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## Subject: Magnetic Resonance Imaging (MRI) Cardiac

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[Position Statement](#)

[Billing/Coding](#)

[Reimbursement](#)

[Program Exceptions](#)

[Definitions](#)

[Related Guidelines](#)

[Other](#)

[References](#)

[Update](#)

### DESCRIPTION:

Magnetic resonance imaging (MRI) or cardiac magnetic resonance imaging (CMR) is a radiation-free, noninvasive, technique used to produce high quality sectional images of the inside of the body in multiple planes. MRI uses natural magnetic properties of the hydrogen atoms in the body that emit radiofrequency signals when exposed to radio waves within a strong magnetic field. These signals are processed and converted by a computer into high-resolution, three-dimensional, tomographic images. Images and resolution produced by MRI is quite detailed. For some MRI, contrast materials (e.g., gadolinium, gadoteridol, non-ionic and low osmolar contrast media, ionic and high osmolar contrast media) are used to enable visualization of a body system or body structure.

The U.S. Food and Drug Administration's (FDA) cleared MRI systems for marketing through the 510(k) process. The Fonar Stand-Up MRI system received FDA marketing clearance in October 2000.

**Summary and Analysis of Evidence:** Cardiac magnetic resonance imaging (MRI) is an established imaging modality, well recognized for its value in the assessment and monitoring of a wide range of diseases of the heart and surrounding related structures (e.g., pericardium). Multidetector computed tomography (MDCT) and MRI, with appropriately equipped scanners, can also acquire images of coronary arteries, cardiac chambers, valves, myocardium, and pericardium in order to view cardiac anatomy. MRI methods also permit the evaluation of regional and global cardiac function. MRI continue to play an increasing role in comprehensive cardiac imaging (ACR–NASCI–SPR, 2021).

### POSITION STATEMENT:

#### Indications for Cardiac (Heart) MRI/Cardiac Magnetic Resonance (CMR)

##### Cardiomyopathy & Heart Failure

- To assess systolic and diastolic function in the evaluation of a newly diagnosed cardiomyopathy
- Suspected infiltrative disease such as amyloidosis, sarcoidosis, hemochromatosis, or endomyocardial fibrosis if PET has not been performed
- Suspected inherited or acquired cardiomyopathy
- Diagnosis of acute myocarditis, with suspicion based upon new, unexplained findings
- Assessment of hypertrophic cardiomyopathy
  - For members with HCM, repeat imaging on a periodic basis (every 3-5 years) for the purpose of SCD risk stratification to evaluate changes in LGE, EF, development of apical aneurysm or LV wall thickness.
- Arrhythmogenic right ventricular cardiomyopathy to aid in identification and diagnosis (assessment of myocardial fat, fibrosis, and RV tissue characteristics)
- Noncompaction cardiomyopathy to aid in the diagnosis (measurement of compacted to noncompacted myocardium) when TTE is suggestive
- Clinical symptoms and signs consistent with a cardiac diagnosis known to cause presyncope/syncope (including but not limited to hypertrophic cardiomyopathy)
- Pulmonary hypertension in the absence of severe valvular disease.

#### **Valvular Heart Disease**

- Evaluation of valvular stenosis, regurgitation, or valvular masses when transthoracic echocardiography (TTE) is inadequate
- Pre-TAVR assessment if the member has not undergone cardiac CT
- Prior to transcatheter mitral valve intervention, when TTE and TEE result in uncertain assessment of the severity of mitral regurgitation
- Suspected clinically significant bioprosthetic valvular dysfunction and inadequate images from TTE and TEE.

#### **Evaluation of Intra- and Extra-Cardiac Structures**

- Initial evaluation of cardiac mass, suspected tumor or thrombus, or potential cardiac source of emboli
- Re-evaluation of intracardiac mass when findings would change therapy
- Evaluation of pericardial disease to provide structural and functional assessment and differentiate constrictive vs restrictive physiology
- Assessment of left ventricular pseudoaneurysm, when TTE was inadequate
- Identification and characteristics of coronary aneurysms or anomalous coronary arteries.

#### **Pre-procedure Evaluation for Closure of ASD or PFO**

### **Assessment Following LAA Occlusion**

- For surveillance at 45 days or FDA guidance, if TEE or Heart CT was not done.

### **Pre-Ablation Planning**

- Evaluation of left atrium and pulmonary veins prior to radiofrequency ablation for atrial fibrillation, if cardiac CT has not been done.

### **Aortic Pathology**

- CT, MR, or echocardiogram can be used for screening and follow-up, with CT and MR preferred for imaging beyond the proximal ascending thoracic aorta
- Screening if first-degree relative with a history of thoracic aortic aneurysm or dissection
- Six-month follow-up after initial diagnosis of thoracic aortic aneurysm to measure rate of change
- Annual follow-up for an enlarged thoracic aortic aneurysm (usually defined as > 4.4 cm)
- Biannual (2x/year) follow-up of enlarged aortic root or showing growth rate  $\geq 0.5$  cm/year
- Screening if first-degree relative with a bicuspid aortic valve
- Re-evaluation (<1 y) of the size and morphology of the aortic sinuses and ascending aorta in members with a bicuspid AV and an ascending aortic diameter >4 cm with 1 of the following:
  - Aortic diameter >4.5 cm
  - Rapid rate of change in aortic diameter
  - Family history (first-degree relative) of aortic dissection.
- Members with Turner's syndrome annually if an abnormality exists; if initial study normal, can have imaging every 5 - 10 years
- Evaluation in members with known or suspected connective tissue disease or genetic conditions that predispose to aortic aneurysm or dissection, such as Marfan's, Ehler's Danlos or Loeys-Dietz syndrome (at the time of diagnosis and 6 months thereafter), followed by annual imaging (can be done more frequently if > 4.5 cm or rate of growth >0.5 cm/year- up to twice per year).

### **Congenital Heart Disease (CHD)**

- For all indications below, either CT or CMR can be performed
- All lesions: evaluation prior to planned repair and evaluation for change in clinical status and/or new concerning signs or symptoms
- Patent Ductus Arteriosus: routine surveillance (1-2 years) in a member with postprocedural aortic obstruction
- Eisenmenger Syndrome and Pulmonary Hypertension associated with CHD:
  - Evaluation due to change in pulmonary arterial hypertension-targeted therapy
  - Initial evaluation with suspicion of pulmonary hypertension following CHD surgery.

- Aortic Stenosis or Regurgitation:
  - Routine surveillance (6-12 months) in a child with aortic sinus and/or ascending aortic dilation with increasing size
  - Routine surveillance (2–3 years) in a child with aortic sinus and/or ascending aortic dilation with stable size (CMR only).
- Aortic Coarctation and Interrupted Aortic Arch:
  - Routine surveillance (3–5 years) in a child or adult with mild aortic coarctation
  - Post procedure (surgical or catheter-based) routine surveillance (3–5 years) in an asymptomatic member to evaluate for aortic arch aneurysms, in-stent stenosis, stent fracture, or endoleak.
- Coronary anomalies
- Tetralogy of Fallot:
  - Postoperative routine surveillance (2–3 years) in a member with pulmonary regurgitation and preserved ventricular function (CMR only)
  - Routine surveillance (2–3 years) in an asymptomatic member with no or mild sequelae (CMR only)
  - Routine surveillance (2–3 years) in a member with valvular or ventricular dysfunction, right ventricular outflow tract obstruction, branch pulmonary artery stenosis, arrhythmias, or presence of an RV-to-PA conduit.
- Double Outlet Right Ventricle: Routine surveillance (3–5 years) in an asymptomatic member with no or mild sequelae (CMR only)
- D-Loop Transposition of the Great Arteries (postoperative):
  - Routine surveillance (3–5 years) in an asymptomatic member
  - Routine surveillance (1–2 years) in a member with dilated aortic root with increasing size, or aortic regurgitation
  - Routine surveillance (3–12 months) in a member with  $\geq$ moderate systemic AV valve regurgitation, systemic RV dysfunction, LVOT obstruction, or arrhythmias.
- Congenitally Corrected Transposition of the Great Arteries:
  - Unrepaired: routine surveillance (3–5 years) in an asymptomatic member
  - Postoperative: routine surveillance (3–5 years) in an asymptomatic member
  - Postoperative anatomic repair: routine surveillance (6–12 months) in a member with valvular or ventricular dysfunction, right or left ventricular outflow tract obstruction, or presence of an RV-to-PA conduit
  - Postoperative physiological repair with VSD closure and/or LV-to-PA conduit: routine surveillance (3–12 months) in a member with  $\geq$ moderate systemic AV valve regurgitation, systemic RV dysfunction, and/or LV-to-PA conduit dysfunction.
- Truncus Arteriosus: routine surveillance (1–2 years) in an asymptomatic child or adult with  $\geq$  moderate truncal stenosis and/or regurgitation

- Single-Ventricle Heart Disease:
  - Postoperative routine surveillance (3–5 years) in an asymptomatic member
  - Routine surveillance (1–2 years) in an asymptomatic adult postoperative Stage 2 palliation (CMR only).
- Ebstein’s Anomaly and Tricuspid Valve dysplasia (only CMR indicated):
  - Evaluation prior to planned repair and evaluation for change in clinical status and/or new concerning signs or symptoms.
- Pulmonary Stenosis (only CMR indicated)
  - Unrepaired: routine surveillance (3–5 years) in an asymptomatic adult with PS and pulmonary artery dilation
  - Postprocedural (surgical or catheter-based): routine surveillance (1–3 years) in an asymptomatic adult with moderate or severe sequelae.
- Pulmonary Atresia (postprocedural complete repair): routine surveillance (1–3 years) in an asymptomatic adult with ≥ moderate sequelae.

**Coronary artery disease evaluation**

**(CMR as an alternative to pharmacologic MPI)**

- CMR, which is done pharmacologically, is used for the assessment of coronary artery disease when a stress echocardiogram (SE) cannot be performed
  - If the member cannot walk and would otherwise be a candidate for a pharmacologic MPI a stress CMR can be performed
  - If the member is able to walk and is having a MPI for another reason (LBBB, CABG, etc) MPI is chosen over the CMR.
- Assessment of LV wall motion to identify members with akinetic segments that would benefit from coronary revascularization.
- To identify the extent and location of myocardial necrosis in members with chronic or acute ischemic heart disease.

**BILLING/CODING INFORMATION:**

**CPT Coding**

75557	Cardiac magnetic resonance imaging for morphology and function without contrast material;
75559	Cardiac magnetic resonance imaging for morphology and function without contrast material; with stress imaging
75561	Cardiac magnetic resonance imaging for morphology and function without contrast material(s), followed by contrast material(s) and further sequences;

75563	Cardiac magnetic resonance imaging for morphology and function without contrast material(s), followed by contrast material(s) and further sequences; with stress imaging
75565	Cardiac magnetic resonance imaging for velocity flow mapping (List separately in addition to code for primary procedure)

### HCPCS Coding

S8042	Magnetic resonance imaging (MRI), low-field
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### REIMBURSEMENT INFORMATION:

Reimbursement for cardiac magnetic resonance imaging (75557, 75559, 75561, 75563, and 75565) is limited to one (1) cardiac magnetic resonance imaging within a 6-month period. Cardiac magnetic resonance imaging in excess of one (1) within a 6-month period is subject to medical review for medical necessity. Documentation should include radiology reason for study, radiology comparison study-date and time, radiology comparison study observation, radiology impression, and radiology study recommendation.

Additional MRI imaging of the same anatomical area may be appropriate for the following, including, but not limited to: diagnosis, staging or follow-up of cancer, follow-up assessment during or after therapy for known metastases, follow-up of member who have had an operative, interventional or therapeutic procedure (e.g., surgery, embolization), reevaluation due to change in clinical status (e.g., deterioration), new or worsening clinical findings, (e.g., neurologic signs, symptoms), medical intervention which warrants reassessment, reevaluation for treatment planning, follow-up during and after completion of therapy or treatment to assess effectiveness, and evaluation after intervention or surgery.

Re-imaging or additional imaging due to poor contrast enhanced exam or technically limited exam is the responsibility of the imaging provider.

#### Request for a follow-up study

A follow-up study may be needed to help evaluate a member’s progress after treatment, procedure, intervention or surgery. Documentation requires a medical reason that clearly indicates why additional imaging is needed for the type and area(s) requested.

#### Stand-Up MRI/Sitting MRI

Stand-up MRI and sitting MRI may be reported like a standard MRI. No additional payment will be made for stand-up MRI or sitting MRI.

#### LOINC Codes:

The following information may be required documentation to support medical necessity: physician history and physical, physician progress notes, plan of treatment and reason for magnetic resonance imaging (MRI) cardiac.

Documentation Table	LOINC Codes	LOINC Time Frame Modifier Code	LOINC Time Frame Modifier Codes Narrative
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Physician history and physical	28626-0	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Attending physician progress note	18741-9	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Plan of treatment	18776-5	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology reason for study	18785-6	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology comparison study-date and time	18779-9	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology comparison study observation	18834-2	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology-study observation	18782-3	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology-impression	19005-8	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology study-recommendation (narrative)	18783-1	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim

### **Determination of Pretest Probability for Coronary Artery Disease (CAD)**

**Table 1:** Determination of Pretest Probability for Coronary Artery Disease Based on Age, Gender, and Symptoms (Source: American College of Cardiology Criteria for Pretest Probability of Coronary Artery Disease (CAD)).

The following risk assessment may be used to determine pre-test probability of coronary artery disease.

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
<b>High:</b> Greater than 90% pre-test probability of CAD.		<b>Intermediate:</b> Between 10% and 90% pre-test probability of CAD.	<b>Low:</b> Between 5% and 10% pre-test probability of CAD.	<b>Very low:</b> Less than 5% pre-test probability of CAD.

Adapted from: Wolk MJ, Bailey SR, Doherty JU et al.

ACCF/AHA/ASE/ASNC/HFSA/HRS/SCAI/SCCT/SCMR/STS 2013 Multimodality appropriate use criteria for the detection and risk assessment of stable ischemic heart disease. Journal of the American College of Cardiology 2014; 63(4): 380-406.

Taylor AJ, Cerqueira M, Hodgson JM, et al. ACCF/SCCT/ACR/AHA/ASE/ASNC/NASCI/SCAI/SCMR 2010 appropriate use criteria for cardiac computed tomography. Journal of the American College of Cardiology 2010;56(22):1864-1894.

## PROGRAM EXCEPTIONS:

**Federal Employee Plan (FEP):** Follow FEP guidelines.

**Medicare Advantage:** No Local Coverage Determination (LCD) were found at the time of the last guideline reviewed date. The following National Coverage Determination (NCD) was reviewed on the last guideline reviewed date: Magnetic Resonance Imaging (220.2), located at cms.gov.

## DEFINITIONS:

**Myocardial infarction:** gross necrosis of the myocardium as a result of interruption of the blood supply to the area; it is almost always caused by atherosclerosis of the coronary arteries, upon which coronary thrombosis is usually superimposed.

**Electrocardiogram (ECG)-uninterpretable:** ECGs with resting ST-segment depression (less than or equal to 1.10 mV), complete left bundle-branch block (LBBB), pre-excitation Wolff-Parkinson-White syndrome (WPW) or paced rhythm.

## RELATED GUIDELINES:

[Magnetic Resonance Spectroscopy \(MRS\), 04-70540-07](#)

[Magnetic Resonance Imaging \(MRI\) of the Breast, 04-70540-09](#)



[Magnetic Resonance Imaging \(MRI\) Orbit, Face, Temporomandibular Joint \(TMJ\) and Neck, 04-70540-12](#)

[Magnetic Resonance Imaging \(MRI\) Abdomen and Pelvis, 04-70540-14](#)

[Magnetic Resonance Imaging \(MRI\) Upper Extremity, 04-70540-15](#)

[Magnetic Resonance Imaging \(MRI\) Lower Extremity, 04-70540-16](#)

[Magnetic Resonance Imaging \(MRI\) Spine \(Cervical, Thoracic, Lumbar\), 04-70540-17](#)

## **OTHER:**

Other names used to report cardiac MRI:

Cardiac magnetic resonance imaging (CMR)/MRI

## **Abbreviations**

ARVD/C= arrhythmogenic right ventricular dysplasia/ cardiomyopathy

CABG = coronary artery bypass grafting surgery

CAD = coronary artery disease

CMR= cardiac magnetic resonance

CT = computed tomography

ECG/EKG = electrocardiogram

ICD- Implantable cardioverter-defibrillator

LV = left ventricular/ left ventricle

MPI = myocardial perfusion imaging

MR= mitral regurgitation

MRI = magnetic resonance imaging

RV= right ventricular

SE = stress echocardiography

TAVR- Transcatheter aortic valve replacement

TEE= transesophageal echocardiography

TTE= transthoracic echocardiogram

VT= ventricular tachycardia

## **REFERENCES:**

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### COMMITTEE APPROVAL:

This Medical Coverage Guideline (MCG) was approved by the Florida Blue Medical Policy and Coverage Committee on 02/22/24.

### GUIDELINE UPDATE INFORMATION:

07/01/07	New Medical Coverage Guideline.
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01/01/08	HCPCS update. Deleted 75552, 75553, 75554, 75555, and 75556. Added 75557, 75558, 75559, 75560, 75561, 75562, 75563, and 75564.
01/21/08	Updated Program Exceptions.
07/15/08	Scheduled review. No change in position statement. Updated references and related Internet links.
05/21/09	Removed Federal Employee Plan (FEP) from BCBSF Radiology Management program exception statement. Added FEP program exception statement: FEP is excluded from the National Imaging Associates (NIA) review; follow FEP guidelines.
07/01/09	Updated BCBSF Radiology Management program exception; added BlueSelect.
11/15/09	Code update; added 71552.
01/01/10	Annual HCPCS coding update: deleted 75558, 75560, 75562, and 75564. Added 75565. Revised BCBSF Radiology Management program exception section, and updated the references.
07/15/10	Annual review: deleted 77084 and updated references.
09/15/11	Scheduled review; revised position statements. Deleted 77084. Updated definitions and references.
10/01/11	Revision; formatting changes.
12/15/12	Annual review; added indications for chest and cardiac MRI and appropriate use criteria and table for cardiac MRI. Added inappropriate indications for cardiac MRI. Added criteria for imaging which exceed limit. And statement for re-imaging or additional imaging. Added Medicare Advantage program exception (nationally non-covered indications) for MRI of cortical bone and calcifications and procedures involving spatial resolution of bone and calcifications. Updated references.
01/01/14	Review. Updated program exception and references.
01/01/15	Scheduled review; maintain position statement. Updated references.
05/15/18	Revision; removed "chest and" from guideline title, revised position statement and updated references.
02/15/20	Review/revision. Updated criteria and indications for cardiac MRI. Added indication and criteria for: congenital heart disease, valvular heart disease, myocardial dysfunction and heart failure, evaluation of intra and extra cardiac structures, pre ablation planning, aortic pathology and coronary artery disease evaluation. Removed appropriate use criteria table. Updated references.
05/15/22	Review: Position statements and references updated.
07/01/22	Revision to Program Exceptions section.
09/30/23	Review: position statements and references updated.
03/15/24	Review; no change in position statement. Updated program exceptions and references.