Medical Coverage Policy

Effective Date.....2/15/2026
Next Review Date.....2/15/2027
Coverage Policy Number..... 0510

Transthoracic Echocardiography in Adults

Table of Contents

Related Coverage Resources

eviCore Adult Cardiac Imaging Guideline
Atrial Fibrillation: Nonpharmacological Treatments
Transthoracic Echocardiography in Children

INSTRUCTIONS FOR USE

The following Coverage Policy applies to health benefit plans administered by Cigna Companies. Certain Cigna Companies and/or lines of business only provide utilization review services to clients and do not make coverage determinations. References to standard benefit plan language and coverage determinations do not apply to those clients. Coverage Policies are intended to provide guidance in interpreting certain standard benefit plans administered by Cigna Companies. Please note, the terms of a customer's particular benefit plan document [Group Service Agreement, Evidence of Coverage, Certificate of Coverage, Summary Plan Description (SPD) or similar plan document] may differ significantly from the standard benefit plans upon which these Coverage Policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a Coverage Policy. In the event of a conflict, a customer's benefit plan document always supersedes the information in the Coverage Policies. In the absence of a controlling federal or state coverage mandate, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of 1) the terms of the applicable benefit plan document in effect on the date of service; 2) any applicable laws/regulations; 3) any relevant collateral source materials including Coverage Policies and; 4) the specific facts of the particular situation. Each coverage request should be reviewed on its own merits. Medical directors are expected to exercise clinical judgment where appropriate and have discretion in making individual coverage determinations. Where coverage for care or services does not depend on specific circumstances, reimbursement will only be provided if a requested service(s) is submitted in accordance with the relevant criteria outlined in the applicable Coverage Policy, including covered diagnosis and/or procedure code(s). Reimbursement is not allowed for services when billed for conditions or diagnoses that are not covered under this Coverage Policy (see "Coding Information" below). When billing, providers must use the most appropriate codes as of the effective date of the submission. Claims submitted for services that are not accompanied by covered code(s) under the applicable Coverage Policy

will be denied as not covered. Coverage Policies relate exclusively to the administration of health benefit plans. Coverage Policies are not recommendations for treatment and should never be used as treatment guidelines. In certain markets, delegated vendor guidelines may be used to support medical necessity and other coverage determinations.

Overview

This Coverage Policy addresses non-stress transthoracic echocardiography (TTE) in an adult age 18 and older.

Coverage Policy

Non-stress transthoracic echocardiography (TTE)

Non-stress transthoracic echocardiography (TTE) is considered medically necessary according to the following American College of Cardiology (ACC) Appropriate Use Criteria (AUC) "Appropriate Care" category (scores 7-9):

- Multimodality Imaging in Cardiovascular Evaluation of Patients Undergoing Nonemergent, Noncardiac Surgery (Writing Group Members, et al., 2024)
- Multimodality Imaging During the Follow-Up Care of Patients With Congenital Heart Disease (Sachdeva, et al., 2020)
- Multimodality Imaging in the Assessment of Cardiac Structure and Function in Nonvalvular Heart Disease (Doherty, et al., 2019)

AND the following ACC/American Heart Association (AHA) Guidelines (Class of recommendation I and/or IIa):

- Guideline for the Diagnosis and Management of Hypertrophic Cardiomyopathy (Ommen et al., 2024)
- Guideline for the Diagnosis and Management of Atrial Fibrillation (Joglar, et al., 2023)
- Guideline for the Diagnosis and Management of Aortic Disease (Isselbacher, et al., 2022)
- Guideline for the Management of Heart Failure (Heidenreich, et al., 2022)
- Guideline for the Evaluation and Diagnosis of Chest Pain (Gulati, et al., 2021)
- Guideline for the Management of Patients With Valvular Heart Disease (Otto, et al., 2021)

Non-stress TTE (with or without three-dimensional [3D]; with contrast as needed) is considered medically necessary for the following indications:

- Multisystem Inflammatory Syndrome (MIS) associated with SARS-CoV-2 (COVID-19) infection
- Individual taking FINTEPLA® (fenfluramine) for a FDA-approved indication (e.g., Dravet syndrome)
- Individual taking CAMZYOS™ (mavacamten) for a FDA-approved indication (i.e., adult with symptomatic New York Heart Association [NYHA] class II-III obstructive hypertrophic cardiomyopathy [oHCM])

Non-stress TTE is not covered or reimbursable for all other indications.

Non-stress TTE as a screening study prior to starting Attention-deficit/Hyperactivity disorder (ADHD) drugs (with or without 3D or contrast) is not covered or reimbursable.

Frequency of non-stress TTE

More than two transthoracic echocardiograms (TTE) submitted within a rolling twelve months are not covered or reimbursable, with the exception of:

- those diagnoses with frequency limits indicated in the policy above, OR
- diagnoses without frequency limits listed in the specified Coding section Table 2 below

Myocardial Strain Imaging (CPT® 93356)

Myocardial strain imaging is considered medically necessary if the primary TTE (CPT® 93303, 93304, 93306, 93307, 93308) on the same date of service is medically necessary AND EITHER of the following criteria are met:

- prior to, during or following exposure to medications/radiation that could result in cardiotoxicity
- to evaluate hypertrophic cardiomyopathy

Myocardial strain imaging is not covered or reimbursable for any other indication.

Coding Information

Notes:

1. This list of codes may not be all-inclusive since the American Medical Association (AMA) and Centers for Medicare & Medicaid Services (CMS) code updates may occur more frequently than policy updates.
2. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

Considered Medically Necessary when criteria in the applicable policy statements listed above are met:

CPT®* Codes	Description
93303	Transthoracic echocardiography for congenital cardiac anomalies; complete
93304	Transthoracic echocardiography for congenital cardiac anomalies; follow-up or limited study
93306	Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, complete, with spectral Doppler echocardiography, and with color flow Doppler echocardiography
93307	Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, complete, without spectral or color Doppler echocardiography
93308	Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, follow-up or limited study
93319	3D echocardiographic imaging and postprocessing during transesophageal echocardiography, or during transthoracic echocardiography for congenital cardiac anomalies, for the assessment of cardiac structure(s) (e.g., cardiac chambers and valves, left atrial appendage, interatrial septum, interventricular

CPT®* Codes	Description
	septum) and function, when performed (List separately in addition to code for echocardiographic imaging)
93320	Doppler echocardiography, pulsed wave and/or continuous wave with spectral display (List separately in addition to codes for echocardiographic imaging); complete
93321	Doppler echocardiography, pulsed wave and/or continuous wave with spectral display (List separately in addition to codes for echocardiographic imaging); follow-up or limited study (List separately in addition to codes for echocardiographic imaging)
93325	Doppler echocardiography color flow velocity mapping (List separately in addition to codes for echocardiography)

HCPCS Codes	Description
C8921	Transthoracic echocardiography with contrast, or without contrast followed by with contrast, for congenital cardiac anomalies; complete
C8922	Transthoracic echocardiography with contrast, or without contrast followed by with contrast, for congenital cardiac anomalies; follow-up or limited study
C8923	Transthoracic echocardiography with contrast, or without contrast followed by with contrast, real-time with image documentation (2D), includes M-mode recording, when performed, complete, without spectral or color doppler echocardiography
C8924	Transthoracic echocardiography with contrast, or without contrast followed by with contrast, real-time with image documentation (2D), includes M-mode recording when performed, follow-up or limited study
C8929	Transthoracic echocardiography with contrast, or without contrast followed by with contrast, real-time with image documentation (2D), includes M-mode recording, when performed, complete, with spectral doppler echocardiography, and with color flow doppler echocardiography

A transthoracic echocardiogram is Considered Medically Necessary when criteria in the applicable policy statements listed above are met and when billed with a diagnosis code from Table 1.

Table 1: Covered ICD-10-CM Diagnosis codes

ICD-10-CM Diagnosis Codes	Description
A18.84	Tuberculosis of heart
A36.81	Diphtheritic cardiomyopathy
A39.50	Meningococcal carditis, unspecified
A39.51	Meningococcal endocarditis
A39.52	Meningococcal myocarditis
A39.53	Meningococcal pericarditis
A40.0	Sepsis due to streptococcus, group A
A40.1	Sepsis due to streptococcus, group B
A40.3	Sepsis due to Streptococcus pneumoniae
A40.8	Other streptococcal sepsis

ICD-10-CM Diagnosis Codes	Description
A40.9	Streptococcal sepsis, unspecified
A41.01-A41.9	Other sepsis
A42.7	Actinomycotic sepsis
A52.00	Cardiovascular syphilis, unspecified
A52.01	Syphilitic aneurysm of aorta
A52.02	Syphilitic aortitis
A52.03	Syphilitic endocarditis
A52.06	Other syphilitic heart involvement
A54.83	Gonococcal heart infection
B00.7	Disseminated herpesviral disease
B33.20-B33.24	Viral carditis
B37.6	Candidal endocarditis
B37.7	Candidal sepsis
B57.0	Acute Chagas' disease with heart involvement
B57.2	Chagas' disease (chronic) with heart involvement
B58.81	Toxoplasma myocarditis
C33	Malignant neoplasm of trachea
C34.01-C34.92	Malignant neoplasm of bronchus and lung
C37	Malignant neoplasm of thymus
C38.0-C38.8	Malignant neoplasm of heart, mediastinum and pleura
C39.0-C39.9	Malignant neoplasm of other and ill-defined sites in the respiratory system and intrathoracic organs
C45.2	Mesothelioma of pericardium
C50.011-C50.912	Malignant neoplasm of breast
C50.921-C50.922	Malignant neoplasm of breast of unspecified site, male
C50.A0-C50.A2	Malignant inflammatory neoplasm of breast
C81.00-C81.9A	Hodgkin lymphoma
C82.00-C82.9A	Follicular lymphoma
C83.00-C83.9A	Non-follicular lymphoma
C84.60-C84.6A	Anaplastic large cell lymphoma, ALK-positive
C84.70-C84.7B	Anaplastic large cell lymphoma, ALK-negative
C85.10-C85.9A	Other specified and unspecified types of non-Hodgkin lymphoma
C86.00-C86.61	Other specified types of T/NK-cell lymphoma

ICD-10-CM Diagnosis Codes	Description
C88.00-C88.91	Malignant immunoproliferative diseases and certain other B-cell lymphomas
D15.1	Benign neoplasm of heart
D86.85	Sarcoid myocarditis
E34.00-E34.09	Carcinoid syndrome
E83.110	Hereditary hemochromatosis
E83.111	Hemochromatosis due to repeated red blood cell transfusions
E83.118	Other hemochromatosis
E83.119	Hemochromatosis, unspecified
G06.0	Intracranial abscess and granuloma
G06.1	Intraspinal abscess and granuloma
G40.811-G40.814	Lennox-Gastaut syndrome
G40.833-G40.834	Dravet syndrome
G40.841-G40.844	KCNQ2-related epilepsy
G45.0-G45.9	Transient cerebral ischemic attacks and related syndromes
G71.01	Duchene or Becker muscular dystrophy
G90.A	Postural orthostatic tachycardia syndrome [POTS]
I01.0-I01.9	Rheumatic fever with heart involvement
I02.0	Rheumatic chorea with heart involvement
I05.0-I09.9	Chronic rheumatic heart diseases
I10	Hypertension
I11.0-I11.9	Hypertensive heart disease
I13.0-I13.2	Hypertensive heart and chronic kidney disease
I20.0-I20.9	Angina pectoris
I21.01-I21.A9	Acute myocardial infarction
I22.0-I22.9	Subsequent ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction
I23.0-I23.8	Certain current complications following ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction (within the 28 day period)
I24.0-I24.9	Other acute ischemic heart diseases
I25.10-I25.119	Atherosclerotic heart disease of native coronary artery
I25.2	Old myocardial infarction
I25.3	Aneurysm of heart
I25.41	Coronary artery aneurysm
I25.42	Coronary artery dissection
I25.5	Ischemic cardiomyopathy
I25.6	Silent myocardial ischemia
I25.700-I25.799	Atherosclerosis of coronary artery bypass graft(s) and coronary artery of transplanted heart with angina pectoris
I25.810	Atherosclerosis of coronary artery bypass graft(s) without angina pectoris
I25.811	Atherosclerosis of native coronary artery of transplanted heart without angina pectoris

ICD-10-CM Diagnosis Codes	Description
I25.812	Atherosclerosis of bypass graft of coronary artery of transplanted heart without angina pectoris
I25.84	Coronary atherosclerosis due to calcified coronary lesion
I25.89	Other forms of chronic ischemic heart disease
I26.01-I26.99	Pulmonary embolism
I27.0-I27.9	Other pulmonary heart diseases
I28.0	Arteriovenous fistula of pulmonary vessels
I30.0-I30.9	Acute pericarditis
I31.0-I31.9	Other diseases of pericardium
I32	Pericarditis in diseases classified elsewhere
I33.0-I33.9	Acute and subacute endocarditis
I34.0-I34.9	Nonrheumatic mitral valve disorders
I35.0-I35.9	Nonrheumatic aortic valve disorders
I36.0-I36.9	Nonrheumatic tricuspid valve disorders
I37.0-I37.9	Nonrheumatic pulmonary valve disorders
I38	Endocarditis, valve unspecified
I39	Endocarditis and heart valve disorders in diseases classified elsewhere
I40.0-I40.9	Acute myocarditis
I41	Myocarditis in diseases classified elsewhere
I42.0-I42.9	Cardiomyopathy
I43	Cardiomyopathy in diseases classified elsewhere
I44.2	Atrioventricular block, complete
I44.30	Unspecified atrioventricular block
I44.39	Other atrioventricular block
I44.7	Left bundle-branch block, unspecified
I45.0	Right fascicular block
I45.10	Unspecified right bundle-branch block
I45.19	Other right bundle-branch block
I45.2	Bifascicular block
I45.3	Trifascicular block
I45.4	Nonspecific intraventricular block
I45.5	Other specified heart block
I45.6	Pre-excitation syndrome
I45.81	Long QT syndrome
I45.89	Other specified conduction disorders
I46.2-I46.9	Cardiac arrest
I47.0-I47.9	Paroxysmal tachycardia
I48.0-I48.92	Atrial fibrillation and flutter
I49.01-I49.9	Other cardiac arrhythmias
I50.1-I50.9	Heart failure
I51.0	Cardiac septal defect, acquired
I51.1	Rupture of chordae tendineae, not elsewhere classified
I51.2	Rupture of papillary muscle, not elsewhere classified
I51.3	Intracardiac thrombosis, not elsewhere classified
I51.4	Myocarditis, unspecified
I51.5	Myocardial degeneration
I51.7	Cardiomegaly

ICD-10-CM Diagnosis Codes	Description
I51.81	Takotsubo syndrome
I51.89	Other ill-defined heart diseases
I5A	Non-ischemic myocardial injury (non-traumatic)
I63.00-I63.9	Cerebral Infarction
I66.01-I66.9	Occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction
I71.010-I71.019	Dissection of thoracic aorta
I71.03	Dissection of thoracoabdominal aorta
I71.10-I71.13	Thoracic aortic aneurysm, ruptured
I71.20-I71.23	Thoracic aortic aneurysm, without rupture
I71.50-I71.52	Thoracoabdominal aortic aneurysm, ruptured
I71.60-I71.62	Thoracoabdominal aortic aneurysm, without rupture
I71.8	Aortic aneurysm of unspecified site, ruptured
I71.9	Aortic aneurysm of unspecified site, without mention of rupture
I74.01-I74.9	Arterial embolism and thrombosis
I75.011-I75.013	Atheroembolism of upper extremity
I75.021-I75.023	Atheroembolism of lower extremity
I75.81	Atheroembolism of kidney
I75.89	Atheroembolism of other site
I76	Septic arterial embolism
I77.810	Thoracic aortic ectasia
I77.812	Thoracoabdominal aortic ectasia
I77.82	Antineutrophilic cytoplasmic antibody [ANCA] vasculitis
I95.0	Idiopathic hypotension
I95.1	Orthostatic hypotension
I95.3	Hypotension of hemodialysis
I95.81	Postprocedural hypotension
I97.0	Postcardiotomy syndrome
I97.110-I97.191	Other postprocedural cardiac functional disturbances
I97.410-I97.418	Intraoperative hemorrhage and hematoma of a circulatory system organ or structure complicating a circulatory system procedure
I97.42	Intraoperative hemorrhage and hematoma of a circulatory system organ or structure complicating other procedure
I97.610-I97.618	Postprocedural hemorrhage of a circulatory system organ or structure following a circulatory system procedure
I97.620	Postprocedural hemorrhage of a circulatory system organ or structure following other procedure
I97.710	Intraoperative cardiac arrest during cardiac surgery
I97.711	Intraoperative cardiac arrest during other surgery
I97.790	Other intraoperative cardiac functional disturbances during cardiac surgery

ICD-10-CM Diagnosis Codes	Description
I97.791	Other intraoperative cardiac functional disturbances during other surgery
I97.88	Other intraoperative complications of the circulatory system, not elsewhere classified
I97.89	Other postprocedural complications and disorders of the circulatory system, not elsewhere classified
J80	Acute respiratory distress syndrome
J95.1	Acute pulmonary insufficiency following thoracic surgery
J95.2	Acute pulmonary insufficiency following nonthoracic surgery
J95.3	Chronic pulmonary insufficiency following surgery start here
J95.821	Acute postprocedural respiratory failure
J95.822	Acute and chronic postprocedural respiratory failure
J96.00-J96.02	Acute respiratory failure
J96.20-J96.22	Acute and chronic respiratory failure
J96.90-J96.92	Respiratory failure, unspecified
M30.3	Mucocutaneous lymph node syndrome [Kawasaki]
M31.4	Aortic arch syndrome [Takayasu]
M32.11	Endocarditis in systemic lupus erythematosus
M32.12	Pericarditis in systemic lupus erythematosus
M34.0-M34.9	Systemic sclerosis [scleroderma]
M35.81	Multisystem inflammatory syndrome (MIS)
M35.89	Other specified systemic involvement of connective tissue
O90.3	Peripartum cardiomyopathy
Q20.0-Q20.9	Congenital malformations of cardiac chambers and connections
Q21.0-Q21.9	Congenital malformations of cardiac septa
Q22.0-Q22.9	Congenital malformations of pulmonary and tricuspid valves
Q23.0-Q23.9	Congenital malformations of aortic and mitral valves
Q24.0-Q24.9	Other congenital malformations of heart
Q25.0-Q25.9	Congenital malformations of great arteries
Q26.0	Congenital stenosis of vena cava
Q26.1	Persistent left superior vena cava
Q26.2	Total anomalous pulmonary venous connection
Q26.3	Partial anomalous pulmonary venous connection
Q26.4	Anomalous pulmonary venous connection, unspecified
Q26.8	Other congenital malformations of great veins
Q26.9	Congenital malformation of great vein, unspecified
Q67.6	Pectus excavatum
Q67.7	Pectus carinatum

ICD-10-CM Diagnosis Codes	Description
Q87.40-Q87.43	Marfan's syndrome
Q89.3	Situs inversus
Q89.7	Multiple congenital malformations, not elsewhere classified
Q89.81	Kabuki syndrome
Q89.89	Other specified congenital malformations
Q89.9	Congenital malformation, unspecified
Q90.0	Trisomy 21, nonmosaicism (meiotic nondisjunction)
Q90.1	Trisomy 21, mosaicism (mitotic nondisjunction)
Q90.2	Trisomy 21, translocation
Q90.9	Down syndrome, unspecified
Q96.0-Q96.9	Turner's syndrome
R00.0	Tachycardia, unspecified
R00.1	Generalized edema
R00.2	Palpitations
R01.1	Cardiac murmur, unspecified
R06.00	Dyspnea, unspecified
R06.01	Orthopnea
R06.02	Shortness of breath
R06.03	Acute respiratory distress
R06.09	Other forms of dyspnea
R06.3	Periodic breathing
R07.2	Precordial pain
R07.82	Intercostal pain
R07.89	Other chest pain
R07.9	Chest pain, unspecified
R09.01	Asphyxia
R09.02	Hypoxemia
R09.2	Respiratory arrest
R42	Dizziness and giddiness
R55	Syncope and collapse
R57.0-R57.9	Shock, not elsewhere classified
R60.0	Localized edema
R60.9	Edema, unspecified
R65.20	Severe sepsis without septic shock
R65.21	Severe sepsis with septic shock
R78.81	Bacteremia
R93.1	Abnormal findings on diagnostic imaging of heart and coronary circulation
R94.31	Abnormal electrocardiogram [ECG] [EKG]
S21.301A-S21.359S	Open wound of front wall of thorax with penetration into thoracic cavity
S22.5XXA	Flail chest, initial encounter for closed fracture
S22.5XXB	Flail chest, initial encounter for open fracture
S22.5XXG	Flail chest, subsequent encounter for fracture with delayed healing
S22.5XXK	Flail chest, subsequent encounter for fracture with nonunion
S22.5XXS	Flail chest, sequela

ICD-10-CM Diagnosis Codes	Description
S25.00XA-S25.09XS	Injury of thoracic aorta
S25.20XA-S25.29XS	Injury of superior vena cava
S25.401A-S25.499S	Injury of pulmonary blood vessels
S26.00XA-S26.99XS	Injury of heart
S27.9XXA-S27.9XXS	Injury of unspecified intrathoracic organ
T45.1X5A-T45.1X5S	Adverse effect of antineoplastic and immunosuppressive drugs
T79.4XXA-T79.4XXS	Traumatic shock
T80.218A-T80.218S	Other infection due to central venous catheter
T80.219A-T80.219S	Unspecified infection due to central venous catheter
T81.10XA-T81.19XS	Postprocedural shock
T81.44XA-T81.44XS	Sepsis following a procedure
T82.01XA-T82.09XS	Mechanical complication of heart valve prosthesis
T82.110A-T82.199S	Mechanical complication of cardiac electronic device
T82.211A-T82.228S	Mechanical complication of coronary artery bypass graft and biological heart valve graft
T82.310A-T82.399S	Mechanical complication of other vascular grafts
T82.41XA-T82.49XS	Mechanical complication of vascular dialysis catheter
T82.510A-T82.599S	Mechanical complication of other cardiac and vascular devices and implants
T82.6XXA-T82.6XXS	Infection and inflammatory reaction due to cardiac valve prosthesis
T82.7XXA-T82.7XXS	Infection and inflammatory reaction due to other cardiac and vascular devices, implants and grafts
T82.817A-T82.818S	Embolism due to cardiac and vascular prosthetic devices, implants and grafts
T82.827A-T82.827S	Fibrosis due to cardiac prosthetic devices, implants and grafts
T82.837A-T82.837S	Hemorrhage due to cardiac prosthetic devices, implants and grafts
T82.847A-T82.847S	Pain due to cardiac prosthetic devices, implants and grafts
T82.855A-T82.855S	Stenosis of coronary artery stent

ICD-10-CM Diagnosis Codes	Description
T82.857A-T82.857S	Stenosis of other cardiac prosthetic devices, implants and grafts
T82.867A-T82.867S	Thrombosis due to cardiac prosthetic devices, implants and grafts
T82.897A-T82.897S	Other specified complication of cardiac prosthetic devices, implants and grafts
T82.9XXA-T82.9XXS	Unspecified complication of cardiac and vascular prosthetic device, implant and graft
T85.730A-T85.738S	Infection and inflammatory reaction due to nervous system devices, implants and graft
T86.20-T86.298	Complications of heart transplant
T86.30-T86.39	Complications of heart-lung transplant
Z01.810	Encounter for preprocedural cardiovascular examination
Z01.811	Encounter for preprocedural respiratory examination
Z01.812	Encounter for preprocedural laboratory examination
Z01.818	Encounter for other preprocedural examination
Z08	Encounter for follow-up examination after completed treatment for malignant neoplasm
Z48.21	Encounter for aftercare following heart transplant
Z48.24	Encounter for aftercare following lung transplant
Z48.280	Encounter for aftercare following heart-lung transplant
Z51.0	Encounter for antineoplastic radiation therapy
Z51.11	Encounter for antineoplastic chemotherapy
Z51.12	Encounter for antineoplastic immunotherapy
Z51.81	Encounter for therapeutic drug level monitoring
Z79.01-Z79.899	Long term (current) drug therapy
Z82.41	Family history of sudden cardiac death
Z82.49	Family history of ischemic heart disease and other diseases of the circulatory system
Z82.79	Family history of other congenital malformations, deformations and chromosomal abnormalities
Z86.003	Personal history of in-situ neoplasm of oral cavity, esophagus and stomach
Z86.005	Personal history of in-situ neoplasm of middle ear and respiratory system
Z86.73	Personal history of transient ischemic attack (TIA), and cerebral infarction without residual deficits
Z86.74	Personal history of sudden cardiac arrest
Z92.21	Personal history of antineoplastic chemotherapy
Z92.22	Personal history of monoclonal drug therapy
Z92.25	Personal history of immunosuppression therapy
Z92.3	Personal history of irradiation
Z92.850	Personal history of Chimeric Antigen Receptor T-cell therapy
Z92.858	Personal history of other cellular therapy
Z92.859	Personal history of cellular therapy, unspecified
Z92.86	Personal history of gene therapy
Z94.1	Heart transplant status

ICD-10-CM Diagnosis Codes	Description
Z94.2	Lung transplant status
Z94.3	Heart and lungs transplant status
Z95.0	Presence of cardiac pacemaker
Z95.2	Presence of prosthetic heart valve
Z95.3	Presence of xenogenic heart valve
Z95.4	Presence of other heart-valve replacement
Z95.811	Presence of heart assist device
Z95.812	Presence of fully implantable artificial heart
Z95.818	Presence of other cardiac implants and grafts
Z98.85	Transplanted organ removal status

Not Covered or Reimbursable:

ICD-10-CM Diagnosis Codes	Description
	All other codes

Frequency of TTE:

More than two transthoracic echocardiograms within a rolling twelve months are considered Medically Necessary when criteria in the applicable policy statements are met and when billed with a covered diagnosis code from Table 1 and a covered diagnosis from Table 2.

Table 2: Covered ICD-10-CM Diagnosis Codes

ICD-10-CM Diagnosis Codes	Description
A36.81	Diphtheritic cardiomyopathy
A39.51	Meningococcal endocarditis
A39.52	Meningococcal myocarditis
A39.53	Meningococcal pericarditis
A52.03	Syphilitic endocarditis
B33.21	Viral endocarditis
B33.22	Viral myocarditis
B33.23	Viral pericarditis
B33.24	Viral cardiomyopathy
B37.6	Candidal endocarditis
B58.81	Toxoplasma myocarditis
C33	Malignant neoplasm of trachea
C34.00-C34.92	Malignant neoplasm of bronchus and lung
C37	Malignant neoplasm of thymus
C38.0-C38.8	Malignant neoplasm of heart, mediastinum and pleura

ICD-10-CM Diagnosis Codes	Description
C39.0-C39.9	Malignant neoplasm of other and ill-defined sites in the respiratory system and intrathoracic organs
C45.2	Mesothelioma of pericardium
C50.011-C50.912	Malignant neoplasm of breast
C50.921-C50.922	Malignant neoplasm of breast of unspecified site, male
C50.A0-C50.A2	Malignant inflammatory neoplasm of breast
C81.00-C81.99	Hodgkin lymphoma
C82.00-C82.99	Follicular lymphoma
C83.00-C83.99	Non-follicular lymphoma
C84.60-C84.69	Anaplastic large cell lymphoma, ALK-positive
C84.70-C84.7A	Anaplastic large cell lymphoma, ALK-negative
C85.10-C85.99	Other specified and unspecified types of non-Hodgkin lymphoma
C86.0-C86.6	Other specified types of T/NK-cell lymphoma
C88.0-C88.9	Malignant immunoproliferative diseases and certain other B-cell lymphomas
D86.85	Sarcoid myocarditis
E34.0	Carcinoid Syndrome
G40.811-G40.814	Lennox-Gastaut syndrome
G40.833-G40.834	Dravet syndrome
I01.0	Acute rheumatic pericarditis
I01.1	Acute rheumatic endocarditis
I01.2	Acute rheumatic myocarditis
I06.0	Rheumatic aortic stenosis
I06.2	Rheumatic aortic stenosis with insufficiency
I09.0	Rheumatic myocarditis
I09.2	Chronic rheumatic pericarditis
I25.5	Ischemic cardiomyopathy
I25.750-I25.759	Atherosclerosis of native coronary artery of transplanted heart with angina pectoris
I25.760-I25.769	Atherosclerosis of bypass graft of coronary artery of transplanted heart with angina pectoris
I25.811	Atherosclerosis of native coronary artery of transplanted heart without angina pectoris
I25.812	Atherosclerosis of bypass graft of coronary artery of transplanted heart without angina pectoris
I30.0-I30.9	Acute pericarditis
I31.0	Chronic adhesive pericarditis

ICD-10-CM Diagnosis Codes	Description
I31.1	Chronic constrictive pericarditis
I31.2	Hemopericardium, not elsewhere classified
I31.31	Malignant pericardial effusion in diseases classified elsewhere
I31.39	Other pericardial effusion (noninflammatory)
I32	Pericarditis in diseases classified elsewhere
I33.0-I33.9	Acute and subacute endocarditis
I35.0	Nonrheumatic aortic (valve) stenosis
I35.2	Nonrheumatic aortic (valve) stenosis with insufficiency
I38	Endocarditis, valve unspecified
I39	Endocarditis and heart valve disorders in diseases classified elsewhere
I40.0-I40.9	Acute myocarditis
I41	Myocarditis in diseases classified elsewhere
I42.0	Dilated cardiomyopathy
I42.1	Obstructive hypertrophic cardiomyopathy
I42.2	Other hypertrophic cardiomyopathy
I42.5	Other restrictive cardiomyopathy
I42.6	Alcoholic cardiomyopathy
I42.7	Cardiomyopathy due to drug and external agent
I42.8	Other cardiomyopathies
I42.9	Cardiomyopathy, unspecified
I43	Cardiomyopathy in diseases classified elsewhere
I51.4	Myocarditis, unspecified
I5A	Non-ischemic myocardial injury (non-traumatic)
I71.20-I71.23	Thoracic aortic aneurysm, without rupture
M32.11	Endocarditis in systemic lupus erythematosus
M32.12	Pericarditis in systemic lupus erythematosus
M35.81	Multisystem inflammatory syndrome
M35.89	Other specified systemic involvement of connective tissue
O90.3	Peripartum cardiomyopathy
Q20.0-Q20.9	Congenital malformations of cardiac chambers and connections
Q21.3	Tetralogy of Fallot
Q22.5	Ebstein's anomaly
Q22.6	Hypoplastic right heart syndrome
Q23.4	Hypoplastic left heart syndrome
Q24.2	Cor triatriatum
Q24.4	Congenital subaortic stenosis
Q25.3	Supravalvular aortic stenosis
Q25.43	Congenital aneurysm of aorta
Q25.44	Congenital dilation of aorta
Q87.40	Marfan’s syndrome, unspecified
Q87.410	Marfan's syndrome with aortic dilation
Q87.418	Marfan's syndrome with other cardiovascular manifestations

ICD-10-CM Diagnosis Codes	Description
Q87.42	Marfan's syndrome with ocular manifestations
Q87.43	Marfan's syndrome with skeletal manifestation
Q96.0-Q96.9	Turner's syndrome
T45.1X5A-T45.1X5S	Adverse effect of antineoplastic and immunosuppressive drugs
T86.20	Unspecified complication of heart transplant
T86.21	Heart transplant rejection
T86.22	Heart transplant failure
T86.23	Heart transplant infection
T86.298	Other complications of heart transplant
T86.30-T86.39	Complications of heart-lung transplant
Z08	Encounter for follow-up examination after completed treatment for malignant neoplasm
Z48.21	Encounter for aftercare following heart transplant
Z48.280	Encounter for aftercare following heart-lung transplant
Z51.0	Encounter for antineoplastic radiation therapy
Z51.11	Encounter for antineoplastic chemotherapy
Z51.12	Encounter for antineoplastic immunotherapy
Z92.21	Personal history of antineoplastic chemotherapy
Z92.22	Personal history of monoclonal drug therapy
Z92.25	Personal history of immunosuppression therapy
Z92.3	Personal history of irradiation
Z92.850	Personal history of Chimeric Antigen Receptor T-cell therapy
Z92.858	Personal history of other cellular therapy
Z92.859	Personal history of cellular therapy, unspecified
Z92.86	Personal history of gene therapy
Z94.1	Heart transplant status
Z94.2	Lung transplant status
Z94.3	Heart and lungs transplant status
Z95.811	Presence of heart assist device
Z95.812	Presence of fully implantable artificial heart

Not Covered or Reimbursable:

ICD-10-CM Diagnosis Codes	Description
	All other codes

Myocardial Strain Imaging: (CPT® 93356):

CPT code 93356 is Considered Medically Necessary when criteria in the applicable policy statements listed above are met and when billed with one or more of these diagnoses:

CPT®* Codes	Description
93356	Myocardial strain imaging using speckle tracking-derived assessment of myocardial mechanics (List separately in addition to codes for echocardiography imaging)

ICD-10-CM Diagnosis Codes	Description
C33	Malignant neoplasm of trachea
C34.01-C34.92	Malignant neoplasm of bronchus and lung
C37	Malignant neoplasm of thymus
C38.0-C38.8	Malignant neoplasm of heart, mediastinum and pleura
C39.0-C39.9	Malignant neoplasm of other and ill-defined sites in the respiratory system and intrathoracic organs
C45.2	Mesothelioma of pericardium
C50.011-C50.912	Malignant neoplasm of breast
C50.921-C50.922	Malignant neoplasm of breast of unspecified site, male
C50.A0-C50.A2	Malignant inflammatory neoplasm of breast
C81.00-C81.9A	Hodgkin lymphoma
C82.00-C82.9A	Follicular lymphoma
C83.00-C83.9A	Non-follicular lymphoma
C84.60-C84.6A	Anaplastic large cell lymphoma, ALK-positive
C84.70-C84.7B	Anaplastic large cell lymphoma, ALK-negative
C85.10-C85.9A	Other specified and unspecified types of non-Hodgkin lymphoma
C86.00-C86.61	Other specified types of T/NK-cell lymphoma
C88.00-C88.91	Malignant immunoproliferative diseases and certain other B-cell lymphomas
I42.1	Obstructive hypertrophic cardiomyopathy
Z08	Encounter for follow-up examination after completed treatment for malignant neoplasm
Z17.0	Estrogen receptor positive status [ER+]
Z51.0	Encounter for antineoplastic radiation therapy
Z51.11	Encounter for antineoplastic chemotherapy
Z51.12	Encounter for antineoplastic immunotherapy
Z51.81	Encounter for therapeutic drug level monitoring
Z79.899	Other long term (current) drug therapy
Z92.21	Personal history of antineoplastic chemotherapy

ICD-10-CM Diagnosis Codes	Description
Z92.22	Personal history of monoclonal drug therapy
Z92.25	Personal history of immunosuppression therapy
Z92.3	Personal history of irradiation
Z92.850	Personal history of Chimeric Antigen Receptor T-cell therapy
Z92.858	Personal history of other cellular therapy
Z92.859	Personal history of cellular therapy, unspecified
Z92.86	Personal history of gene therapy

Not Covered or Reimbursable:

ICD-10-CM Diagnosis Codes	Description
	All other codes

General Background

Echocardiography is the most frequently employed cardiac imaging test for evaluation of cardiovascular disease related to a structural, functional or hemodynamic abnormality of the heart or great vessels. Echocardiography allows ultrasonic visualization of cardiac structures in real time from multiple planes, and Doppler and color flow imaging allows a reliable assessment of cardiac hemodynamics and blood flow.

A transthoracic echocardiography (TTE) examination begins with real-time two-dimensional (2D) echocardiography, which provides high-resolution images of cardiac structures and their movements. TTE technique has evolved from a simple M-mode tracing to a family of technologies that include 2D imaging, pulsed and continuous wave spectral Doppler, color flow Doppler, tissue Doppler, 3-dimensional (3D) imaging, and myocardial strain imaging using speckle tracking.

Myocardial strain is the deformation produced by the application of a force; myocardial strain represents percent change in myocardial length from relaxed to contractile state. The main limitation remains that strain values vary among methods, modalities and software versions. The most prevalent use of myocardial strain imaging evaluated in current literature is for identifying potential cancer therapy-related cardiac dysfunction. Myocardial strain imaging in individuals with exposure to medications/radiation that could result in cardiotoxicity is supported by the American College of Cardiology and current peer-reviewed literature (Oikonomou, et al., 2019; Amzulescu, et al., 2019; Thavendiranathan, et al., 2014).

Diagnostic procedures used as alternatives to TTE for cardiac diagnosis and assessment vary, depending on the clinical situation and other factors, and may include electrocardiogram (ECG), chest x-ray, stress TTE, transesophageal echocardiography (TEE), magnetic resonance imaging (MRI), computed tomography (CT), computed tomography angiography (CTA), magnetic resonance angiography (MRA), single photon emission computed tomography (SPECT), coronary

arteriography, and positron emission tomography (PET). In some cases TTE may be the sole diagnostic procedure, while in other situations additional testing is required.

Professional society recommendations have been published in an effort to guide appropriate use of this imaging modality for selected patient indications.

Professional Societies/Organizations
As stated above, this Cigna Coverage Policy is primarily based upon American College of Cardiology (ACC) Appropriate Use Criteria (AUC) and Guidelines. To be taken to the associated ACC AUC or Guideline, click on the applicable topic.

Noncardiac Surgery
Congenital Heart Disease
Nonvalvular Heart Disease
Hypertrophic Cardiomyopathy
Atrial Fibrillation
Aortic Disease
Heart Failure
Chest Pain
Valvular Heart Disease

AMERICAN COLLEGE OF CARDIOLOGY (ACC) APPROPRIATE USE CRITERIA (AUC)

2024 ACC/AHA Appropriate Use Criteria for Multimodality Imaging in Cardiovascular Evaluation of Patients Undergoing Nonemergent, Noncardiac Surgery

The American College of Cardiology Solution Set Oversight Committee, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Failure Society of America, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and the Society of Thoracic Surgeons published the 2024 Appropriate Use Criteria for Multimodality Imaging in Cardiovascular Evaluation of Patients Undergoing Nonemergent, Noncardiac Surgery (Writing Group Members, et al., 2024).

Noteworthy:
- TTE includes With or Without 3D; With or Without Contrast-Enhancing Agent
- Includes 98 separate TTE indications
- The criteria are divided into three primary sections: 1) No Known or Suspected Heart Disease and No Prior Testing Within 90 to 220 Days; 2) Section 2: Known or Suspected Heart Disease and No Prior Testing Within 90 to 220 Days; and 3) Section 3: Known or Suspected Heart Disease and Prior Testing Within 90 to 220 Days

Section 1: No Known or Suspected Heart Disease and No Prior Testing Within 90 to 220 Days TTE includes With or Without 3D; With or Without Contrast-Enhancing Agent	TTE (score / rating*)
TABLE 1.1 No New or Worsening Symptoms AND a Functional Status ≥4 metabolic equivalent of task (METs). Patient undergoing:	
Low-risk nonvascular surgery	1/R
Intermediate-risk nonvascular surgery	1/R
High-risk nonvascular surgery	4/M
Low-risk vascular surgery	2/R

Intermediate-risk vascular surgery	3/R
High-risk vascular surgery	4/M
Solid organ transplantation (recipient only)	7/A
TABLE 1.2 No New or Worsening Symptoms AND a Functional Status <4 METs. Patient undergoing:	
Low-risk nonvascular surgery	1/R
Intermediate-risk nonvascular surgery	3/R
High-risk nonvascular surgery	4/M
Low-risk vascular surgery	1/R
Intermediate-risk vascular surgery	4/M
High-risk vascular surgery	6/M
Solid organ transplantation (recipient only)	7/A

Section 2: Known or Suspected Heart Disease and No Prior Testing Within 90 to 220 Days TTE includes With or Without 3D; With or Without Contrast-Enhancing Agent	TTE (score / rating*)
TABLE 2.1 No New or Worsening Symptoms AND a Functional Status ≥4 METs. Patient undergoing:	
Known or Suspected Ischemic Heart Disease	
Low-risk nonvascular surgery	1/R
Intermediate-risk nonvascular surgery	4/M
High-risk nonvascular surgery	5/M
Low-risk vascular surgery	1/R
Intermediate-risk vascular surgery	4/M
High-risk vascular surgery	6/M
Solid organ transplantation (recipient only)	7/A
Known or Suspected VHD or HF	
Low-risk nonvascular surgery	2/R
Intermediate-risk nonvascular surgery	5/M
High-risk nonvascular surgery	7/A
Low-risk vascular surgery	3/R
Intermediate-risk vascular surgery	6/M
High-risk vascular surgery	7/A
Solid organ transplantation (recipient only)	8/A
TABLE 2.2 New or Worsening Symptoms OR a Functional Status <4 METs. Patient undergoing:	
Known or Suspected Ischemic Heart Disease	
Low-risk nonvascular surgery	5/M
Intermediate-risk nonvascular surgery	6/M
High-risk nonvascular surgery	7/A
Low-risk vascular surgery	5/M
Intermediate-risk vascular surgery	7/A
High-risk vascular surgery	8/A
Solid organ transplantation (recipient only)	8/A
Known or Suspected VHD or HF	
Low-risk nonvascular surgery	5/M
Intermediate-risk nonvascular surgery	7/A
High-risk nonvascular surgery	7/A

Low-risk vascular surgery	5/M
Intermediate-risk vascular surgery	7/A
High-risk vascular surgery	9/A
Solid organ transplantation (recipient only)	8/A

Section 3: Known or Suspected Heart Disease and Prior Testing Within 90 to 220 Days TTE includes With or Without 3D; With or Without Contrast-Enhancing Agent	TTE (score / rating*)
TABLE 3.1 No New or Worsening Symptoms AND a Functional Status ≥4 METs. Patient undergoing:	
Normal ECG Stress Testing in the Setting of Initial Suspicion of Ischemic Heart Disease	
Low-risk nonvascular surgery	1/R
Intermediate-risk nonvascular surgery	1/R
High-risk nonvascular surgery	3/R
Low-risk vascular surgery	1/R
Intermediate-risk vascular surgery	2/R
High-risk vascular surgery	4/R
Solid organ transplantation (recipient only)	6/M
Normal Stress Testing of Any Modality for Ischemia in the Setting of Initial Suspicion of VHD or HF	
Low-risk nonvascular surgery	2/R
Intermediate-risk nonvascular surgery	4/M
High-risk nonvascular surgery	7/A
Low-risk vascular surgery	2/R
Intermediate-risk vascular surgery	5/M
High-risk vascular surgery	7/A
Solid organ transplantation (recipient only)	7/A
Abnormal Stress Testing of Any Modality Indicating Low Risk Ischemic Heart Disease	
Low-risk nonvascular surgery	2/R
Intermediate-risk nonvascular surgery	4/M
High-risk nonvascular surgery	6/M
Low-risk vascular surgery	2/R
Intermediate-risk vascular surgery	4/M
High-risk vascular surgery	6/M
Solid organ transplantation (recipient only)	7/A
Abnormal Stress Testing of any Modality Indicating at Least Moderate Risk Ischemic Heart Disease	
Low-risk nonvascular surgery	4/M
Intermediate-risk nonvascular surgery	6/M
High-risk nonvascular surgery	6/M
Low-risk vascular surgery	4/M
Intermediate-risk vascular surgery	6/M
High-risk vascular surgery	7/A
Solid organ transplantation (recipient only)	7/A
TABLE 3.2 New or Worsening Symptoms OR a Functional Status <4 METs. Patient undergoing:	

Normal Stress Testing in the Setting of Initial Suspicion of Ischemic Heart Disease	
Low-risk nonvascular surgery	4/M
Intermediate-risk nonvascular surgery	6/M
High-risk nonvascular surgery	7/A
Low-risk vascular surgery	6/M
Intermediate-risk vascular surgery	7/A
High-risk vascular surgery	7/A
Solid organ transplantation (recipient only)	7/A
Normal Stress Testing for Ischemia in the Setting of Initial Suspicion of VHD or HF	
Low-risk nonvascular surgery	4/M
Intermediate-risk nonvascular surgery	7/A
High-risk nonvascular surgery	7/A
Low-risk vascular surgery	4/M
Intermediate-risk vascular surgery	7/A
High-risk vascular surgery	8/A
Solid organ transplantation (recipient only)	8/A
Abnormal Stress Testing in the Setting of Initial Suspicion of Ischemic Heart Disease Indicating Low-Risk Ischemic Heart Disease	
Low-risk nonvascular surgery	4/M
Intermediate-risk nonvascular surgery	6/M
High-risk nonvascular surgery	7/A
Low-risk vascular surgery	5/M
Intermediate-risk vascular surgery	7/A
High-risk vascular surgery	7/A
Solid organ transplantation (recipient only)	7/A
Abnormal Stress Testing in the Setting of Initial Suspicion of Ischemic Heart Disease Indicating at Least Moderate Ischemic Heart Disease	
Low-risk nonvascular surgery	6/M
Intermediate-risk nonvascular surgery	7/A
High-risk nonvascular surgery	8/A
Low-risk vascular surgery	6/M
Intermediate-risk vascular surgery	7/A
High-risk vascular surgery	9/A
Solid organ transplantation (recipient only) (Writing Group Members, et al., 2024)	9/A

*****See Appendix for ACC definitions for Scores / Ratings

2020 American College of Cardiology (ACC) Appropriate Use Criteria (AUC) for Multimodality Imaging During the Follow-Up Care of Patients With Congenital Heart Disease (CHD)

The American College of Cardiology (ACC) Solution Set Oversight Committee and Appropriate Use Criteria (AUC) Task Force, American Heart Association (AHA), American Society of Echocardiography (ASE), Heart Rhythm Society (HRS), International Society for Adult Congenital Heart Disease, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and Society of Pediatric Echocardiography published the 2020 Appropriate Use Criteria for

Multimodality Imaging During the Follow-Up Care of Patients With Congenital Heart Disease (Sachdeva, et al., 2020).

Noteworthy:

- Includes 324 separate TTE indications
- Addresses cardiac imaging in adult and pediatric patients with established Congenital Heart Disease.
- Addresses only the follow-up of patients with established CHD using various cardiovascular imaging modalities. It is assumed that a complete anatomic cardiac diagnosis has been established. The initial evaluation by TTE prompted by signs and symptoms suggesting CHD has been addressed in the 2014 AUC for Initial Transthoracic Echocardiography in Outpatient Pediatric Cardiology.

Table 1: Congenital Heart Disease (CHD), Patent Foramen Ovale, Atrial Septal Defects (ASD) and Partial Anomalous Pulmonary Venous Connection (PAPVC)

Patent Foramen Ovale (PFO)	TTE (score/rating*)	TTE with contrast (score/rating*)
Routine surveillance of an asymptomatic patient with a PFO	1/R	1/R
Atrial Septal Defects (ASD) and Partial Anomalous Pulmonary Venous Connection (PAPVC); Unrepaired		
Routine surveillance (1–2 years) in an asymptomatic patient with a small atrial septal defects (ASD) or Partial anomalous pulmonary venous connection (PAPVC) involving a single pulmonary vein	4/M	Not rated
Routine surveillance (3–5 years) in an asymptomatic patient with a small ASD or PAPVC involving a single pulmonary vein	7/A	Not rated
Routine surveillance (1–2 years) in an asymptomatic patient with ≥ moderate ASD or PAPVC involving >1 pulmonary vein	8/A	Not rated
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	5/M
Evaluation to determine the method of closure of isolated secundum ASD	9/A	4/M
Evaluation prior to planned repair of sinus venosus defect and/or PAPVC	9/A	4/M
ASD and PAPVC; Postprocedural: Surgical or catheter-based		
Routine postprocedural evaluation (within 30 days)	9/A	5/M
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	6/M
Routine surveillance within 1 week following device closure of ASD in an asymptomatic patient with no or mild sequelae	9/A	3/R
Routine surveillance at 1 month following device closure of ASD in an asymptomatic patient with no or mild sequelae	9/A	3/R
Routine surveillance at 3–6 months following device closure of ASD in an asymptomatic patient with no or mild sequelae	9/A	3/R
Routine surveillance at 1 year following device closure of ASD in an asymptomatic patient with no or mild sequelae	9/A	3/R
Routine surveillance (2–5 years) after the first year following device closure of ASD in an asymptomatic patient with no or mild sequelae	8/A	2/R

Routine surveillance within a year following surgical ASD closure or PAPVC repair in an asymptomatic patient with no or mild sequelae	9/A	2/R
Routine surveillance (annually) after the first year following surgical ASD closure or PAPVC repair in an asymptomatic patient with no or mild sequelae	6/M	2/R
Routine surveillance (2–5 years) after the first year following surgical ASD closure or PAPVC repair in an asymptomatic patient with no or mild sequelae	9/A	2/R
Routine surveillance (3–12 months) following surgical or device closure of ASD in a patient with significant residual shunt, valvular or ventricular dysfunction, arrhythmias, and/or pulmonary hypertension	9/A	4/M
Routine surveillance (3–12 months) following repair of PAPVC in a patient with systemic or pulmonary venous obstruction, valvular or ventricular dysfunction, arrhythmias, and/or pulmonary hypertension	9/A	5/M

Table 2: Congenital Heart Disease (CHD), Ventricular Septal Defects (VSD)

Unrepaired	TTE (score/rating*)
Routine surveillance (1–2 years) in an asymptomatic child with a small muscular VSD	3/R
Routine surveillance (3–5 years) in an asymptomatic child with a small muscular VSD	7/A
Routine surveillance (3–5 years) in an asymptomatic adult with a small muscular VSD	7/A
Routine surveillance (1–2 years) in an asymptomatic child with a small VSD in a location other than muscular septum	7/A
Routine surveillance (3–5 years) in an asymptomatic adult with a small VSD in a location other than muscular septum	8/A
Routine surveillance (1–3 months) in an infant with ≥ moderate VSD on medical management	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postprocedural: Surgical or Catheter-Based	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance within a year following surgical or device VSD closure in an asymptomatic patient with no or mild sequelae	8/A
Routine surveillance (2–3 years) after the first year following device closure of VSD in an asymptomatic patient with no or mild sequelae	9/A
Routine surveillance (annually) after the first year following surgical VSD closure in an asymptomatic patient with no or mild sequelae	5/M
Routine surveillance (2–3 years) after the first year following surgical VSD closure in an asymptomatic patient with no or mild sequelae	8/A
Routine surveillance (2–3 years) following surgical or device closure in a patient with small residual shunt, ≤ mild valvular dysfunction, no ventricular dysfunction, arrhythmias, or pulmonary hypertension	9/A

Routine surveillance (3–12 months) following surgical or device closure in a patient with significant residual shunt, valvular or ventricular dysfunction, arrhythmias, and/or pulmonary hypertension	9/A

Table 3: Congenital Heart Disease (CHD), Atrioventricular Septal Defects

Unrepaired: Partial/Transitional	TTE (score/rating*)
Routine surveillance (3–6 months) in an asymptomatic infant	9/A
Routine surveillance (1–2 years) in an asymptomatic child	9/A
Unrepaired: Complete	
Routine surveillance (1–3 months) in an infant	9/A
Unrepaired: All Types	
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postoperative	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance within a year after atrioventricular septal defects (AVSD) repair in an asymptomatic patient with no or mild sequelae	9/A
Routine surveillance (1–3 years) after the first year following repair in an asymptomatic patient with no or mild sequelae	9/A
Routine surveillance (3–12 months) in a patient with significant residual shunt, valvular or ventricular dysfunction, left ventricular outflow tract (LVOT) obstruction, arrhythmias, and/or pulmonary hypertension	9/A
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A

Table 4: Congenital Heart Disease (CHD), Patent Ductus Arteriosus (PDA)

Unrepaired	TTE (score/rating*)
Routine surveillance (3–5 years) in an asymptomatic patient with a trivial, silent PDA	3/R
Routine surveillance (3–6 months) in an infant with ≥ moderate PDA	9/A
Routine surveillance (3–6 months) in an infant with a small, audible PDA until closure	7/A
Routine surveillance (1–2 years) in an infant or child with a small, audible PDA until closure	8/A
Routine surveillance (3–5 years) in an adult with a small PDA	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postprocedural: Surgical or Catheter-Based	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (annually) within 2 years following PDA closure in an asymptomatic patient with no or mild sequelae	8/A
Routine surveillance (5 years) after the first 2 years following surgical closure in an asymptomatic patient with no or mild sequelae	3/R

Routine surveillance (5 years) after the first 2 years following device closure in an asymptomatic patient with no or mild sequelae	7/A
Routine surveillance (1–2 years) in a patient with postprocedural left pulmonary artery stenosis	9/A
Routine surveillance (1–2 years) in a patient with postprocedural aortic obstruction	9/A

Table 5: Congenital Heart Disease (CHD), Total Anomalous Pulmonary Venous Connection

Unrepaired	TTE (score/rating*)
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postoperative	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (3–6 months) in an asymptomatic infant with no or mild sequelae	8/A
Routine surveillance (1–2 years) in an asymptomatic child with no or mild sequelae	8/A

Table 6: Congenital Heart Disease (CHD), Eisenmenger Syndrome (ES) and Pulmonary Hypertension Associated With CHD

Eisenmenger Syndrome (ES)	TTE (score/rating*)
Initial evaluation with suspicion of ES	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms in a patient with ES	9/A
Evaluation due to change in pulmonary arterial hypertension-targeted therapy in a patient with ES	9/A
Routine surveillance (3 months) in a stable child with ES	6/M
Routine surveillance (6–12 months) in a stable child with ES	9/A
Routine surveillance (3 months) in a stable adult with ES	3/R
Routine surveillance (6–12 months) in a stable adult with ES	9/A
Pulmonary Hypertension (PH) Associated With Congenital heart disease (CHD)	
Initial evaluation with suspicion of pulmonary hypertension following CHD surgery	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms in a patient with postoperative PH	9/A
Evaluation due to change in pulmonary arterial hypertension-targeted therapy in a patient with postoperative PH	9/A
Routine surveillance (3 months) in a stable child with postoperative PH	7/A
Routine surveillance (6–12 months) in a stable child with post-operative PH	5/M
Routine surveillance (3 months) in a stable adult with postoperative PH	9/A
Routine surveillance (6–12 months) in a stable adult postoperative PH	9/A

Table 7: Congenital Heart Disease (CHD), Ebstein Anomaly and Tricuspid Valve Dysplasia

Unrepaired	TTE (score/rating*)	TTE with contrast (score/rating*)
Routine surveillance (1–2 years) in an asymptomatic infant or child with mild tricuspid regurgitation (TR)	9/A	Not rated
Routine surveillance (3–5 years) in an asymptomatic adult with mild TR	9/A	5/M
Routine surveillance (3–6 months) in an asymptomatic infant with ≥ moderate TR without hypoxemia	9/A	Not rated
Routine surveillance (6–12 months) in an asymptomatic patient with ≥ moderate TR and previously stable RV size and/or function without hypoxemia	9/A	4/M
Evaluation due to change in clinical status and/or new concerning signs and symptoms	9/A	7/A
Evaluation of an atrial septal defect (ASD) for device closure in a patient with mild or moderate TR, right ventricle (RV) enlargement, and no hypoxemia	9/A	6/M
Evaluation prior to planned repair	9/A	6/M
Postprocedural: Surgical or Catheter-Based		
Routine postprocedural evaluation (within 30 days)	9/A	6/M
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	7/A
Routine surveillance (1–2 years) in an asymptomatic patient with no or mild sequelae	9/A	Not rated
Routine surveillance (3–5 years) in an asymptomatic patient with no or mild sequelae	Not rated	Not rated
Routine surveillance (6–12 months) in an asymptomatic child with valvular or ventricular dysfunction or arrhythmias	9/A	Not rated
Routine surveillance (1–2 years) in an asymptomatic adult with valvular or ventricular dysfunction or arrhythmias	9/A	Not rated
Routine surveillance (3–12 months) in a patient with symptoms of heart failure and/or atrial arrhythmias	9/A	Not rated

Table 8: Congenital Heart Disease (CHD), Pulmonary Stenosis (PS)

Unrepaired	TTE (score/rating*)
Routine surveillance (3–6 months) in an asymptomatic infant with mild PS	8/A
Routine surveillance (1–2 years) in an asymptomatic child with mild PS	8/A
Routine surveillance (3–5 years) in an asymptomatic adult with mild PS	9/A
Routine surveillance (3–6 months) in an asymptomatic infant with ≥ moderate PS	9/A
Routine surveillance (1–2 years) in an asymptomatic child or adult with ≥ moderate PS	9/A
Routine surveillance (3–5 years) in an asymptomatic adult with PS and pulmonary artery dilation	Not rated
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postprocedural: Surgical or Catheter-Based	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A

Routine surveillance (1–2 years) in an asymptomatic child with no or mild sequelae	9/A
Routine surveillance (3–5 years) in an asymptomatic adult with no or mild sequelae	9/A
Routine surveillance (6–12 months) in an asymptomatic child with moderate or severe sequelae	9/A
Routine surveillance (1–3 years) in an asymptomatic adult with moderate or severe sequelae	9/A
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A

Table 9: Congenital Heart Disease (CHD), Pulmonary Atresia With Intact Ventricular Septum

Unrepaired	TTE (score/rating*)
Evaluation prior to planned repair	9/A
Postprocedural: Palliation	
Routine postprocedural evaluation (within 30 days)	9/A
Routine surveillance (1–3 months) in an asymptomatic patient	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postprocedural: Complete Repair	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation due to a change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (3–6 months) in an asymptomatic infant	9/A
Routine surveillance (1–2 years) in an asymptomatic child with no or mild sequelae	9/A
Routine surveillance (2–3 years) in an asymptomatic adult with no or mild sequelae	9/A
Routine surveillance (6–12 months) in an asymptomatic child with ≥ moderate sequelae	9/A
Routine surveillance (1–3 years) in an asymptomatic adult with ≥ moderate sequelae	9/A
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A

Table 10: Congenital Heart Disease (CHD), Mitral Valve Disease

Unrepaired Congenital Mitral Stenosis (MS)	TTE (score/rating*)
Routine surveillance (1–4 weeks) in an infant <3 months with any degree of MS	8/A
Routine surveillance (3–6 months) in an infant ≥3 months with mild MS	8/A
Routine surveillance (1–3 months) in an infant ≥3 months with ≥ moderate MS	9/A
Routine surveillance (1–2 years) in an asymptomatic child with mild MS	9/A
Routine surveillance (3–12 months) in an asymptomatic child with ≥ moderate MS	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Unrepaired: Congenital Mitral Regurgitation (MR) including Mitral Valve Prolapse (MVP)	

Routine surveillance (6–12 months) in an asymptomatic infant with mild MR	9/A
Routine surveillance (1–3 months) in an asymptomatic infant with ≥ moderate MR	9/A
Routine surveillance (2–5 years) in a child with mild MR, normal LV size and systolic function	9/A
Routine surveillance (6–12 months) in a child with ≥ moderate MR	9/A
Routine surveillance (1–2 years) in an asymptomatic child with MVP and mild MR	5/M
Routine surveillance (3–5 years) in an asymptomatic child with MVP and mild MR	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postprocedural: Surgical or Catheter-Based	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation in an infant or child due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (3–6 months) in an infant with mild MS or MR, and no LV dysfunction	9/A
Routine surveillance (1–3 months) in an infant with ≥ moderate MS or MR, dilated LV, and no LV dysfunction	9/A
Routine surveillance (1–2 years) in a child with mild MS or MR, and no LV dysfunction	9/A
Routine surveillance (3–12 months) in a child with ≥ moderate MS or MR, dilated LV, and no LV dysfunction	9/A
Routine surveillance (annually) in a child with normal prosthetic mitral valve function and no LV dysfunction	9/A
Routine surveillance (3–12 months) in a child with prosthetic mitral valve or ventricular dysfunction, and/or arrhythmias	9/A

Table 11: Congenital Heart Disease (CHD), Left ventricular outflow tract (LVOT) lesions

Unrepaired: Subvalvular Aortic Stenosis (AS)	TTE (score/rating*)
Routine surveillance (1–3 months) in an infant with any degree of subvalvular aortic stenosis (AS) and ≤ mild aortic regurgitation (AR)	9/A
Routine surveillance (1–2 years) in a child or adult with mild subvalvular AS and no AR	9/A
Routine surveillance (6–12 months) in a child or adult with ≥ moderate subvalvular AS and/or ≤ mild AR	9/A
Routine surveillance (3–5 years) in an asymptomatic adult with ≥ moderate subvalvular AS	Not rated
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postoperative	
Routine postoperative evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (3–6 months) in an infant with ≤ mild stenosis and/or AR	9/A
Routine surveillance (1–3 months) in an infant with ≥ moderate stenosis and/or AR	9/A

Routine surveillance (1–2 years) in a child or adult with ≤ mild stenosis and/or AR	9/A
Routine surveillance (6–12 months) in a child or adult with ≥ moderate stenosis and/or AR	9/A
Routine surveillance (3–12 months) in an adult with heart failure symptoms or ≥ moderate stenosis and/or AR	9/A
Unrepaired: Aortic Valve Stenosis and/or Regurgitation* *This part of the table does not include indications for adults:	
Routine surveillance (1–4 weeks) in an infant (<3 months old) with any degree of AS and/or AR not requiring neonatal surgery	9/A
Routine surveillance (3–6 months) in an infant (3–12 months old) with mild AS and/or mild AR	9/A
Routine surveillance (1–3 months) in an infant (3-12 months old) with ≥ moderate AS and/or ≥ moderate AR	9/A
Routine surveillance (6 months) in an asymptomatic child with mild AS and/or mild AR without aortic dilation	3/R
Routine surveillance (1–2 years) in an asymptomatic child with mild AS and/or mild AR without aortic dilation	9/A
Routine surveillance (6–12 months) in an asymptomatic child with ≥ moderate AS and/or ≥ moderate AR	9/A
Routine surveillance (3–5 years) in a child with a bicuspid aortic valve with trivial or mild valvular dysfunction with no aortic sinus and/or ascending aortic dilation	9/A
Routine surveillance (2–3 years) in a child with aortic sinus and/or ascending aortic dilation with stable z-scores	9/A
Routine surveillance (6–12 months) in a child with aortic sinus and/or ascending aortic dilation with increasing z-scores	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postprocedural: Surgical or Catheter-Based* *This part of the table does not include indications for adults:	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (3–6 months) in an infant following neonatal intervention with ≤ mild AS and/or AR and no LV dysfunction	9/A
Routine surveillance (1–3 months) in an infant following neonatal intervention with ≥ moderate AS and/or regurgitation, and/or LV dysfunction	9/A
Routine surveillance (1–2 years) in a child with ≤ mild AS and/or AR following repair or normal prosthetic valve function	9/A
Routine surveillance (6–12 months) in a child with ≥ moderate AS or AR	9/A
Routine surveillance (3–12 months) in a child with heart failure symptoms and/or ventricular dysfunction	9/A
Unrepaired: Supravalvular Aortic Stenosis (AS)	
Routine surveillance (3–6 months) in an infant with any degree of supravalvular AS	9/A
Routine surveillance (1–2 years) in an asymptomatic child or adult with mild supravalvular AS	9/A
Routine surveillance (6–12 months) in an asymptomatic child or adult with moderate supravalvular AS	9/A

Routine surveillance (2–5 years) in an asymptomatic adult with moderate supravalvular AS	Not rated
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postoperative	
Routine postoperative evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (2–5 years) in a patient with no or mild supravalvular AS	9/A
Routine surveillance (6–12 months) in a patient with ≥ moderate supravalvular AS	9/A

Table 12: Congenital Heart Disease (CHD), Aortic Coarctation and Interrupted Aortic Arch

Unrepaired	TTE (score/rating*)
Routine surveillance (3–6 months) in an infant with mild aortic coarctation in the absence of a Patent ductus arteriosus (PDA)	9/A
Routine surveillance (1–2 years) in a child or adult with mild aortic coarctation	9/A
Routine surveillance (3–5 years) in a child or adult with mild aortic coarctation	Not rated
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postprocedural: Surgical or Catheter-Based	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (3–6 months) within the first year following surgical or catheter-based intervention in an asymptomatic patient with no or mild sequelae	9/A
Routine surveillance (6–12 months) within the first year following catheter-based intervention in an asymptomatic patient with no or mild sequelae	Not rated
Routine surveillance (6 months) after the first year following surgical or catheter-based intervention in an asymptomatic patient with no or mild sequelae	9/A
Routine surveillance (1–2 years) after the first year following surgical or catheter-based intervention in an asymptomatic patient with no or mild sequelae	9/A
Routine surveillance (3–5 years) in an asymptomatic patient to evaluate for aortic arch aneurysms, in-stent stenosis, stent fracture, or endoleak	Not rated
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A

Table 13: Congenital Heart Disease (CHD), Coronary Anomalies

Unrepaired	TTE (score/rating*)
Routine surveillance (annually) in an asymptomatic patient with anomalous right coronary artery from the left aortic sinus	3/R

Routine surveillance (2–5 years) in an asymptomatic patient with anomalous right coronary artery from the left aortic sinus	7/A
Routine surveillance (annually) in an asymptomatic patient with small coronary fistula	3/R
Routine surveillance (2–5 years) in an asymptomatic patient with small coronary fistula	8/A
Routine surveillance (1–2 years) in an asymptomatic patient with moderate or large coronary fistula	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postprocedural: Surgical or Catheter-Based	
Routine post–procedural evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation within 1 year after surgery or catheter-based intervention with no or mild sequelae	9/A
Routine surveillance (1–3 months) within the first year following repair	7/A
Routine surveillance (3–6 months) in an infant with or without ventricular or valvular dysfunction	9/A
Routine surveillance (3–6 months) in a child or adult with ventricular or valvular dysfunction	9/A
Routine surveillance (annually) with no or mild sequelae	7/A
Routine surveillance (2–5 years) with no or mild sequelae	Not rated

Table 14: Congenital Heart Disease (CHD), Tetralogy of Fallot (TOF)

Unrepaired	TTE (score/rating*)
Routine surveillance (1–3 months) in an infant before complete repair	9/A
Routine surveillance (1–3 months) in an infant following valvuloplasty, patent ductus arteriosus (PDA) and/or right ventricular outflow tract (RVOT) stenting, or shunt placement before complete repair	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postoperative: Initial Repair	
Routine postoperative evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (annually) in an asymptomatic patient with no or mild sequelae or PR of any severity	9/A
Routine surveillance (6–12 months) in a patient with valvular dysfunction other than pulmonary valve, RVOT obstruction, branch pulmonary artery stenosis, arrhythmias, or presence of a right ventricle to pulmonary artery (RV-to-PA) conduit	9/A
Routine surveillance (2–3 years) in a patient with pulmonary regurgitation (PR) and preserved ventricular function	Not rated
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A
Evaluation prior to planned pulmonary valve replacement (percutaneous or surgical)	9/A
Postprocedural: Surgical or Catheter-based Pulmonary Valve Replacement	
Routine postprocedural evaluation (within 30 days)	9/A

Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation at 1 year following transcatheter or surgical pulmonary valve replacement	9/A
Routine surveillance at 1 and 6 month(s) in an asymptomatic patient following transcatheter pulmonary valve replacement	9/A
Routine surveillance (annually) in an asymptomatic patient following transcatheter pulmonary valve replacement	9/A
Routine surveillance (annually) in an asymptomatic patient with no or mild sequelae	9/A
Routine surveillance (6–12 months) in a patient with RV-to-PA conduit dysfunction, valvular or ventricular dysfunction, branch pulmonary artery stenosis, or arrhythmias	9/A
Routine surveillance (2–3 years) in an asymptomatic patient with no or mild sequelae	Not rated
Routine surveillance (2–3 years) in a patient with valvular or ventricular dysfunction, RVOT obstruction, branch pulmonary artery stenosis, arrhythmias, or presence of an RV-to- PA conduit	9/A
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A

Table 15: Congenital Heart Disease (CHD), Double Outlet Right Ventricle (DORV)

Unrepaired	TTE (score/rating*)
Routine surveillance (1–3 months) in an infant with balanced systemic and pulmonary circulation	9/A
Routine surveillance (3–6 months) in a child with balanced systemic and pulmonary circulation	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postoperative	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (6 months) within a year following repair in an asymptomatic infant or child with no or mild sequelae	9/A
Routine surveillance (1–2 years) in an asymptomatic patient with no or mild sequelae	9/A
Routine surveillance (3–12 months) in a patient with valvular or ventricular dysfunction, right or left ventricular outflow tract obstruction, branch pulmonary artery stenosis, arrhythmias, or presence of an right ventricle to pulmonary artery (RV-to-PA) conduit	9/A
Routine surveillance (3–5 years) in an asymptomatic patient with no or mild sequelae	Not rated
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A

Table 16: Congenital Heart Disease (CHD), D-Loop Transposition of the Great Arteries (D-Loop TGA)

Unrepaired	TTE (score/rating*)
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A

Postoperative: Arterial Switch Operation		
Routine postoperative evaluation (within 30 days)	9/A	
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	
Evaluation for coronary imaging in an asymptomatic patient	Not rated	
Routine surveillance (1–3 months) in an asymptomatic infant with moderate sequelae	9/A	
Routine surveillance (3–6 months) in an asymptomatic infant with no or mild sequelae	9/A	
Routine surveillance (3–12 months) in an asymptomatic child or adult with ≥ moderate valvular or ventricular dysfunction, right or left ventricular outflow tract obstruction, branch pulmonary artery stenosis, or arrhythmias	9/A	
Routine surveillance (1–2 years) in an asymptomatic child or adult with no or mild sequelae	9/A	
Routine surveillance (3–5 years) in an asymptomatic patient	Not rated	
Routine surveillance (1–2 years) in a patient with dilated neoaortic root with increasing Z scores, or neoaortic regurgitation	9/A	
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A	
Postoperative: Rastelli		
Routine postoperative evaluation (within 30 days)	9/A	
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	
Routine surveillance (3–6 months) within the first year following repair	9/A	
Routine surveillance (6 months) after the first year following repair in an asymptomatic patient with no or mild sequelae	9/A	
Routine surveillance (1–2 years) in an asymptomatic patient with no or mild sequelae	9/A	
Routine surveillance (3–5 years) in an asymptomatic patient	Not rated	
Routine surveillance (3–12 months) in a patient with ≥ moderate valvular dysfunction, LVOT obstruction, presence of an right ventricle to pulmonary artery (RV-to-PA) conduit, branch pulmonary artery stenosis, or arrhythmias	9/A	
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A	
Postoperative: Atrial Switch Operation	TTE (score/rating*)	TTE with contrast (score/rating*)
Evaluation due to concerning signs or symptoms and/or change in clinical status	9/A	6/M
Routine surveillance (6 months) in an asymptomatic patient with no or mild sequelae	3/R	3/R
Routine surveillance (1–2 years) in an asymptomatic patient with no or mild sequelae	9/A	3/R
Routine surveillance (3–5 years) in an asymptomatic patient	Not rated	3/R
Routine surveillance (3–12 months) in a patient with ≥ moderate systemic AV valve regurgitation, systemic RV dysfunction, LVOT obstruction, or arrhythmias	9/A	Not rated

Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A	Not rated

Table 17: Congenital Heart Disease (CHD), Congenitally Corrected Transposition of the Great Arteries (ccTGA)

Unrepaired	TTE (score/rating*)	TTE with contrast (score/rating*)
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	Not rated
Routine surveillance (3–6 months) in an asymptomatic infant	9/A	Not rated
Routine surveillance (1–2 years) in a patient with < moderate systemic atrioventricular (AV) valve regurgitation	9/A	Not rated
Routine surveillance (6–12 months) in a patient with ≥ moderate systemic AV valve regurgitation	9/A	Not rated
Routine surveillance (3–5 years) in an asymptomatic patient	9/A	Not rated
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A	Not rated
Evaluation prior to planned repair	9/A	Not rated
Postoperative: Anatomic Repair		
Routine post–operative evaluation (within 30 days)	9/A	M (5)
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	M (5)
Routine surveillance (3–6 months) within a year following repair in an asymptomatic patient with no or mild sequelae	9/A	Not rated
Routine surveillance (1–2 years) after the first year following repair in an asymptomatic patient with no or mild sequelae	9/A	Not rated
Routine surveillance (6–12 months) in a patient with valvular or ventricular dysfunction, right or left ventricular outflow tract obstruction, or presence of a right ventricle to pulmonary artery (RV-to-PA) conduit	9/A	Not rated
Routine surveillance (3–5 years) in an asymptomatic patient	Not rated	Not rated
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A	Not rated
Postoperative: Physiological Repair With Ventricular septal defect (VSD) Closure and/or Left ventricle to Pulmonary artery (LV-to-PA) Conduit		
Routine postoperative evaluation (within 30 days)	9/A	Not rated
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	Not rated
Routine surveillance (3–6 months) within a year following repair in an asymptomatic patient with no or mild sequelae	9/A	Not rated
Routine surveillance (1–2 years) in an asymptomatic patient with no or mild sequelae	9/A	Not rated
Routine surveillance (3–5 years) in an asymptomatic patient with no or mild sequelae	9/A	Not rated
Routine surveillance (3–12 months) in a patient with ≥ moderate systemic AV valve regurgitation, systemic RV dysfunction, and/or LV-to-PA conduit dysfunction	9/A	Not rated
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A	Not rated

Table 18: Congenital Heart Disease (CHD), Truncus Arteriosus

Unrepaired	TTE (score/rating*)
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Evaluation prior to planned repair	9/A
Postoperative	
Routine postprocedural evaluation (within 30 days)	9/A
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A
Routine surveillance (1–3 months) within the first year following repair in an asymptomatic patient	9/A
Routine surveillance (6–12 months) after the first year following repair in an asymptomatic child or adult with no or mild sequelae	9/A
Routine surveillance (3–5 years) in an asymptomatic child or adult with no or mild sequelae	Not rated
Routine surveillance (3–6 months) in an asymptomatic child or adult with ≥ moderate truncal stenosis and/or regurgitation	9/A
Routine surveillance (1–2 years) in an asymptomatic child or adult with ≥ moderate truncal stenosis and/or regurgitation	Not rated
Routine surveillance (3–12 months) in a patient with known residual VSD, presence of an right ventricle to pulmonary artery RV-to-PA conduit, or branch pulmonary artery obstruction	9/A
Routine surveillance (3–12 months) in a patient with heart failure symptoms	9/A

Table 19: Congenital Heart Disease (CHD), Single-Ventricle Heart Disease

Unrepaired	TTE (score/rating*)	TTE with contrast (score/rating*)
Routine surveillance (1–4 weeks) in a patient with balanced systemic and pulmonary circulation not requiring neonatal surgery	9/A	Not rated
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	Not rated
Evaluation prior to planned surgical palliation	9/A	Not rated
Postprocedural: Surgical and/or Catheter-Based (Stage 1 Palliation)		
Routine post-procedural evaluation (within 30 days)	9/A	Not rated
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	Not rated
Routine surveillance (1–4 weeks) in an asymptomatic infant	9/A	Not rated
Evaluation prior to planned stage 2 palliation	9/A	Not rated
Postoperative: Stage 2 Palliation		
Routine postoperative evaluation (within 30 days)	9/A	Not rated
Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	6/M
Routine surveillance (1–6 months) in an asymptomatic infant or child	9/A	Not rated
Routine surveillance (1–2 years) in an asymptomatic adult	9/A	Not rated
Evaluation prior to planned stage 3 palliation	9/A	5/M
Postoperative: Stage 3 Palliation		
Routine postoperative evaluation (within 30 days)	9/A	3/R

Evaluation due to change in clinical status and/or new concerning signs or symptoms	9/A	6/M
Routine surveillance (3–6 months) within a year following stage 3 palliation in an asymptomatic patient	9/A	Not rated
Routine surveillance (6–12 months) after the first year following stage 3 palliation in an asymptomatic patient	9/A	Not rated
Routine surveillance (3–5 years) in an asymptomatic patient	9/A	Not rated
Routine surveillance (3–12 months) in a patient with valvular or ventricular dysfunction, arrhythmias, or other cardiac complications	9/A	Not rated
Routine surveillance (3–12 months) in a patient with heart failure symptoms (Sachdeva, et al., 2020)	9/A	Not rated

*****See Appendix for ACC definitions for Scores / Ratings

2019 American College of Cardiology (ACC) Appropriate Use Criteria (AUC) for Multimodality Imaging in the Assessment of Cardiac Structure and Function in Nonvalvular Heart Disease

The American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and the Society of Thoracic Surgeons published the 2019 Appropriate Use Criteria (AUC) for Multimodality Imaging in the Assessment of Cardiac Structure and Function in Nonvalvular Heart Disease (Doherty, et al., 2019). Noteworthy:

- Includes 103 separate TTE indications
- Where appropriate, the scenarios were developed on the basis of the most current American College of Cardiology/American Heart Association Clinical Practice Guidelines.

Table 1: Nonvalvular Heart Disease, Initial Evaluation of an Asymptomatic Patient

	TTE (With or Without 3D; With Contrast as Needed) (score/rating*)	Strain/Strain Rate Imaging by Speckle or Tissue Doppler (score/rating*)
Initial cardiac evaluation of a known systemic, congenital, or acquired disease that could be associated with structural heart disease	9/A	5/M
Screening evaluation for structure and function in first-degree relatives of a patient with an inherited cardiomyopathy	9/A	4/M
Initial evaluation prior to exposure to medications/radiation that could result in cardiotoxicity/heart failure	9/A	7/A
Evaluation of the ascending aorta in the setting of a known or suspected connective tissue disease or genetic condition that predisposes to aortic aneurysm or dissection (e.g., Marfan syndrome)	8/A	1/R
Screening evaluation in relatives of a patient with known aortic aneurysm or dissection	8/A	1/R

	TTE (With or Without 3D; With Contrast as Needed) (score/rating*)	Strain/Strain Rate Imaging by Speckle or Tissue Doppler (score/rating*)
Preparticipation athlete assessment in a patient with no symptoms, normal examination, and no family history of inheritable heart disease	3/R	1/R
Preparticipation assessment of an asymptomatic athlete with ≥1 of the following: abnormal examination, abnormal electrocardiogram (ECG), or definite (or high suspicion for) family history of inheritable heart disease	9/A	4/M
Evaluation of suspected pulmonary arterial hypertension, including evaluation of right ventricular function and estimated pulmonary artery pressure in a patient at risk for developing pulmonary arterial hypertension	9/A	2/R

Table 2: Nonvalvular Heart Disease, Initial Evaluation of a Patient With Clinical Signs and/or Symptoms of Heart Disease

	TTE (With or Without 3D; With Contrast as Needed) (score/rating*)	Strain/Strain Rate Imaging by Speckle or Tissue Doppler (score/rating*)
Initial evaluation when symptoms or signs suggest heart disease	9/A	5/M
Arrhythmias or Conduction Disorders		
Newly diagnosed left bundle branch block (LBBB)	7/A	4/M
Newly diagnosed right bundle branch block (RBBB)	5/M	2/R
Frequent ventricular premature contractions (VPCs) without other evidence of heart disease	7/A	2/R
Nonsustained ventricular tachycardia (VT)	8/A	4/M
Sustained VT or ventricular fibrillation (VF)	9/A	3/R
Evaluation of the patient with episodes of supraventricular tachycardia (SVT) without other evidence of heart disease	6/M	1/R
Atrial fibrillation/flutter (not for purposes of Precardioversion evaluation)	8/A	3/R
Palpitations/Presyncope/Syncope		
Clinical symptoms or signs consistent with a cardiac diagnosis known to cause presyncope/syncope (including but not limited to hypertrophic cardiomyopathy and heart failure [HF])	9/A	4/M
Palpitations without other symptoms or signs of cardiovascular disease	6/M	2/R
Presyncope without other symptoms or signs of cardiovascular disease	7/A	2/R
Syncope without other symptoms or signs of cardiovascular disease	8/A	2/R
Hypotension or Hemodynamic Instability		
Hypotension or hemodynamic instability of uncertain or suspected cardiac etiology	8/A	1/R
Assessment of volume status in a critically ill patient	7/A	1/R

	TTE (With or Without 3D; With Contrast as Needed) (score/rating*)	Strain/Strain Rate Imaging by Speckle or Tissue Doppler (score/rating*)
Hypertensive Heart Disease		
Initial evaluation of suspected hypertensive heart disease	8/A	3/R
Routine evaluation of systemic hypertension without symptoms or signs of hypertensive heart disease	5/M	1/R
Acute Coronary Syndrome (ACS)		
Evaluation of left ventricular (LV) function during initial presentation with acute coronary syndrome	8/A	1/R
Suspected complication of myocardial ischemia/ infarction, including but not limited to acute mitral regurgitation, ventricular septal defect, free-wall rupture/tamponade, shock, right ventricular involvement, HF, or intraventricular thrombus	9/A	1/R
Respiratory Failure/Exertional Shortness of Breath		
Exertional shortness of breath/dyspnea or hypoxemia of uncertain etiology	8/A	4/M
Exertional shortness of breath /dyspnea or hypoxemia when a noncardiac etiology of dyspnea has been established	4/M	1/R
Heart Failure/Cardiomyopathy		
Initial evaluation of known or suspected HF (systolic or diastolic) based on symptoms, signs, or abnormal test results to assess systolic or diastolic function and to assess for possible etiology (coronary artery disease [CAD], valvular disease)	9/A	6/M
Suspected inherited or acquired cardiomyopathy (e.g., restrictive, infiltrative, dilated, hypertrophic)	9/A	6/M
Evaluation of LV function in patients who are scheduled for or who have received chemotherapy	9/A	6/M
Pulmonary Hypertension		
Evaluation of suspected pulmonary hypertension including evaluation of right ventricular function and estimated pulmonary artery pressure	9/A	3/R
Device Therapy		
Evaluation after appropriate time interval following revascularization and/or optimal medical therapy to determine candidacy for implantable cardioverter-defibrillator (ICD)/ cardiac resynchronization therapy (CRT) and/or to determine optimal choice of device	9/A	2/R
Initial evaluation for CRT device optimization after implantation	7/A	3/R
Known implanted pacing/ ICD/CRT device with symptoms possibly due to suboptimal device settings	8/A	4/M
To determine candidacy for ventricular assist device	9/A	1/R
Optimization of ventricular assist device settings	8/A	1/R
Cardiac Transplantation		
Monitoring for rejection or coronary arteriopathy in a cardiac transplant recipient	8/A	4/M

	TTE (With or Without 3D; With Contrast as Needed) (score/rating*)	Strain/Strain Rate Imaging by Speckle or Tissue Doppler (score/rating*)
Cardiac structure and function evaluation in a potential heart donor	9/A	1/R
Other		
Suspected pericardial diseases	9/A	5/M
Initial evaluation of cardiac mass, suspected tumor or thrombus, or potential cardiac source of emboli	9/A	1/R
Suspected acute aortic pathology including acute aortic syndrome	7/A	1/R

Table 3: Nonvalvular Heart Disease, Sequential or Follow-Up Testing to Clarify Initial Diagnostic Testing

	TTE (With or Without 3D; With Contrast as Needed) (score/rating*)	Strain/Strain Rate Imaging by Speckle or Tissue Doppler (score/rating*)
Comprehensive further evaluation of undefined cardiomyopathy	Not rated	5/M
Evaluation of suspected cardiac amyloidosis	Not rated	6/M
Evaluation of suspected hypertrophic cardiomyopathy	Not rated	7/A
Further anatomic characterization of anomalous coronary arteries identified by invasive coronary angiography	2/R	1/R

Table 4: Nonvalvular Heart Disease, Sequential or Follow-Up Testing: Asymptomatic or Stable Symptoms

	TTE (With or Without 3D; With Contrast as Needed) (score/rating*)	Strain/Strain Rate Imaging by Speckle or Tissue Doppler (score/rating*)
Re-evaluation (<1 y) in a patient at risk for heart failure (HF) without structural heart disease on prior TTE and no change in clinical status or cardiac examination (stage A)	2/R	1/R
Re-evaluation of known hypertensive heart disease without a change in clinical status or cardiac examination (stage A) (<1 y)	2/R	1/R
Re-evaluation (<1 y) of HF (systolic or diastolic) cardiomyopathy or HF without a change in clinical status or cardiac examination	2/R	1/R
Re-evaluation (<1 y) in a patient previously or currently undergoing therapy with potentially cardiotoxic agents	7/A	7/A
Re-evaluation (<1 y) of known aortic dilatation at baseline study to assess changes in rate of expansion or size in patient without bicuspid aortic valve	3/R	1/R
Re-evaluation (<1 y) of the size and morphology of the aortic sinuses and ascending aorta in patients with a bicuspid	2/R	1/R

	TTE (With or Without 3D; With Contrast as Needed) (score/rating*)	Strain/Strain Rate Imaging by Speckle or Tissue Doppler (score/rating*)
aortic valve and an aortic diameter >4 cm without characteristics mentioned in the indication below		
Re-evaluation (<1 y) of the size and morphology of the aortic sinuses and ascending aorta in patients with a bicuspid aortic valve and an aortic diameter >4 cm with one of the following: Aortic dilatation >4.5 cm; Rapid rate of change in aortic diameter; Family history of aortic dissection	3/R	1/R
Re-evaluation (<1 y) of known moderate or greater pulmonary hypertension without change in clinical status or cardiac examination	4/M	1/R
Re-evaluation (≥1 y) of known moderate or greater pulmonary hypertension without change in clinical status or cardiac examination	7/A	1/R
Re-evaluation of chronic asymptomatic pericardial effusion when findings would potentially alter therapy	7/A	1/R
Further clarification of suspected pericardial constriction when findings of TTE including tissue Doppler is unclear	1/R	1/R
Re-evaluation of intracardiac mass when findings would potentially alter therapy	8/A	1/R
Re-evaluation of prior TEE findings for interval change (e.g., resolution of atrial thrombus after anticoagulation) when no change in therapy is anticipated.	1/R	1/R

Table 5: Nonvalvular Heart Disease, Sequential or Follow-Up Testing: New or Worsening Symptoms or to Guide Therapy

	TTE (With or Without 3D; With Contrast as Needed) (score/rating*)	Strain/Strain Rate Imaging by Speckle or Tissue Doppler (score/rating*)
Re-evaluation of known structural heart disease with change in clinical status or cardiac examination or to guide therapy (assume ischemic work-up has been performed and remains valid)	8/A	4/M
Re-evaluation of prior TEE findings for interval change (e.g., reduction or resolution of atrial thrombus after anticoagulation or intracardiac evaluation of cardiac mass when a change in therapy is anticipated	5/M	1/R
Re-evaluation of known cardiomyopathy with a change in clinical status or cardiac examination or to guide therapy (assume ischemic work-up has been done, performed, and remains valid)	8/A	5/M
Re-evaluation of known HF (systolic or diastolic) with a change in clinical status or cardiac examination without a clear precipitating change in medication or diet	8/A	4/M

	TTE (With or Without 3D; With Contrast as Needed) (score/rating*)	Strain/Strain Rate Imaging by Speckle or Tissue Doppler (score/rating*)
Re-evaluation of known HF (systolic or diastolic) with a change in clinical status or cardiac examination with a clear precipitating change in medication or diet	4/M	1/R
Periodic re-evaluation in a patient undergoing therapy with cardiotoxic agents and worsening symptoms	9/A	7/A
Re-evaluation after revascularization and/or optimal medical therapy to determine candidacy for device therapy and/ or to determine optimal choice of device	8/A	1/R
Re-evaluation for CRT device optimization in a patient with worsening HF (*Gated-SPECT for this indication only)	8/A	4/M
Re-evaluation for ventricular assist device-related complication or infection is suspected (*FDG PET in this indication is for infection detection)	8/A	1/R
Re-evaluation for progression of pericardial effusion size or development of tamponade	9/A	1/R
Re-evaluation for progression of pericardial constriction	8/A	1/R
Evaluation of patient with pericardial mass and symptoms suggestive of expansion	8/A	1/R
Re-evaluation of known ascending aortic dilatation or history of aortic dissection with a change in clinical status (excluding acute coronary syndrome) or cardiac examination or when findings may alter management or therapy	8/A	1/R
Re-evaluation of known pulmonary hypertension with change in clinical status or cardiac examination or to guide therapy	8/A	1/R

Table 6: Nonvalvular Heart Disease, Patients Undergoing Transcatheter Intervention, Imaging for the Evaluation of transient ischemic attack (TIA) or Ischemic Stroke

	TTE (with agitated saline injection; with or without 3D; with contrast as needed) (score/rating*)
Initial evaluation of patient to exclude cardiac origin of TIA or ischemic stroke: (Intracardiac masses (thrombus, vegetation);Valvular pathology	8/A
Provocative maneuvers (Valsalva, cough) to assess for the presence of: Right-to-left intracardiac shunt	8/A

Table 7A: Nonvalvular Heart Disease, Imaging for the Evaluation of Patent Foramen Ovale or Atrial Septal Defect, Preprocedural Evaluation for Closure of PFO or Atrial Septal Defect

	TTE (with agitated saline injection; with or without 3D; with contrast as needed) (score/rating*)
Preprocedure assessment for PFO: Atrial appendage thrombus; Spontaneous echo contrast (slow blood flow); Aortic atheroma; Cardiac masses; Vegetations	7/A
Preprocedure assessment for: Atrial septum anatomy; Atrial septum aneurysm; Suitability for percutaneous device closure	7/A

Table 7B: Nonvalvular Heart Disease, Imaging for the Evaluation of Patent Foramen Ovale or Atrial Septal Defect, Intra-Procedural Guidance for Closure of PFO or ASD

	TTE (with agitated saline injection; with or without 3D; with contrast as needed) (score/rating*)
Intraprocedural guidance in patient with either: ASD of simple anatomy; No aneurysmal atrial septum; PFO with short tunnel	3/R
Intraprocedural guidance in patient with either: ASD with complex anatomy; Aneurysmal interatrial septum; PFO with long tunnel	3/R

Table 7C: Nonvalvular Heart Disease, Imaging for the Evaluation of Patent Foramen Ovale or Atrial Septal Defect, Assessment Following Closure of PFO or ASD

	TTE (with agitated saline injection; with or without 3D; with contrast as needed) (score/rating*)
6-month routine scheduled follow-up ASD/PFO device closure for position of device and integrity of device; PFO patency; Thrombus formation	7/A
Nonroutine follow up of ASD/PFO device closure and clinical concern for infection, malposition, embolization or persistent shunt.	8/A

Table 8A: Nonvalvular Heart Disease, Imaging for the Evaluation of Left Atrial Appendage (LAA) Occlusion Device, Pre-Procedural Evaluation for LAA Occlusion

	TTE (with or without 3D; with contrast as needed) (score/rating*)
Evaluate for: All cardiac chambers; LV function; Interatrial septum; Valve function	8/A
Evaluate for: LA/LAA thrombus; Spontaneous echo contrast/slow blood flow	5/M
Assess: LAA morphology; Baseline LAA dimensions; Ostial morphology and dimension; Maximum length of dominant lobe	6/M

Table 8B: Nonvalvular Heart Disease, Imaging for the Evaluation of Left Atrial Appendage (LAA) Occlusion Device, Intraprocedural Guidance for LAA Occlusion

	TTE (with or without 3D; with contrast as needed) (score/rating*)
Screen for procedural complications	7/A

Table 8C: Nonvalvular Heart Disease, Imaging for the Evaluation of Left Atrial Appendage (LAA) Occlusion Device, Assessment Following LAA Occlusion

	TTE (with or without 3D) (score/rating*)
Prior to discharge to assess: Device position; Presence of pericardial effusion; Presence of thrombus around the device; Mitral valve function; LV function	6/M
Surveillance at 45 days or FDA guidance/guidelines for follow-up: Assess device stability; Exclude migration, displacement, or erosion; Assess device leak	4/M
Long-term follow-up (assume device integrity) (Doherty et al., 2019)	5/M

*See Appendix for ACC definitions for Scores / Ratings

AMERICAN COLLEGE OF CARDIOLOGY (ACC) GUIDELINES

AHA/ACC Guideline for the Management of Hypertrophic Cardiomyopathy (Ommen et al., 2024)

Note: For children, the diagnostic criteria are confounded by needing to adjust for body size and growth. (Ommen, at al., 2024) states "We propose that the diagnosis of HCM in children should therefore consider the circumstances of screening and the pretest probability of disease: a threshold of a z-score >2.5 may be appropriate to identify early HCM in asymptomatic children with no family history, whereas for children with a definitive family history or a positive genetic test, a threshold of a z-score >2 may suffice for early diagnosis."

2024 AHA/ACC Guideline for the Management of Hypertrophic Cardiomyopathy (HCM) (Ommen, et al., 2024)	Class of Recommendation (COR) and Level of Evidence (LOE)*
6.2 Echocardiography	
In patients with suspected HCM, a transthoracic echocardiogram (TTE) is recommended in the initial evaluation.	COR:1; LOE: B-NR*
In patients with HCM who have no change in clinical status or events, repeat TTE is recommended every 1 to 2 years to assess the degree of myocardial hypertrophy, dynamic left ventricular outflow tract obstruction (LVOTO), mitral regurgitation (MR), and myocardial function.	COR:1; LOE: B-NR (children) COR:1; LOE: C-LD (adults)
For patients with HCM who experience a change in clinical status or a new clinical event, repeat TTE is recommended.	COR:1; LOE: B-NR

2024 AHA/ACC Guideline for the Management of Hypertrophic Cardiomyopathy (HCM) (Ommen, et al., 2024)	Class of Recommendation (COR) and Level of Evidence (LOE)*
For patients with HCM and resting peak left ventricular outflow tract (LVOT) gradient <50 mm Hg, a TTE with provocative maneuvers is recommended.	COR:1; LOE: B-NR
For symptomatic patients with HCM who do not have a resting or provocable outflow tract peak gradient ≥50 mm Hg on TTE, exercise TTE is recommended for the detection and quantification of dynamic LVOTO.	COR:1; LOE: B-NR
For patients with HCM who are undergoing surgical septal myectomy, intraoperative transesophageal echocardiogram (TEE) is recommended to assess mitral valve anatomy and function and adequacy of septal myectomy.	COR:1; LOE: B-NR
For patients with HCM who are undergoing alcohol septal ablation, TTE or intraoperative TEE with intracoronary ultrasound-enhancing contrast injection of the candidate's septal perforator(s) is recommended.	COR:1; LOE: B-NR
For patients with HCM who have undergone septal reduction therapy (SRT), TTE within 3 to 6 months after the procedure is recommended to evaluate the procedural results.	COR:1; LOE: B-NR
Screening: In first-degree relatives of patients with HCM, a TTE is recommended as part of initial family screening and periodic follow-up.	COR:1; LOE: B-NR
Screening: In individuals who are genotype-positive, phenotype-negative, echocardiography is recommended at periodic intervals depending on age (1-2 years in children and adolescents, 3-5 years in adults) and change in clinical status.	COR:1; LOE: B-NR
For patients with HCM, TEE can be useful if TTE is inconclusive in clinical decision-making regarding medical therapy, and in situations such as planning for myectomy, exclusion of subaortic membrane or MR secondary to structural abnormalities of the mitral valve apparatus, or in the assessment of the feasibility of alcohol septal ablation.	COR:2a; LOE: C-LD
For patients with HCM in whom the diagnosis of apical HCM, apical aneurysm, or atypical patterns of hypertrophy is inconclusive on TTE, the use of an intravenous ultrasound-enhancing agent is reasonable, particularly if other imaging modalities such as CMR are not readily available or are contraindicated.	COR:2a; LOE: B-NR
For asymptomatic patients with HCM who do not have a resting or provocable outflow tract peak gradient ≥50 mm Hg on standard TTE, exercise TTE is reasonable for the detection and quantification of dynamic LVOTO.	COR:2a; LOE: C-LD
6.7. Exercise Stress Testing	
For symptomatic patients with HCM who resting or provocable outflow tract peak gradient do not have ≥50 mm Hg on TTE, exercise TTE is recommended for the detection and quantification of dynamic LVOTO.	COR:1; LOE: B-NR
For asymptomatic patients with HCM who do not have a resting or provocable outflow tract peak gradient ≥50 mm Hg on standard TTE, exercise TTE is reasonable for the detection and quantification of dynamic LVOTO	COR:2a; LOE: C-LD

2024 AHA/ACC Guideline for the Management of Hypertrophic Cardiomyopathy (HCM) (Ommen, et al., 2024)	Class of Recommendation (COR) and Level of Evidence (LOE)*
(Ommen, et al., 2024).	

*See Appendix for ACC/AHA Class of Recommendation and Level of Evidence

ACC/AHA Guideline for the Diagnosis and Management of Atrial Fibrillation (Joglar, et al., 2023)

2023 ACC/AHA Guideline for the Diagnosis and Management of Atrial Fibrillation	Class of Recommendation (COR) and Level of Evidence (LOE)*
In patients with newly diagnosed AF, a transthoracic echocardiogram to assess cardiac structure (Joglar, et al., 2023).	COR:1; LOE: B-NR*

*****See Appendix for ACC/AHA Class of Recommendation and Level of Evidence

ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease (Isselbacher, et al., 2022)

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease	Class of Recommendation (COR) and Level of Evidence (LOE)*
6.1.2.1. Heritable thoracic aortic disease (HTAD): Genetic Testing and Screening of Family Members for thoracic aortic disease (TAD) Recommendations for HTAD: Genetic Testing and Screening of Family Members for TAD: • In patients with TAD who have a pathogenic/likely pathogenic variant, genetic testing of at-risk biological relatives (i.e., cascade testing) is recommended. In family members who are found by genetic screening to have inherited the pathogenic/likely pathogenic variant, aortic imaging with TTE (if aortic root and ascending aorta are adequately visualized, otherwise with CT or MRI) is recommended.	COR:1; LOE: B-NR
6.1.2.2.1. Diagnostic and Surveillance Aortic Imaging in Marfan Syndrome Initial Diagnosis and Surveillance Imaging Recommendations for Diagnostic and Surveillance Aortic Imaging in Marfan Syndrome: • In patients with Marfan syndrome, a TTE is recommended at the time of initial diagnosis, to determine the diameters of the aortic root and ascending aorta, and 6 months thereafter, to determine the rate of aortic growth; if the aortic diameters are stable, an annual surveillance TTE is recommended. If the aortic root, ascending aorta, or both are not adequately visualized on TTE, a CT or MRI of the thoracic aorta is recommended.	COR:1; LOE: C-EO

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease	Class of Recommendation (COR) and Level of Evidence (LOE)*
6.1.2.3.1. Imaging in Loeys-Dietz Syndrome Recommendations for Imaging in Loeys-Dietz Syndrome: • In patients with Loeys-Dietz syndrome, a baseline TTE is recommended to determine the diameters of the aortic root and ascending aorta, and 6 months thereafter to determine the rate of aortic growth; if the aortic diameters are stable, annual surveillance TTE is recommended.	COR:1; LOE: C-EO
6.1.2.5. Turner Syndrome Recommendations for Diagnostic Testing, Surveillance, and Surgical Intervention for Aortic Dilation in Turner Syndrome: • In patients with Turner syndrome, TTE and cardiac MRI are recommended at the time of diagnosis to evaluate for bicuspid aortic valve (BAV), aortic root and ascending aortic dilation, aortic coarctation, and other congenital heart defects. • In patients with Turner syndrome without risk factors for aortic dissection, surveillance imaging with TTE or MRI to evaluate the aorta is recommended every 5 years in children and every 10 years in adults, as well as before planning a pregnancy.	COR:1; LOE: B-NR COR:1; LOE: C-LD
6.1.3. Bicuspid aortic valve (BAV) Aortopathy Recommendations for BAV Aortopathy: • In patients with a BAV, TTE is indicated to evaluate valve morphology and function, to evaluate the diameter of the aortic root and ascending aorta, and to evaluate for aortic coarctation and other associated cardiovascular defects. • In patients with a BAV and a dilated aortic root or ascending aorta, screening of all first-degree relatives by TTE is recommended to evaluate for the presence of a BAV, dilation of the aortic root and ascending aorta, or both; if the diameter and morphology of the aortic root, ascending aorta, or both cannot be assessed accurately or completely by TTE, a cardiac gated CT or MRI of the thoracic aorta is indicated. • In patients with a BAV, screening of all first-degree relatives by TTE is reasonable to evaluate for the presence of a BAV, dilation of the aortic root and ascending aorta, or both.	COR:1; LOE: B-NR COR:1; LOE: C-LD COR:2a; LOE: B-NR
6.1.3.1. Routine Follow-Up of BAV Disease Aortopathy Recommendations for Routine Follow-Up of BAV Disease Aortopathy: • In patients with a BAV who have undergone previous aortic valve repair or replacement and have a diameter of the aortic root, ascending aortic, or both of ≥4.0 cm, lifelong surveillance imaging of the aortic root and ascending aorta by	COR:1; LOE: B-NR

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease	Class of Recommendation (COR) and Level of Evidence (LOE)*
TTE, CT, or MRI is recommended at an interval dependent on aortic diameter and rate of growth. • In patients with a BAV and a diameter of the aortic root, ascending aorta, or both of ≥4.0 cm, lifelong surveillance imaging of the aortic root and ascending aorta by TTE, CT, or MRI is recommended at an interval dependent on aortic diameter and rate of growth.	COR:1; LOE: C-LD
6.4.3.1. Surveillance of Thoracic Aortic Dilation and Aneurysm Recommendations for Surveillance of Thoracic Aortic Dilation and Aneurysm: • In patients with a dilated thoracic aorta, a TTE is recommended at the time of diagnosis to assess aortic valve anatomy, aortic valve function, and thoracic aortic diameters. • In patients with a dilated thoracic aorta, follow-up imaging (with TTE, CT, or MRI, as appropriate based on individual anatomy) in 6 to 12 months is reasonable to determine the rate of aortic enlargement; if stable, surveillance imaging every 6 to 24 months (depending on aortic diameter) is reasonable.	COR:1; LOE: C-LD COR:2a; LOE: C-LD
8.1. Counseling and Management of Aortic Disease in Pregnancy and Postpartum Recommendations for Counseling and Management of Aortic Disease in Pregnancy and Postpartum: • Pre-pregnancy: In patients with syndromic and nonsyndromic heritable thoracic aortic disease (nsHTAD), Turner syndrome, BAV with aortic dilation, and other aortopathy conditions, aortic imaging (with TTE, MRI or CT, or both as appropriate) before pregnancy is recommended to determine aortic diameters. • During Pregnancy: In pregnant patients with an aortopathic condition or a dilated aortic root or ascending aorta, surveillance TTE to monitor aortic diameters and aortic valve function is recommended each trimester and again several weeks postpartum, although imaging may be more frequent depending on aortic diameter, aortic growth rate, and underlying condition (Isselbacher, et al., 2022).	COR:1; LOE: C-LD COR:1; LOE: C-LD

*See Appendix for ACC/AHA Class of Recommendation and Level of Evidence

AHA/ACC/HFSA Guideline for the Management of Heart Failure (Heidenreich, et al., 2022)

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure	Class of Recommendation (COR) and Level of Evidence (LOE)*
4.4. Evaluation With Cardiac Imaging Recommendations for Evaluation With Cardiac Imaging Recommendation: In patients with suspected or newly diagnosed heart failure, transthoracic echocardiography (TTE) should be performed during initial evaluation to assess cardiac structure and function (Heidenreich, et al., 2022).	COR: 1; LOE: C-LD

*See Appendix for ACC/AHA Class of Recommendation and Level of Evidence definitions

2021 American Heart Association (AHA)/ American College of Cardiology (ACC) Guideline for the Evaluation and Diagnosis of Chest Pain (Gulati, et al., 2021)

2021 AHA/ACC Guideline for the Evaluation and Diagnosis of Chest Pain	Class of Recommendation (COR) and Level of Evidence (LOE)*
4.1.2. Intermediate-Risk Patients With Acute Chest Pain For intermediate-risk patients with acute chest pain, TTE is recommended as a rapid, bedside test to establish baseline ventricular and valvular function, evaluate for wall motion abnormalities, and to assess for pericardial effusion.	COR: 1; LOE: C-EO
4.2. Evaluation of Acute Chest Pain With Nonischemic Cardiac Pathologies In patients with acute chest pain in whom other potentially life-threatening nonischemic cardiac conditions are suspected (e.g., aortic pathology, pericardial effusion, endocarditis), TTE is recommended for diagnosis.	COR: 1; LOE: C-EO
4.2.3. Acute Chest Pain With Suspected Myopericarditis In patients with acute chest pain and suspected myopericarditis, TTE is effective to determine the presence of ventricular wall motion abnormalities, pericardial effusion, valvular abnormalities, or restrictive physiology.	COR: 1; LOE: C-EO
4.2.4. Acute Chest Pain With Valvular Heart Disease (VHD) In patients presenting with acute chest pain with suspected or known history of VHD, TTE is useful in determining the presence, severity, and cause of VHD. In patients presenting with acute chest pain with suspected or known VHD in whom TTE diagnostic quality is inadequate, TEE (with 3D imaging if available) is useful in determining the severity and cause of VHD.	COR: 1; LOE: C-EO COR: 1; LOE: C-EO

2021 AHA/ACC Guideline for the Evaluation and Diagnosis of Chest Pain	Class of Recommendation (COR) and Level of Evidence (LOE)*
In patients presenting with acute chest pain with known or suspected VHD, CMR imaging is reasonable as an alternative to TTE and/or TEE is nondiagnostic.	COR: 2a; LOE: C-EO
5.1.3. Intermediate-High Risk Patients With Stable Chest Pain and No Known CAD Assessment of Left Ventricular Function: In intermediate-high risk patients with stable chest pain who have pathological Q waves, symptoms or signs suggestive of heart failure, complex ventricular arrhythmias, or a heart murmur with unclear diagnosis, use of TTE is effective for diagnosis of resting left ventricular systolic and diastolic ventricular function and detection of myocardial, valvular, and pericardial abnormalities (Gulati, et al., 2021)	COR: 1; LOE: B-NR

*See Appendix for ACC/AHA Class of Recommendation and Level of Evidence definitions

2020 American College of Cardiology (ACC) / American Heart Association (AHA) Guideline for the Management of Patients With Valvular Heart Disease (Otto, et al., 2021)

Note: TTE is the standard initial diagnostic test in the initial evaluation of patients with known or suspected VHD.

2021 AHA/ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease	Class of Recommendation (COR) and Level of Evidence (LOE)*
2.7.4. Periodic Imaging After Valve Intervention In asymptomatic patients with any type of valve intervention, a baseline postprocedural TTE followed by periodic monitoring with TTE is recommended, depending on type of intervention, length of time after intervention, ventricular function, and concurrent cardiac conditions.	COR: 1; LOE: C-EO
3.2.1.1. Diagnostic Testing: Initial Diagnosis of Aortic Stenosis (AS) In patients with signs or symptoms of AS or a bicuspid aortic valve (BAV), TTE is indicated for accurate diagnosis of the cause of AS, assessment of hemodynamic severity, measurement of LV size and systolic function, and determination of prognosis and timing of valve intervention. In patients with suspected low-flow, low-gradient severe AS with normal LVEF (Stage D3), optimization of blood pressure control is recommended before measurement of AS severity by TTE, TEE, cardiac catheterization, or CMR	COR: 1; LOE: A COR: 1; LOE: B-NR
4.3.1. Diagnosis of Chronic Aortic Regurgitation (AR)	

2021 AHA/ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease	Class of Recommendation (COR) and Level of Evidence (LOE)*
In patients with signs or symptoms of AR, TTE is indicated for assessment of the cause and severity of regurgitation, LV size and systolic function, prognosis, and timing of valve intervention	COR: 1; LOE: B-NR
In patients with a BAV or with known dilation of the aortic sinuses or ascending aorta, TTE is indicated to evaluate the presence and severity of AR.	COR: 1; LOE: B-NR
In patients with moderate or severe AR and suboptimal TTE images or a discrepancy between clinical and TTE findings, TEE, CMR, or cardiac catheterization is indicated for the assessment of LV systolic function, systolic and diastolic volumes, aortic size, and AR severity	COR: 1; LOE: B-NR
5.1.1.1. Diagnostic Testing: Initial Diagnosis of BAV	
In patients with a known BAV, TTE is indicated to evaluate valve morphology, measure severity of AS and AR, assess the shape and diameter of the aortic sinuses and ascending aorta, and evaluate for the presence of aortic coarctation for prediction of clinical outcome and to determine timing of intervention	COR: 1; LOE: B-NR
In first-degree relatives of patients with a known BAV, a screening TTE might be considered to look for the presence of a BAV or asymptomatic dilation of the aortic sinuses and ascending aorta.	COR: 2b; LOE: B-NR
6.2.1.1. Diagnostic Testing: Initial Diagnosis of Rheumatic MS	
In patients with signs or symptoms of rheumatic MS, TTE is indicated to establish the diagnosis, quantify hemodynamic severity, assess concomitant valvular lesions, and demonstrate valve morphology (to determine suitability for mitral commissurotomy)	COR: 1; LOE: B-NR
7.2.2.1. Diagnostic Testing: Initial Diagnosis of Chronic MR	
In patients with known or suspected primary MR, TTE is indicated for baseline evaluation of LV size and function, RV function, LA size, pulmonary artery pressure, and the mechanism and severity of primary MR (Stages A to D)	(COR: 1; LOE: B-NR)
In patients with primary MR, when TTE provides insufficient or discordant information, TEE is indicated for evaluation of the severity of MR, mechanism of MR, and status of LV function (Stages B to D).	COR: 1; LOE: C-EO
7.2.2.2. Diagnostic Testing: Changing Signs or Symptoms in Patients With Primary MR	
In patients with primary MR (Stages B to D) and new-onset or changing symptoms, TTE is indicated to evaluate the mitral valve apparatus and LV function	COR: 1; LOE: B-NR
7.2.2.3. Diagnostic Testing: Routine Follow-Up for Chronic Primary MR	

2021 AHA/ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease	Class of Recommendation (COR) and Level of Evidence (LOE)*
For asymptomatic patients with severe primary MR (Stages B and C1), TTE is indicated every 6 to 12 months for surveillance of LV function (estimated by LVEF, LVEDD, and LVESD) and assessment of pulmonary artery pressure	COR: 1; LOE: B-NR
7.3.2. Diagnosis of Chronic Secondary MR In patients with chronic secondary MR (Stages B to D), TTE is useful to establish the etiology and to assess the extent of regional and global LV remodeling and systolic dysfunction, severity of MR, and magnitude of pulmonary hypertension.	COR: 1; LOE: B-NR
8.2.1. Diagnosis of Tricuspid Regurgitation (TR) In patients with TR, TTE is indicated to evaluate the presence and severity of TR, determine the etiology, measure the sizes of the right-sided chambers and inferior vena cava, assess RV systolic function, estimate pulmonary artery systolic pressure, and characterize any associated left-sided heart disease	COR: 1; LOE: C-LD
10.1. Diagnosis of Mixed VHD For patients with mixed valve disease, TTE is recommended to assess the etiology, severity, and pathophysiological impact.	COR: 1; LOE: C-EO
11.1.1. Diagnosis and Follow-Up of Prosthetic Valves In patients with a surgical or transcatheter prosthetic valve and in patients who have had valve repair, an initial postprocedural TTE study is recommended for evaluation of valve hemodynamics and ventricular function In patients with a prosthetic valve or prior valve repair and a change in clinical symptoms or signs suggesting valve dysfunction, repeat TTE is recommended.	COR: 1; LOE: B-NR COR: 1; LOE: C-EO
11.1.1. Diagnosis and Follow-Up of Prosthetic Valves In patients with a bioprosthetic surgical valve, TTE at 5 and 10 years and then annually after implantation is reasonable, even in the absence of a change in clinical status. In patients with a bioprosthetic TAVI, TTE annually is reasonable.	COR: 2a; LOE: C-LD COR: 2a; LOE: C-LD
11.6.1. Diagnosis of Acute Mechanical Valve Thrombosis In patients with suspected mechanical prosthetic valve thrombosis, urgent evaluation with TTE, TEE, fluoroscopy, and/or multidetector CT imaging is indicated to assess valve function, leaflet motion, and the presence and extent of thrombus	COR: 1; LOE: B-NR
11.8.1. Diagnosis of Prosthetic Valve Stenosis	COR: 1; LOE: B-NR

2021 AHA/ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease	Class of Recommendation (COR) and Level of Evidence (LOE)*
In patients with suspected mechanical or bioprosthetic valve stenosis, TTE and TEE are recommended to diagnosis the cause and severity of valve obstruction, assess ventricular function, and estimate pulmonary artery systolic pressure	
11.9.1. Diagnosis of Prosthetic Valve Regurgitation In patients with suspected mechanical or bioprosthetic valve regurgitation, TTE and TEE are recommended to determine the cause and severity of the leak, assess ventricular function, and estimate pulmonary artery systolic pressure	COR: 1; LOE: B-NR
12.2. Diagnosis of IE In patients with suspected IE, TTE is recommended to identify vegetations, characterize the hemodynamic severity of valvular lesions, assess ventricular function and pulmonary pressures, and detect complications In patients with IE who have a change in clinical signs or symptoms (e.g., new murmur, embolism, persistent fever, HF, abscess, or atrioventricular heart block) and in patients at high risk of complications (e.g., extensive infected tissue, large vegetation on initial echocardiogram, or staphylococcal, enterococcal, or fungal infections), TTE and/or TEE are recommended for reevaluation	COR: 1; LOE: B-NR COR: 1; LOE: B-NR
13.1. Initial Management of Women With VHD Before and During Pregnancy Women with suspected valve disease who are considering pregnancy should undergo a clinical evaluation and TTE before pregnancy. (Otto, et al., 2021)	COR: 1; LOE: B-NR

*****See Appendix for ACC/AHA Class of Recommendation and Level of Evidence

AMERICAN SOCIETY OF ECHOCARDIOGRAPHY

2022 American Society of Echocardiography (ASE) Recommendations for Multimodality Cardiovascular Imaging of Patients with Hypertrophic Cardiomyopathy (Nagueh, et al., 2022):

ASE Recommendations for Multimodality Cardiovascular Imaging of Patients with Hypertrophic Cardiomyopathy
Assessment of Left Ventricular Systolic Function: • Assessment of global longitudinal strain adds important prognostic data and may be performed in centers with experience and expertise with using strain echocardiography.

2022 American Society of Echocardiography (ASE): Non-Invasive Imaging in Coronary Syndromes (Edvardsen, et al., 2022):

ASE Non-Invasive Imaging in Coronary Syndromes
Left Ventricular Function Assessment • TTE should be used as the initial imaging modality for the assessment of LV systolic function. If initial echocardiographic images are of limited quality (two or more contiguous segments cannot be properly seen), an ultrasound enhancing agents (UEA) should be used for better endocardial delineation.

AMERICAN ACADEMY OF PEDIATRICS

The AAP Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents (Wolraich, et al., 2019) states the following:

- Stimulant medications, on average, increase patient heart rate (HR) and blood pressure (BP) to a mild and clinically insignificant degree. However, because stimulants have been linked to more substantial increases in HR and BP in a subset of individuals (5%–15%), clinicians are encouraged to monitor these vital signs in patients receiving stimulant treatment. Although concerns have been raised about sudden cardiac death among children and adolescents using stimulant and medications, it is an extremely rare occurrence. In fact, stimulant medications have not been shown to increase the risk of sudden death beyond that observed in children who are not receiving stimulants. Nevertheless, before initiating therapy with stimulant medications, it is important to obtain the child or adolescent's history of specific cardiac symptoms in addition to the family history of sudden death, cardiovascular symptoms, Wolff-Parkinson-White syndrome, hypertrophic cardiomyopathy, and long QT syndrome. If any of these risk factors are present, clinicians should obtain additional evaluation to ascertain and address potential safety concerns of stimulant medication use by the child or adolescent.

- Among nonstimulants, the risk of serious cardiovascular events is extremely low, as it is for stimulants.

- Clinicians are recommended to not only obtain the personal and family cardiac history, as detailed above, but also to perform additional evaluation if risk factors are present before starting nonstimulant medications (i.e., perform an electrocardiogram [ECG] and possibly refer to a pediatric cardiologist if the ECG is not normal).

Health Equity Considerations

Health equity is the highest level of health for all people; health inequity is the avoidable difference in health status or distribution of health resources due to the social conditions in which people are born, grow, live, work, and age.

Social determinants of health are the conditions in the environment that affect a wide range of health, functioning, and quality of life outcomes and risks. Examples include safe housing, transportation, and neighborhoods; racism, discrimination and violence; education, job opportunities and income; access to nutritious foods and physical activity opportunities; access to clean air and water; and language and literacy skills.

Medicare Coverage Determinations

	Contractor	Determination Name/Number	Revision Effective Date
NCD		No National Coverage Determination found	
LCD		numerous	

Note: Please review the current Medicare Policy for the most up-to-date information.
(NCD = National Coverage Determination; LCD = Local Coverage Determination)

Appendix

The Class (Strength) of Recommendation (COR) indicates the strength of recommendation, encompassing the estimated magnitude and certainty of benefit in proportion to risk.

Class I – Strong (is recommended)
Class 2a – Moderate (is reasonable)
Class 2b – Weak (may/might be reasonable)
Class 3 – No benefit (Moderate) (is not recommended)
Class 3 – Harm (Strong) (potentially harmful)

The Level (Quality) of Evidence (LOE) rates the quality of scientific evidence supporting the intervention on the basis of the type, quantity, and consistency of data from clinical trials and other sources.

Level A – High quality evidence from more than one randomized clinical trial, Meta-analyses of high-quality randomized clinical trials, one or more randomized clinical trials corroborated by high-quality registry.
Level B-R – Randomized. Moderate quality evidence from one or more randomized clinical trials, Meta-analyses of moderate-quality randomized clinical trials.
Level B-NR – Non-randomized. Moderate quality evidence from one or more well-designed, well-executed nonrandomized studies, observational studies, or registry studies, Meta-analyses of such studies.
Level C-LD – Limited data. Randomized or nonrandomized observational or registry studies with limitations of design or execution, Meta-analyses of such studies, Physiological or mechanistic studies of human subjects.
Level C-EO – Expert Opinion. Consensus expert opinion based on the clinical experience

Scores / Ratings:

- A = Appropriate. Median Score 7 to 9: Appropriate test for specific indication (test is generally acceptable and is a reasonable approach for the indication).
- M = May be appropriate. Median Score 4 to 6: May Be Appropriate test for specific indication (test may be generally acceptable and may be a reasonable approach for the indication). May Be Appropriate also implies that more research and/or patient information is needed to classify the indication definitively.
- R = Rarely appropriate. Median Score 1 to 3: Rarely Appropriate test for specific indication (test is not generally acceptable and is not a reasonable approach for the indication).

References

1. American College of Cardiology Foundation. Guidelines and Clinical Documents. Accessed Nov 2025. Available at URL address: https://www.acc.org/Guidelines https://www.acc.org/Guidelines#/tab0 (Guidelines) https://www.acc.org/Guidelines#/tab4 (Appropriate Use Criteria)

2. American College of Cardiology Foundation Appropriate Use Criteria Task Force; American Society of Echocardiography; American Heart Association; American Society of Nuclear Cardiology; Heart Failure Society of America; Heart Rhythm Society, et al. ACCF/ASE/AHA/ASNC/HFSA/HRS/SCAI/SCCM/SCCT/SCMR 2011 Appropriate Use Criteria for Echocardiography. A Report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, American Society of Echocardiography, American Heart Association, American Society of Nuclear Cardiology, Heart Failure Society of America, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Critical Care Medicine, Society of Cardiovascular Computed Tomography, and Society for Cardiovascular Magnetic Resonance Endorsed by the American College of Chest Physicians. J Am Coll Cardiol. 2011 Mar 1;57(9):1126-66.

3. American Heart Association. Guidelines and Statements Search. Accessed Nov 2025. Available at URL address: https://professional.heart.org/en/guidelines-and-statements/guidelines-and-statements-search https://www.heart.org/en/get-involved/advocate/policy-research/our-policy-positions

4. American Society of Echocardiography. ASE Guidelines. Accessed Nov 2025. Available at URL address: https://www.asecho.org/guidelines-search/

5. Amzulescu MS, De Craene M, Langet H, Pasquet A, Vancraeynest D, et al. Myocardial strain imaging: review of general principles, validation, and sources of discrepancies. Eur Heart J Cardiovasc Imaging. 2019 Jun 1;20(6):605-619

6. Bhatia RS, Ivers NM, Yin XC, Myers D, Nesbitt GC, Edwards J, et al. Improving the Appropriate Use of Transthoracic Echocardiography: The Echo WISELY Trial. J Am Coll Cardiol. 2017 Aug 29;70(9):1135-1144.

7. Centers for Disease Control and Prevention. Multisystem Inflammatory Syndrome (MIS). Page last reviewed: Sept 8, 2025. Accessed Nov 2024. Available at URL address: https://www.cdc.gov/mis/about/

8. Centers for Medicare and Medicaid Services (CMS). Medicare Coverage Database. Accessed Oct 2025. Available at URL address: https://www.cms.gov/medicare-coverage-database/search.aspx

9. Doherty JU, Kort S, Mehran R, Schoenhagen P, Soman P, Dehmer GJ, et al. 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: A Report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and the Society of Thoracic Surgeons. J Am Coll Cardiol. 2019 Feb 5;73(4):488-516.

10. Edvardsen T, Asch FM, Davidson B, Delgado V, DeMaria A, et al. Non-Invasive Imaging in Coronary Syndromes: Recommendations of The European Association of Cardiovascular Imaging and the American Society of Echocardiography, in Collaboration with The American Society of Nuclear Cardiology, Society of Cardiovascular Computed Tomography, and Society for Cardiovascular Magnetic Resonance. J Am Soc Echocardiogr. 2022 Apr;35(4):329-354.

11. Garg V, Vorobiof G. Echocardiography and Alternative Cardiac Imaging Strategies for Long-Term Cardiotoxicity Surveillance of Cancer Survivors Treated with Chemotherapy and/or Radiation Exposure. Curr Oncol Rep. 2016 Aug;18(8):52.

12. Heidenreich PA, Bozkurt B, Aguilar D, Allen LA, Byun JJ, Colvin MM, et al. 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. J Am Coll Cardiol. 2022 May 3;79(17):e263-e421.

13. Joglar JA, Chung MK, Armbruster AL, Benjamin EJ, Chyou JY, et al. 2023 ACC/AHA/ACCP/HRS Guideline for the Diagnosis and Management of Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2024 Jan 2;149(1):e1-e156

14. Mitchell C, Rahko PS, Blauwet LA, Canaday B, Finstuen JA, et al. Guidelines for Performing a Comprehensive Transthoracic Echocardiographic Examination in Adults: Recommendations from the American Society of Echocardiography. J Am Soc Echocardiogr. 2019 Jan;32(1):1-64.

15. Morris SB, Schwartz NG, Patel P, Abbo L, Beauchamps L, et al. Case Series of Multisystem Inflammatory Syndrome in Adults Associated with SARS-CoV-2 Infection - United Kingdom and United States, March-August 2020. MMWR Morb Mortal Wkly Rep. 2020 Oct 9;69(40):1450-1456.

16. Nagueh SF, Phelan D, Abraham T, Armour A, Desai MY, et al. Recommendations for Multimodality Cardiovascular Imaging of Patients with Hypertrophic Cardiomyopathy: An Update from the American Society of Echocardiography, in Collaboration with the American Society of Nuclear Cardiology, the Society for Cardiovascular Magnetic Resonance, and the Society of Cardiovascular Computed Tomography. J Am Soc Echocardiogr. 2022 Jun;35(6):533-569.

17. Oikonomou EK, Kokkinidis DG, Kampaktsis PN, Amir EA, Marwick TH, et al. Assessment of Prognostic Value of Left Ventricular Global Longitudinal Strain for Early Prediction of Chemotherapy-Induced Cardiotoxicity: A Systematic Review and Meta-analysis. JAMA Cardiol. 2019 Oct 1;4(10):1007-1018.

18. Ommen SR, Ho CY, Asif IM, Balaji S, Burke MA, Day SM, et al. 2024 AHA/ACC/AMSSM/HRS/PACES/SCMR Guideline for the Management of Hypertrophic Cardiomyopathy: A Report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. Circulation. 2024 Jun 4;149(23):e1239-e1311.

19. Otto CM, Nishimura RA, Bonow RO, Carabello BA, Erwin JP 3rd, Gentile F, et al. 2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2021 Feb 2;143(5):e35-e71.

20. Pandian NG, Kim JK, Arias Godinez JA, Marx GR, Michelena HI, et al. Recommendations for the Use of Echocardiography in the Evaluation of Rheumatic Heart Disease: A Report from the American Society of Echocardiography. J Am Soc Echocardiogr. 2022 Nov 22:S0894-7317(22)00521-1.

21. Sachdeva R, Valente AM, Armstrong AK, Cook SC, Han BK, et al. 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: A Report of the American College of Cardiology Solution Set Oversight Committee and Appropriate Use Criteria Task Force, American Heart Association, American Society of Echocardiography, Heart Rhythm Society, International Society for Adult Congenital Heart Disease, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and Society of Pediatric Echocardiography. J Am Coll Cardiol. 2020 Feb 18;75(6):657-703.

22. Thavendiranathan P, Poulin F, Lim KD, Plana JC, Woo A, Marwick TH. Use of myocardial strain imaging by echocardiography for the early detection of cardiotoxicity in patients during and after cancer chemotherapy: a systematic review. J Am Coll Cardiol. 2014 Jul 1;63(25 Pt A):2751-68.

23. U.S. Food and Drug Administration (FDA). FINTEPLA® (fenfluramine). New drug application (NDA). NDA 212102. June 25, 2020. Accessed Nov 2025. Available at URL address: https://www.accessdata.fda.gov/scripts/cder/ob/results_product.cfm?Appl_Type=N&Appl_No=212102#39454

24. U.S. Food and Drug Administration (FDA). CAMZYOS™ (mavacamten). New drug application (NDA). NDA 214998. Approval Date Apr 28, 2022. Accessed Nov 2025. Available at URL address: https://www.accessdata.fda.gov/scripts/cder/ob/results_product.cfm?Appl_Type=N&Appl_No=214998#

25. Gulati M, Levy PD, Mukherjee D, Amsterdam E, Bhatt DL, Birtcher KK, et al. 2021 AHA/ACC/ASE/CHEST/SAEM/SCCT/SCMR Guideline for the Evaluation and Diagnosis of Chest Pain: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2021 Nov 30;144(22): e368-e454.

26. Isselbacher EM, Preventza O, Hamilton Black J 3rd, Augoustides JG, Beck AW, et al. 2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease: A Report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines.Circulation. 2022 Dec 13;146(24): e334-e482.

27. Writing Group Members; Doherty JU, Daugherty SL, Kort S, London MJ, Mehran R, Merli GJ, et al. ACC/AHA/ASE/ASNC/HFSA/HRS/SCAI/SCCT/SCMR/STS 2024 Appropriate Use Criteria for Multimodality Imaging in Cardiovascular Evaluation of Patients Undergoing Nonemergent, Noncardiac Surgery. J Am Coll Cardiol. 2024 Oct 8;84(15):1455-1491.

28. Wolraich ML, Hagan JF Jr, Allan C, Chan E, Davison D, Earls M, et al. Subcommittee on Children and Adolescents with Attention-deficit/Hyperactive disorder. Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. Pediatrics. 2019 Oct;144(4): e20192528.

Revision Details

Type of Revision	Summary of Changes	Date

Annual Review	• Editorial update to references listed in policy statement. No change to intent of coverage.	2/15/2026
Focused Review	• No policy statement changes	10/15/2025
Annual Review	• Revised policy statement to include individuals undergoing nonemergent, noncardiac surgery, and to include the diagnosis and management of hypertrophic cardiomyopathy • Removed the 2017 Multimodality Imaging in Valvular Heart Disease Appropriate Use Criteria (AUC) from the policy statement.	02/15/2025