc. Assessment of myocardial viability by nuclear imaging in coronary heart disease. <https://www.uptodate.com>. Updated June 2023. Accessed July 10, 2023.
49. UpToDate, Inc. Cardiac manifestations of systemic sclerosis (scleroderma). <https://www.uptodate.com>. Updated June 2023. Accessed July 10, 2023.
50. UpToDate, Inc. Cardiovascular sequelae of Kawasaki disease: clinical features and evaluation. <https://www.uptodate.com>. Updated June 2023. Accessed July 12, 2023.
51. UpToDate, Inc. Hypertriglyceridemia in adults: management. <https://www.uptodate.com>. Updated July 2023. Accessed August 3, 2023.
52. UpToDate, Inc. Noninvasive testing and imaging for diagnosis in patients at low to intermediate risk of acute coronary syndrome. <https://www.uptodate.com>. Updated June 2023. Accessed July 12, 2023.
53. UpToDate, Inc. Overview of hypertension in adults. <https://www.uptodate.com>. Updated July 2023. Accessed August 3, 2023.
54. UpToDate, Inc. Overview of stress radionuclide myocardial perfusion imaging. <https://www.uptodate.com>. Updated June 2023. Accessed July 10, 2023.
55. UpToDate, Inc. Selecting the optimal cardiac stress test. <https://www.uptodate.com>. Updated June 2023. Accessed July 11, 2023.

56. UpToDate, Inc. Stress testing for the diagnosis of obstructive coronary heart disease. <https://www.uptodate.com>. Updated June 2023. Accessed July 10, 2023.
57. UpToDate, Inc. Tests to evaluate left ventricular systolic function. <https://www.uptodate.com>. Updated June 2023. Accessed July 10, 2023.

Appendix

N/A

Change Summary

- 01/01/2024 New Policy.
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