Coverage Indications, Limitations, and/or Medical Necessity

The two types of radionuclide studies commonly used for cardiac evaluation are myocardial perfusion imaging and ventriculography. Myocardial perfusion imaging is used primarily for the evaluation of coronary artery disease. Ventriculography is sometimes referred to as multiple gated acquisition scanning (MUGA) and is primarily used to evaluate valvular disease and cardiomyopathies. Either type of study may be obtained at rest or with stress. Stress may be provided by exercise or with pharmacologic agents.

Myocardial perfusion imaging is a diagnostic procedure that evaluates blood flow to cardiac muscle using radionuclides. A gamma camera is used to record images in planar or tomographic (single photon emission computed tomography [SPECT]) projections. Use of dual radiopharmaceuticals permits concurrent studies at rest and after stress, which are then compared and interpreted by a nuclear physician. Since the radiopharmaceutical accumulates in the myocardium in relation to blood flow, ischemic and infarcted myocardium can be detected.

With the use of technetium-based radiopharmaceuticals, the perfusion imaging may be linked to acquisition of “first pass” data to visualize blood flow through the right heart, lungs and left heart giving diagnostically useful information about cardiac chamber shunts, wall motion, cardiac output, ejection fraction, left ventricular volume, shunt fraction and valvular regurgitation.

Effective for services performed on or after March 14, 1995, PET scans performed at rest or with pharmacological stress used for noninvasive imaging of the perfusion of the heart for the diagnosis and management of patients with known or suspected coronary artery disease using the FDA approved radiopharmaceutical Rubidium 82 (Rb 82) are covered, provided the requirements below are met:
• The PET scan, whether at rest alone, or rest with stress, is performed in place of, but not in addition to, a single photon emission computed tomography (SPECT); or

• The PET scan whether at rest alone or rest with stress is used following a SPECT that was found to be inconclusive.

In these cases the PET scan must have been considered necessary in order to determine what medical or surgical intervention is required to treat the patient.

(For purposes of this requirement, an inconclusive test is a test(s) whose results are equivocal, technically uninterpretable, or discordant with a patient’s other clinical data and must be documented in the beneficiary’s file.)

The following studies are considered investigational and will not be covered:
Ambulatory radionuclide cardiac monitoring
Monoclonal anti-myosin imaging
Radionuclide imaging of thrombi
Radionuclide imaging of cardiac adrenergic nerves

Myocardial Perfusion Imaging (CPT codes 78451-78454, 78491, 78492)

Patients with a high pretest probability of disease are usually not candidates for this study unless determination of the size and reversibility of a defect are required for clinical decision making. Patients whose diagnosis is in question benefit most from this study. Patients with a low pretest probability of disease are usually not studied except when a prior exercise stress test by treadmill ECG or echo is a presumed false positive. Stress myocardial perfusion imaging, preceded by satisfactory stress echocardiography (CPT code 93350), is not medically necessary.

Cardiac Blood Pool Imaging (CPT codes 78472, 78473, 78481, 78483, 78494, 78496)

These services are allowed for the evaluation of ventricular size, wall motion, stroke volume, and ejection fraction when this information is medically necessary to direct further evaluation and management of the cardiac condition.

Indications:

1. Acute myocardial infarction - Myocardial perfusion imaging is not typically performed during the acute period of myocardial infarction, if the diagnosis is established by other means. In selected patients, imaging is appropriate in the assessment of:
   Disease severity
• Risk assessment and/or prognosis
• Efficacy of acute reperfusion therapy
• Evidence of myocardial salvage
• Suspected infarction when the combination of history and other tests is not diagnostic.

2. Unstable angina - Myocardial perfusion imaging may be useful as an adjunct to other tests in the diagnosis or treatment of unstable angina only when the combination of history and other tests is not diagnostic. In selected patients, imaging is appropriate for:
  • Identification of ischemia in the distribution of a known lesion or in remote areas
  • Identification of the severity/extent of disease in patients with medically unstable angina or ongoing ischemia
  • Measurement of left ventricular function.

3. Chronic ischemic heart disease - The use of myocardial perfusion imaging is well established in the diagnosis and management of coronary artery disease (CAD) and is covered in these situations:
  • Diagnosis of CAD, especially in patients with atypical chest pain
  • Evaluation of abnormal or suspected false positive stress ECG
  • Evaluation of other symptoms suspicious for the diagnosis of CAD such as syncope and ventricular arrhythmia
  • Assessment of myocardial viability after revascularization or medical management
  • Planning PTCA to identify lesions causing ischemia, if unknown
  • Evaluation of suspected or known CAD prior to high risk surgical procedures
  • Identification of the presence, location, extent, and severity of myocardial ischemia
  • Assessment of drug therapy
  • Assessment of symptoms suggesting restenosis following PTCA
  • Assessment of symptoms suggesting ischemia following CABG
  • Follow up of symptomatic ischemic heart disease.

4. Cardiomyopathy - Cardiac blood pool imaging is covered for:
  • Diagnosis of hypertrophic cardiomyopathy and/or myocardial ischemia
• Differentiation of ischemic from non-ischemic cardiomyopathy

5. Congenital heart disease - Echocardiography is the method of choice for evaluating patients with known or suspected congenital heart disease. Selected patients may benefit from myocardial perfusion imaging when assessing for:
  • Diagnosis of anomalies of the coronary circulation
  • Kawasaki's disease

6. Post-transplant cardiac disease
  • Assessment of coronary arteriopathy
  • Evaluation for ventricular dysfunction with post-transplant rejection

Pharmacologic Stress Agents (HCPCS codes J0151, J0280, J0461, J1245, J1250)

For those patients who are unable to reach 75-100% of their age predicted maximum heart rate by physiologic exercise, vasodilation can be achieved with the use of either dipyridamole or adenosine. Use of pharmacologic agents in myocardial perfusion imaging (CPT codes 78451-78454) is not a standard of care and is not medically necessary unless exercise is not possible. In some cases dobutamine may be used to effect stress through its inotropic effect.

1. Dipyridamole is typically administered intravenously at 0.56 mg/Kg over a 4-minute period. The maximum dose should not exceed 60 mg. Since the dilation effect persists, after injection of the radiopharmaceutical, its effect is typically reversed with intravenous aminophylline, which must be available to reverse ischemia when it occurs. Dipyridamole is relatively contraindicated in patients with:
   • Known bronchospastic lung disease (asthma)
   • Systemic hypotension (systolic BP below 100 mm Hg.)
   • Acute myocardial infarction less than 48 hours old
   • Unstable angina

2. Adenosine is administered intravenously at 140 mcg/Kg/min over 6 minutes (0.84mg/Kg). The vasodilation effect is short lived. Adenosine is contraindicated in patients with:
   • Second or third degree AV block
   • Sinus node disease, except those with a functioning pacemaker
   • Known or suspected bronchoconstrictive or bronchospastic lung disease
- Known hypersensitivity to adenosine

3. Dobutamine is administered intravenously, starting at 5-10 mcg/Kg and titrated to reach the maximum heart rate for 2-5 minutes. The maximum dose is 50 mcg/Kg. Atropine may be added in appropriate doses IV. Dobutamine is contraindicated in patients with:
   - Idiopathic subaortic stenosis
   - Acute myocardial infarction

Physician Supervision Requirements

Myocardial perfusion and blood pool imaging require general supervision by a qualified physician licensed to administer radioactive materials. Cardiology stress procedures (CPT codes 93015-93018) performed in conjunction with nuclear myocardial perfusion imaging studies are covered by Medicare only when performed under the direct supervision of a qualified physician, who provides:
   - Medical expertise required for performance of the test
   - Medical treatment for complications and side effects of the test
   - Medical services required as part of the test such as injections of medications
   - Medical expertise in the interpretation of the cardiovascular stress test component, some of which has to be provided during the test and before the patient is discharged from the testing suite.

Coding Information

Bill Type Codes:

Contractors may specify Bill Types to help providers identify those Bill Types typically used to report this service. Absence of a Bill Type does not guarantee that the policy does not apply to that Bill Type. Complete absence of all Bill Types indicates that coverage is not influenced by Bill Type and the policy should be assumed to apply equally to all claims.

011x Hospital Inpatient (Including Medicare Part A)
012x Hospital Inpatient (Medicare Part B only)
013x Hospital Outpatient
085x Critical Access Hospital

Revenue Codes:

Contractors may specify Revenue Codes to help providers identify those Revenue Codes typically used to report this service. In most instances Revenue Codes are purely advisory; unless specified in the policy services reported under other Revenue Codes are equally
subject to this coverage determination. Complete absence of all Revenue Codes indicates that coverage is not influenced by Revenue Code and the policy should be assumed to apply equally to all Revenue Codes.

For Part A:
Revenue codes 096X, 097X and 098X are to be used only by Critical Access Hospitals (CAHs) choosing the optional payment method (also called Option 2 or Method 2) and only for services performed by physicians or practitioners who have reassigned their billing rights. When a CAH has selected the optional payment method, physicians or other practitioners providing professional services at the CAH may elect to bill their carrier or assign their billing rights to the CAH. When professional services are reassigned to the CAH, the CAH must bill the A/B MAC using revenue codes 096X, 097X or 098X.

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**CPT/HCPCS Codes**

**Group 1 Paragraph: NOTE:** For Part A services only, the provider should bill the appropriate procedure code on the UB-04 for 11X bill type.

**Use CPT Code 78496 in conjunction with CPT code 78472.**

**Group 1 Codes:**

- 78451 Ht muscle image spect sing
- 78452 Ht muscle image spect mult
- 78453 Ht muscle image planar sing
- 78454 Ht musc image planar mult
- 78472 Gated heart planar single
- 78473 Gated heart multiple
- 78481 Heart first pass single
- 78483 Heart first pass multiple
- 78491 Heart image (pet) single
- 78492 Heart image (pet) multiple
- 78494 Heart image spect
- 78496 Heart first pass add-on

**Group 2 Paragraph: HCPCS Codes**
Group 2 Codes:

A4641  Radiopharm dx agent noc
A9500  Tc99m sestamibi
A9501  Technetium TC-99m teboroxime
A9502  Tc99m tetrofosmin
A9505  TL201 thallium
A9526  Nitrogen N-13 ammonia
A9555  Rb82 rubidium

ICD-9 Codes that Support Medical Necessity

Group 1 Paragraph: Use of these codes does not guarantee reimbursement. The patient’s medical record must document that the coverage criteria in this policy have been met.

Myocardial Perfusion Imaging
CPT Codes: 78451-78454, 78491, 78492
HCPCS Codes: A4641, A9500, A9501, A9502, A9505, A9526, A9555

Group 1 Codes:

410.00 - ACUTE MYOCARDIAL INFARCTION OF ANTEROLATERAL WALL EPISODE OF CARE UNSPECIFIED - ACUTE MYOCARDIAL INFARCTION OF UNSPECIFIED SITE SUBSEQUENT EPISODE OF CARE
411.0 POSTMYOCARDIAL INFARCTION SYNDROME
411.1 INTERMEDIATE CORONARY SYNDROME
411.81 ACUTE CORONARY OCCLUSION WITHOUT MYOCARDIAL INFARCTION OTHER ACUTE AND SUBACUTE FORMS OF ISCHEMIC HEART DISEASE OTHER
413.0 ANGINA DECUBITUS
413.1 PRINZMETAL ANGINA
413.9 OTHER AND UNSPECIFIED ANGINA PECTORIS
414.00 CORONARY ATHEROSCLEROSIS OF UNSPECIFIED TYPE OF VESSEL NATIVE OR GRAFT
414.01 CORONARY ATHEROSCLEROSIS OF NATIVE CORONARY ARTERY
414.02 CORONARY ATHEROSCLEROSIS OF AUTOLOGOUS VEIN BYPASS GRAFT CORONARY ATHEROSCLEROSIS OF NONAUTOLOGOUS BIOLOGICAL BYPASS GRAFT
414.03 CORONARY ATHEROSCLEROSIS OF ARTERY BYPASS GRAFT
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Group 2 Paragraph:

Blood Pool Imaging
CPT Codes: 78472, 78473, 78481, 78483, 78494, 78496

Group 2 Codes:
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394.1 RHEUMATIC MITRAL INSUFFICIENCY
394.2 MITRAL STENOSIS WITH INSUFFICIENCY
395.0 RHEUMATIC AORTIC STENOSIS
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396.2 MITRAL VALVE INSUFFICIENCY AND AORTIC VALVE STENOSIS
396.3 MITRAL VALVE INSUFFICIENCY AND AORTIC VALVE INSUFFICIENCY
396.8 MULTIPLE INVOLVEMENT OF MITRAL AND AORTIC VALVES
397.0 DISEASES OF TRICUSPID VALVE
397.1 RHEUMATIC DISEASES OF PULMONARY VALVE
397.9 RHEUMATIC DISEASES OF ENDOCARDIUM VALVE UNSPECIFIED
398.0 RHEUMATIC MYOCARDITIS
398.90 RHEUMATIC HEART DISEASE UNSPECIFIED
398.91 RHEUMATIC HEART FAILURE (CONGESTIVE)
410.02 ACUTE MYOCARDIAL INFARCTION OF ANTEROLATERAL WALL SUBSEQUENT EPISODE OF CARE
410.12 ACUTE MYOCARDIAL INFARCTION OF OTHER ANTERIOR WALL SUBSEQUENT EPISODE OF CARE
410.22 ACUTE MYOCARDIAL INFARCTION OF INFEROLATERAL WALL SUBSEQUENT EPISODE OF CARE
410.32 ACUTE MYOCARDIAL INFARCTION OF INFEROPOSTERIOR WALL
SUBSEQUENT EPISODE OF CARE

410.42 ACUTE MYOCARDIAL INFARCTION OF OTHER INFERIOR WALL
SUBSEQUENT EPISODE OF CARE

410.52 ACUTE MYOCARDIAL INFARCTION OF OTHER LATERAL WALL
SUBSEQUENT EPISODE OF CARE

410.62 TRUE POSTERIOR WALL INFARCTION SUBSEQUENT EPISODE OF CARE

410.72 SUBENDOCARDIAL INFARCTION SUBSEQUENT EPISODE OF CARE

410.92 ACUTE MYOCARDIAL INFARCTION OF UNSPECIFIED SITE SUBSEQUENT
EPISODE OF CARE

411.1 INTERMEDIATE CORONARY SYNDROME

411.81 ACUTE CORONARY OCCLUSION WITHOUT MYOCARDIAL INFARCTION
OTHER ACUTE AND SUBACUTE FORMS OF ISCHEMIC HEART DISEASE

411.89 OTHER

413.0 ANGINA DECUBITUS

413.1 PRINZMETAL ANGINA

413.9 OTHER AND UNSPECIFIED ANGINA PECTORIS

414.00 CORONARY ATHEROSCLEROSIS OF UNSPECIFIED TYPE OF VESSEL
NATIVE OR GRAFT

414.01 CORONARY ATHEROSCLEROSIS OF NATIVE CORONARY ARTERY

414.02 CORONARY ATHEROSCLEROSIS OF AUTOLOGOUS VEIN BYPASS GRAFT

414.03 CORONARY ATHEROSCLEROSIS OF NONAUTOLOGOUS BIOLOGICAL
BYPASS GRAFT

414.04 CORONARY ATHEROSCLEROSIS OF ARTERY BYPASS GRAFT

414.05 CORONARY ATHEROSCLEROSIS OF UNSPECIFIED BYPASS GRAFT
CORONARY ATHEROSCLEROSIS OF NATIVE CORONARY ARTERY OF
TRANSPLANTED HEART

414.06 CORONARY ATHEROSCLEROSIS OF BYPASS GRAFT (ARTERY) (VEIN) OF
TRANSPLANTED HEART

414.10 ANEURYSM OF HEART (WALL)

414.2 CHRONIC TOTAL OCCLUSION OF CORONARY ARTERY

414.4 CORONARY ATHEROSCLEROSIS DUE TO CALCIFIED CORONARY LESION

414.8 OTHER SPECIFIED FORMS OF CHRONIC ISCHEMIC HEART DISEASE

415.0 ACUTE COR PULMONALE

416.0 PRIMARY PULMONARY HYPERTENSION

416.8 OTHER CHRONIC PULMONARY HEART DISEASES

416.9 CHRONIC PULMONARY HEART DISEASE UNSPECIFIED

424.0 MITRAL VALVE DISORDERS

424.1 AORTIC VALVE DISORDERS

424.2 TRICUSPID VALVE DISORDERS SPECIFIED AS NONRHEUMATIC

424.3 PULMONARY VALVE DISORDERS

425.0 ENDOCARDIAL FIBROSIS

425.11 HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY

425.18 OTHER HYPERTROPHIC CARDIOMYOPATHY
425.2 OBSCURE CARDIOMYOPATHY OF AFRICA
425.3 ENDOCARDIAL FIBROELASTOSIS
425.4 OTHER PRIMARY CARDIOMYOPATHIES
425.5 ALCOHOLIC CARDIOMYOPATHY
425.7 NUTRITIONAL AND METABOLIC CARDIOMYOPATHY
425.8 CARDIOMYOPATHY IN OTHER DISEASES CLASSIFIED ELSEWHERE
425.9 SECONDARY CARDIOMYOPATHY UNSPECIFIED
428.0 CONGESTIVE HEART FAILURE UNSPECIFIED
428.1 LEFT HEART FAILURE
428.9 HEART FAILURE UNSPECIFIED
429.0 MYOCARDITIS UNSPECIFIED
429.1 MYOCARDIAL DEGENERATION
429.2 CARDIOVASCULAR DISEASE UNSPECIFIED
429.3 CARDIOMEGALY
429.4 FUNCTIONAL DISTURBANCES FOLLOWING CARDIAC SURGERY
429.5 RUPTURE OF CHORDAE TENDINEAE
429.6 RUPTURE OF PAPILLARY MUSCLE
429.71 CERTAIN SEQUELAE OF MYOCARDIAL INFARCTION NOT ELSEWHERE CLASSIFIED ACQUIRED CARDIAC SEPTAL DEFECT
429.79 CERTAIN SEQUELAE OF MYOCARDIAL INFARCTION NOT ELSEWHERE CLASSIFIED OTHER
429.81 OTHER DISORDERS OF PAPILLARY MUSCLE
429.82 HYPERKINETIC HEART DISEASE
429.83 TAKOTSUBO SYNDROME
429.89 OTHER ILL-DEFINED HEART DISEASES
745.0 COMMON TRUNCUS
745.10 COMPLETE TRANSPOSITION OF GREAT VESSELS
745.11 DOUBLE OUTLET RIGHT VENTRICLE
745.12 CORRECTED TRANSPOSITION OF GREAT VESSELS
745.19 OTHER TRANSPOSITION OF GREAT VESSELS
745.2 TETRALOGY OF FALLOT
745.3 COMMON VENTRICLE
745.4 VENTRICULAR SEPTAL DEFECT
745.5 OSTIUM SECUNDUM TYPE ATRIAL SEPTAL DEFECT
745.60 ENDOCARDIAL CUSHION DEFECT UNSPECIFIED TYPE
745.61 OSTIUM PRIMUM DEFECT
745.69 OTHER ENDOCARDIAL CUSHION DEFECTS
745.7 COR BILOCULARE
746.00 CONGENITAL PULMONARY VALVE ANOMALY UNSPECIFIED
746.01 ATRESIA OF PULMONARY VALVE CONGENITAL
746.02 STENOSIS OF PULMONARY VALVE CONGENITAL
746.09 OTHER CONGENITAL ANOMALIES OF PULMONARY VALVE
746.1 TRICUSPID ATRESIA AND STENOSIS CONGENITAL
746.2 EBSTEIN'S ANOMALY
746.3 CONGENITAL STENOSIS OF AORTIC VALVE
746.4 CONGENITAL INSUFFICIENCY OF AORTIC VALVE
746.5 CONGENITAL MITRAL STENOSIS
746.6 CONGENITAL MITRAL INSUFFICIENCY
746.7 HYPOPLASTIC LEFT HEART SYNDROME
746.81 SUBAORTIC STENOSIS CONGENITAL
746.82 COR TRIATRIATUM
746.83 INFUNDIBULAR PULMONIC STENOSIS CONGENITAL
746.84 CONGENITAL OBSTRUCTIVE ANOMALIES OF HEART NOT ELSEWHERE CLASSIFIED
746.85 CORONARY ARTERY ANOMALY CONGENITAL
746.86 CONGENITAL HEART BLOCK
746.87 MALPOSITION OF HEART AND CARDIAC APEX
746.89 OTHER SPECIFIED CONGENITAL ANOMALIES OF HEART
746.9 UNSPECIFIED CONGENITAL ANOMALY OF HEART
786.02 ORTHOPNEA
786.05 SHORTNESS OF BREATH
786.07 WHEEZING
786.50 UNSPECIFIED CHEST PAIN
786.51 PRECORDIAL PAIN
786.59 OTHER CHEST PAIN
996.61 INFECTION AND INFLAMMATORY REACTION DUE TO CARDIAC DEVICE IMPLANT AND GRAFT
996.72 OTHER COMPLICATIONS DUE TO OTHER CARDIAC DEVICE IMPLANT AND GRAFT
V58.11 ENCOUNTER FOR ANTINEOPLASTIC CHEMOTHERAPY
V67.2 FOLLOW-UP EXAMINATION FOLLOWING CHEMOTHERAPY

ICD-9 Codes that DO NOT Support Medical Necessity

**Paragraph:** All other ICD-9 codes not listed under “ICD-9 Codes That Support Medical Necessity” will be denied as not medically necessary.

N/A

**Associated Information**

**Documentation Requirements**

The patient's medical record must document the medical necessity of services performed for each date of service submitted on a claim, and documentation must be available to A/B MAC on request.

The medical record must document when significant resting ECG abnormalities are present, or a medication is being used and cannot be withdrawn, that would interfere with interpretation of a stress ECG, resulting in the selection of myocardial perfusion study.
The rationale for selecting pharmacologic stress rather than exercise stress must be indicated in the medical record.

Claims submitted for stress tests performed as preoperative evaluation of patients without symptoms of CAD who are deemed to be at moderate risk must document one of the following at-risk conditions in the medical record: Diabetes mellitus with complications, peripheral vascular disease, aortic aneurysm or cerebrovascular disease.

**Utilization Guidelines**

Services performed for excessive frequency are not medically necessary. Frequency is considered excessive when services are performed more frequently than generally accepted by peers and the reason for additional services is not justified by documentation.