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2025 Echocardiogram (ECHO)

Diagnostic Imaging/Cardiology

CARD-ECHO-HH

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Preamble: Pediatric Cardiology Preamble

HealthHelp's clinical guidelines for the Cardiology program, are intended to apply to both adults and pediatrics (21 years of age or younger), unless otherwise specified within the criteria.

Stress Echocardiogram Contraindications

A stress echocardiogram is contraindicated for **ANY** of the following:

1. Angina is unstable and high-risk.
   References: [24] [9]
2. Aortic dissection is acute.
   References: [24] [9]
3. Aortic stenosis is severe and symptomatic (eg, mean gradient greater than 40 mm Hg or peak velocity greater than 4 m/s).
   References: [24] [9]
4. Cardiac arrhythmias are uncontrolled, with symptoms or instability.
   References: [24] [9]
5. **Contraindications** to dobutamine or atropine, if use is anticipated.
   References: [24] [9]
6. Heart failure is decompensated or unstable with left ventricle ejection fraction (LVEF) less than 35%.
   References: [24] [9]
7. Left ventricular outflow track obstruction (LVOTO) is significant.
   References: [24] [9]
8. Myocardial infarction is acute and within the last 48 hours
   References: [24] [9]
9. Pericarditis or myocarditis is acute.
   References: [24] [9]
10. Pulmonary embolism or pulmonary infarction is acute.
    References: [24] [9]
11. Respiratory failure
    References: [24] [9]

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Stress ECHO Guideline

A stress echocardiogram (ECHO) is considered medically appropriate when the documentation demonstrates **ANY** of the following: (*__NOTE__: *Stress ECHO is preferred for women and children*)

1. Acute coronary syndrome (ACS) occurred recently (last 90 days) and **ALL** of the following: (*__NOTE__: *Dobutamine stress echo [DSE] is indicated when exercise is **NOT** possible [eg, poor functional capacity]*).
    a. Hemodynamically stable
    b. Inducible ischemia evaluation
    c. **NO** prior coronary angiography since event
    d. **NO** recurrent chest pain or signs of heart failure

    References: [26] [8] [3] [5]
2. Aortic stenosis is known and left ventricular ejection fraction is less than 50%. (*__NOTE__: *Dobutamine stress echo [DSE] is indicated*.)
    References: [23] [5]
3. Asymptomatic and **ANY** of the following: (*__NOTE__: *Dobutamine stress echo [DSE] is indicated when exercise is **NOT** possible [eg, poor functional capacity]*)
    a. Comorbidity (eg, diabetes, family history of CAD, peripheral vascular disease) is known.
    b. Coronary artery disease (CAD) is known, for surveillance.
    c. Previous testing demonstrates high risk of CAD (eg, coronary artery calcium score is 400 agatston or more, elevated troponin).

    References: [26] [19] [8] [5] [2022 Stress Echocardiography for Detecting Coronary Ischemia]
4. Chest pain or anginal equivalents (eg, dyspnea, fatigue, vomiting) are known and **ANY** of the following: (*__NOTE__: *Dobutamine stress echo [DSE] is indicated when exercise is **NOT** possible [eg, poor functional capacity]*)
    a. Acute, CAD pretest probability risk is intermediate or high **OR** left ventricular ejection fraction (LVEF) is preserved and **ANY** of the following:
        i. CAD is known and symptoms (eg, chest pain, dyspnea, orthopnea, vomiting) are new or progressing.
        ii. **NO** known CAD
    b. CAD is suspected and resting electrocardiogram (ECG) is abnormal.

c. Prior coronary computed tomography angiography (CCTA) demonstrated moderate stenosis (50% to 69%) **OR** is non-diagnostic or indeterminate.

d. Prior stress imaging or coronary angiography is abnormal, non-diagnostic or indeterminate.

e. Stable and **ANY** of the following:

i. CAD pretest probability risk is intermediate to high or LVEF is reduced **AND NO** known CAD.

ii. Chest pain is stable despite optimal guideline-directed management and therapy (GDMT) **AND** obstructive CAD is known.

iii. Symptoms (eg, chest pain, dsypnea, orthopnea, vomiting) are new or progressing.

References: [26] [9] [19] [2022 Stress Echocardiography for Detecting Coronary Ischemia] [5]

5. Coronary artery disease (CAD) pretest probability is intermediate to high **AND** antiarrhythmic Class IC drug initiation is planned or for annual follow-up until discontinuation. (*__NOTE__: *Dobutamine stress echo [DSE] is indicated when exercise is **NOT** possible [eg, poor functional capacity]*)
References: [26] [5] [2022 Stress Echocardiography for Detecting Coronary Ischemia]

6. Coronary artery stenosis is suspected and prior invasive coronary angiography (ICA) is non-diagnostic or indeterminate.
References: [26] [8]

7. Dyspnea, exertional shortness of breath or hypoxemia is known **AND** cardiac origin is suspected based on prior testing or clinical examination. (*__NOTE__: *Dobutamine stress echo [DSE] is indicated when exercise is **NOT** possible [eg, poor functional capacity]*)
References: [26] [7] [9] [19] [2022 Stress Echocardiography for Detecting Coronary Ischemia] [5]

8. Exercise stress ECG demonstrates an intermediate to high Duke treadmill score (+4 or less). (*__NOTE__: *Dobutamine stress echo [DSE] is indicated when exercise is **NOT** possible [eg, poor functional capacity]*)
References: [26] [19] [5] [2022 Stress Echocardiography for Detecting Coronary Ischemia]

9. Heart failure (HF) is suspected or known and **ANY** of the following:

a. Based on prior testing or signs/symptoms (eg, dyspnea, orthopnea, paroxysmal nocturnal dyspnea, peripheral edema)

b. HF is known with LV systolic dysfunction **AND** asymptomatic, to **EXCLUDE** CAD, when prior testing is non-diagnstic or indeterminate.

References: [26] [7]

10. Hypertrophic cardiomyopathy is suspected and prior testing was non-diagnostic or indeterminate.
References: [26] [7]

11. Intermediate lesions demonstrated on coronary angiography (50% to 70% stenosis), to assess functional severity. (*__NOTE__: *Dobutamine stress echo [DSE] is indicated when exercise is **NOT** possible [eg, poor functional capacity]*)
References: [26] [19] [2022 Stress Echocardiography for Detecting Coronary Ischemia] [5]

12. Kawasaki disease related coronary aneurysms
References: [26] [19]

13. Left bundle branch block (LBBB) is known **AND** CAD is suspected. (*__NOTE__: *Dobutamine stress echo [DSE] is indicated when exercise is **NOT** possible [eg, poor functional capacity]*)
References: [26] [19] [5]

14. Left ventricular systolic dysfunction and **NO** severe valvular disease.
References: [26] [7]

15. Peri-procedural, for pre-procedural planning, intra-operative guidance and post-procedure follow-up (*__NOTE__: *Dobutamine stress echo [DSE] is indicated when exercise is **NOT** possible [eg, poor functional capacity]*)
References: [26] [7] [24] [19] [5]

16. Prior exercise ECG was non-diagnostic or indeterminate.
References: [26]

17. Syncope and CAD pretest probability is intermediate to high. (*__NOTE__: *Dobutamine stress echo [DSE] is indicated when exercise is **NOT** possible [eg, poor functional capacity]*)
References: [26] [5]

18. Valvular disease evaluation demonstrated on doppler ultrasound is chronic and **ANY** of the following: (__NOTE__: *Dobutamine stress echocardiogram [SE])*

    a. Asymptomatic and **ANY** of the following:

        i. Aortic or mitral regurgitation is severe and **NOT** a candidate for surgery due to LV size and function.

        ii. Mitral stenosis is severe.

b. Symptomatic and **ANY** of the following:

i. Aortic stenosis is borderline **AND** low cardiac output or LV systolic dysfunction is known.

ii. Mitral regurgitation or stenosis is moderate.

References: [26] [8]

19. Ventricular arrhythmias and **ANY** of the following:

a. Ventricular tachycardia (VT) is sustained (at more than 100 bpm), ventricular fibrillation (VF) or exercise induced VT **AND NO** prior invasive coronary arteriography.

b. VT is non-sustained, with multiple episodes (each 3 or more beats at 100 or more bpm), exercise induced VT or frequent premature ventricular contractions (PVC's) (remote monitoring demonstrates 30 per hour)

References: [26] [8] [1] [7]

LCD 33577
See also, **LCD 33577**: Transthoracic Echocardiography (TTE) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 34324
See also, **LCD 34324**: Cardiovascular Stress Testing, Including Exercise and/or Pharmacological Stress and Stress Echocardoigraphy at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 34338
See also, **LCD 34338**: Transthoracic Echocardiography (TTE) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 35083
See also, **LCD 35083**: Cardiology Non-emergent Outpatient Stress Testing at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 36889
See also, **LCD 36889**: Cardiovascular Stress Testing, Including Exercise and/or Pharmacological Stress and Stress Echocardiography at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 37379
See also, **LCD 37379**: Echocardography at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 38396
See also, **LCD 38396**: Cardiology Non-Emergent Outpatient Stress Testing at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 38786
See also, **LCD 38786**: Echocardiography for Myocardial Perfusion at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

Stress ECHO Procedure Codes

Table 1. Stress Echocardiogram Associated Procedure Codes

CODE	DESCRIPTION
93350	Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report
93351	Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report; including performance of continuous electrocardiographic monitoring, with physician supervision
C8928	Transthoracic echocardiography with contrast, or without contrast followed by with contrast, real-time with image documentation (2D), includes M-mode recording, when performed, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report
C8930	Transthoracic echocardiography, with contrast, or without contrast followed by with contrast, real-time with image documentation (2D), includes M-mode recording, when performed, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report; including performance of continuous electrocardiographic monitoring, with physician supervision

Transesophageal Echocardiography (TEE)

Preamble: Pediatric Diagnostic Imaging

HealthHelp's clinical guidelines for the Diagnostic Imaging program, are intended to apply to both adults and pediatrics (21 years of age or younger), unless otherwise specified within the criteria.

Transesophageal Echocardiogram (TEE) Contraindications

A transesophageal echocardiogram is contraindicated for **ANY** of the following:

1. Absolute Contraindications:
    a. Esophagectomy, history
    b. Esophageal injury is suspected.
    c. Esophageal pathology, (eg, diverticulum, laceration, stricture, tumor) is known
    d. Perforated viscus
    e. Upper gastrointestinal bleeding is active.

    References: [15]
2. Relative Contraindications:
    a. Barrett's esophagus

b. Coagulopathy or thrombocytopenia is severe (activated partial thromboplastin time and/or prothrombin time is prolonged, decreased fibrinogen levels, elevated fibrin degradation products).

c. Dysphagia history

d. Esophageal dilation or upper gastrointestinal surgery in the past 4 to 6 weeks

e. Esophageal varices

f. Hiatal hernia is symptomatic (eg, epigastric pain, gastroesophageal reflux disease, nausea).

g. Peptic ulcer disease, esophagitis, is active (eg burning, epigastric pain, nocturnal pain).

h. Radiation to neck and chest history

i. Spine mobility, (eg, atlantoaxial instability, severe cervical arthritis) is restricted.

j. Unable to remain immobile for test.

k. Upper gastrointestinal bleeding is recent.

References: [15]

TEE Guideline

A transesophageal echocardiogram (TEE) is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Atrial fibrillation or atrial flutter is known, for treatment planning.
   References: [10] [12]
2. Cardiac structure (eg, atrium, valves, ventricles) and function evaluation (eg, left ventricular ejection fraction [LVEF], diastolic and systolic function) for diagnosis or treatment planning when prior transthoracic echocardiogram (TTE) is non- diagnostic, indeterminate or insufficient, or for follow-up after therapy adjustment.
   References: [9] [20] [12]
3. Chest pain or anginal equivalent (dyspnea, faintness, fatigue) is acute and **ANY** of the following:

   a. Aortic pathology (eg, dissection/transection) is suspected **AND** computed tomography angiography (CTA) of the chest is **contraindicated or unavailable**.

   b. Valvular heart disease is suspected or known and TTE is non-diagnostic or is anticipated to have a high probability of being non-diagnostic due to individual characteristics or inadequate visualization of relevant structures.

   References: [9] [12] [20] [18] [25]

4. Infective endocarditis (IE) is suspected or known, for management or treatment.
   References: [20] [12] [16]
5. Paravalvular abscesses evaluation for replaced valves
   References: [20] [12]
6. Peri-procedural, for pre-procedural planning, intra-operative guidance and post-procedure follow-up.
   References: [18] [10] [12] [20]
7. Stroke, transient ischemic attack (TIA) or systemic embolization is suspected to be of cardiac etiology **AND** full work-up of non-cardiac etiology (cerebral hemorrhage or cerebral ischemia) is completed.
   References: [20] [12]

LCD 33579
See also, **LCD 33579**: Transesophageal Echocardiography (TEE) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 33756
See also , **LCD 33756**: Transesophageal Echocardiogram at www.cms.gov/medicare-coverage-database/search.aspx *if appropriate for individual's healthplan membership*.

LCD 34337
See also, **LCD 34337**: Transesophageal Echocardiography (TEE) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 35016
See also, **35016**: Transesophageal Echocardiography (TEE) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 37379
See also, **LCD 37379**: Echocardiography at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

TEE Procedure Codes

Table 1. Transesophageal echocardiography (TEE) Associated Procedure Codes

CODE	DESCRIPTION
93312	Echocardiography, transesophageal, real-time with image documentation (2D) (with or without M-mode recording); including probe placement, image acquisition, interpretation and report
93313	Echocardiography, transesophageal, real-time with image documentation (2D) (with or without M-mode recording); placement of transesophageal probe only
93314	Echocardiography, transesophageal, real-time with image documentation (2D) (with or without M-mode recording); image acquisition, interpretation and report only
93315	Transesophageal echocardiography for congenital cardiac anomalies; including probe placement, image acquisition, interpretation and report
93316	Transesophageal echocardiography for congenital cardiac anomalies; placement of transesophageal probe only
93317	Transesophageal echocardiography for congenital cardiac anomalies; image acquisition, interpretation and report only
93318	Echocardiography, transesophageal (TEE) for monitoring purposes, including probe placement, real time 2-dimensional image acquisition and interpretation leading to ongoing (continuous) assessment of (dynamically changing) cardiac pumping function and to therapeutic measures on an immediate time basis
93355	Echocardiography, transesophageal (TEE) for guidance of a transcatheter intracardiac or great vessel(s) structural intervention(s) (eg, TAVR, transcatheter pulmonary valve replacement, mitral value repair, paravalvular regurgitation repair, left atrial appendage occlusion/closure, ventricular septal defect closure) (peri-and intraprocedural), real-time image acquisition and documentation, guidance with quantitative measurements, probe manipulation, interpretation and report, including diagnostic transesophageal echocardiography and, when performed, administration of ultrasound contrast, Doppler, color flow, and 3D
C8925	Transesophageal echocardiography (TEE) with contrast, or without contrast followed by with contrast, real time with image documentation (2D) (with or without M-mode recording); including probe placement, image acquisition, interpretation and report
C8926	Transesophageal echocardiography (TEE) with contrast, or without contrast followed by with contrast, for congenital cardiac anomalies; including probe placement, image acquisition, interpretation and report
C8927	Transesophageal echocardiography (TEE) with contrast, or without contrast followed by with contrast, for monitoring purposes, including probe placement, real time 2-dimensional image acquisition and interpretation leading to ongoing (continuous) assessment of (dynamically changing) cardiac pumping function and to therapeutic measures on an immediate time basis

Transthoracic Echocardiogram (TTE)

Preamble: Pediatric Cardiology Preamble

HealthHelp's clinical guidelines for the Cardiology program, are intended to apply to both adults and pediatrics (21 years of age or younger), unless otherwise specified within the criteria.

TTE Guideline

A transthoracic echocardiogram (TTE) is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Abnormal diagnostic testing (eg, electrocardiogram [ECG], chest X-ray or myocardial perfusion imaging) that suggests **EITHER** of the following:
    a. Cardiac abnormality is new.
    b. Heart disease is suspected (eg, abnormal test results, signs/symptoms, systemic or genetic disorders associated with heart disease [eg. Loeys-Dietz syndrome, Marfan syndrome, Turner syndrome]), in a pediatric individual.

    References: [7] [14]
2. Acquired heart disease (eg, cardiomyopathy, coronary artery disease [CAD], tumor, valvular heart disease [VHD]) is known, in a pediatric individual
    References: [14]
3. Aortic pathology (eg, aortic coarctation, aortic dissection), acute, is suspected, including acute aortic syndrome.
    References: [7] [13]
4. Arrhythmia or conduction disorders (atrial fibrillation, atrial flutter, premature ventricular contractions [PVC], supraventricular tachycardia [SVT], ventricular fibrillation [VF], ventricular tachycardia [VT], left bundle branch block [LBBB], right bundle branch block [RBBB]) is demonstrated by cardiac monitoring or ECG.
    References: [7]
5. Asymptomatic, athletic sport participation is anticipated, and **ANY** of the following:
    a. Abnormal cardiac examination (eg, abnormal heart rate or sounds, edema)
    b. Abnormal ECG
    c. Inheritable heart disease history (eg, cardiomyopathy, long QT syndrome, progressive familial heart block types I and II)

    References: [7]

6. Cardiomyopathy suspected or known and **ANY** of the following:
    a. Cardiomyopathy is known and resting peak left ventricular outflow tract (LVOT) gradient is less than 50 mm Hg, perform with provocative maneuvers (eg, squat to stand, sustained valsalva maneuver), to determine presence of left ventricular outflow tract obstruction (LVOTO)
    b. Cardiomyopathy is suspected, for initial evaluation.
    c. Cardiomyopathy surveillance, every 1 to 2 years
    d. First degree relative (child, parent, sibling) with hypertrophic cardiomyopathy
    e. Geno-type positive, pheno-type negative and **EITHER** of the following:
        i. Every 1 to 2 years, in a pediatric individual
        ii. Every 3 to 5 years in an adult
    f. Symptoms (eg, dyspnea, exercise intolerance, fatigue) are new or progressing.

    References: [17] [14]
7. Cardiotoxic chemotherapy or radiation use and **ANY** of the following:
    a. Baseline, prior to initial administration
    b. Re-evaluation at least annually, during course of treatment and post-treatment

    References: [7]
8. Congenital heart disease is suspected or known and **ANY** of the following:
    a. Change in chamber size, hemodynamics, valvular function or ventricular function is suspected.
    b. Initial evaluation
    c. Prior to and after therapeutic intervention

    References: [14] [2] [13]
9. First-degree relative (child, parent, sibling) with known aortic aneurysm/dissection or bicuspid aortic valve.
    References: [7]
10. Heart failure is suspected or known based on prior testing or signs/symptoms (eg, dyspnea, orthopnea, paroxysmal nocturnal dyspnea, peripheral edema).
    References: [7] [11]
11. Hemodynamic instability and cardiac origin is suspected.
    References: [7]

12. Hypertension (HTN) heart disease (eg, diastolic dysfunction, heart failure with preserved ejection fraction [HFpEF], left ventricular hypertrophy [LVH]) is suspected and symptomatic (shortness of breath, syncope, fainting, lightheadedness).
References: [7]

13. Infective endocarditis (IE) is suspected or known (native valve, prosthetic valve, endocardial lead) and **ANY** of the following:
    a. Positive blood cultures **OR** new murmur
    b. Re-evaluation after antibiotic therapy
    c. Risk of progression or complications are high (eg, immunocompromised), for re-evaluation.

    References: [6] [16]

14. Inheritable heart disease (eg, cardiomyopathy, long QT syndrome, progressive familial heart block types I and II) family history, in a pediatric individual
References: [14]

15. Intracardiac shunt, right-to-left is suspected (eg, arterial hypoxemia [oxygen saturation less than 93%], cyanosis, digital clubbing). (*__NOTE__: *Use provocative maneuvers [cough, valslva]*)
References: [7]

16. Kawasaki Disease is suspected in a pediatric individual, and **ANY** of the following:
    a. Aneurysm is known and **ANY** of the following:
        i. Follow-up weekly until stable (**NO** growth from previous imaging)
        ii. Stable (**NO** growth from previous imaging), **NO** ongoing inflammation after 8 weeks, follow-up every 6 to 12 months
    b. **NO** aneurysm is known and **ANY** of the following:
        i. Diagnosis
        ii. Surveillance as follows:
            A. Follow-up study 1 to 2 weeks **AND** 6 to 8 weeks after diagnosis
            B. Follow-up study study 4 to 6 weeks after acute treatment
            C. Follow-up study 1 year after completion of therapy if prior TTEs are negative.
            D. Inflammation is active and ongoing; follow-up weekly

References: [4]

17. Mass, cardiac, tumor or thrombus and **ANY** of the following:
    a. Determination of cardiac source of emboli
    b. Re-evaluation when results may alter treatment
    c. Suspected

    References: [7] [9] [6] [21]

18. Myocardial infarction (MI) or myocardial ischemia occurred recently (within the last 6 months) and complication is suspected (eg, mitral regurgitation, shock, tamponade, ventricular septal defect)
    References: [7]

19. Pericardial disease (effusion, pericarditis [inflammatory and constrictive], tamponade) and **EITHER** of the following:
    a. Chronic, asymptomatic **AND** results may alter treatment.
    b. Symptoms (eg, chest pain, dyspnea edema) are new or progressing.

    References: [7]

20. Peri-procedural, for pre-procedural planning, intra-operative guidance and post-procedure follow-up.
    References: [7]

21. Prior to therapy for cardiac function, in a pediatric individual
    References: [14]

22. Pulmonary hypertension and **EITHER** of the following:
    a. Pulmonary hypertension, moderate or greater, is known, asymptomatic **AND NO** change in cardiac examination, re-evaluation at least one year from prior testing
    b. Symptoms (eg, dyspnea, fatigue, palpitations, syncope) are new or progressing.

    References: [7] [14]

23. Stroke or transient ischemic attack (TIA) initial evaluation, to **EXCLUDE** cardiac origin (eg, thrombus, vegetation, valvular pathology).
    References: [7]

24. Structural heart disease (eg, atrial septal defect, cardiomyopathies, complications of MI) is known, symptoms (eg, angina, dyspnea on exertion, palpitations) are new or progressing, for re-evaluation **OR** therapy guidance. (*__NOTE__: *it should be assumed ischemic work-up was previously completed and remains valid*.)
    References: [7]

25. Symptoms are documented and include **ANY** of the following:

a. Chest pain or anginal ischemic equivalent symptoms (eg, dyspnea, fatigue, vomiting) and **ANY** of the following:
    i. Acute and **ANY** of the following:
        A. CAD risk is intermediate or high.
        B. Non-ischemic cardiac condition is suspected (eg, aortic pathology, endocarditis, pericardial effusion).
        C. Valvular heart disease is suspected or known.
    ii. Stable, CAD risk is intermediate or high, for assessment of left ventricular function and **ANY** of the following:
        A. Complex ventricular arrhythmias
        B. Heart failure signs/symptoms
        C. Heart murmur with unclear etiology
        D. Pathological Q waves
b. Dyspnea, exertional shortness of breath or hypoxemia is known **AND** cardiac origin is suspected based on prior testing or clinical examination.
c. Presyncope or syncope, when cardiac abnormalities (eg, aortic stenosis, heart failure or hypertrophic cardiomyopathy) are suspected from clinical findings.

References: [9] [2] [7] [6] [22]

26. Valvular heart disease (VHD) is suspected or known and **ANY** of the following:
    a. Aortic or mitral valve disease (regurgitation, reflux, vegetation) is suspected, based on clinical findings
    b. Bicuspid aortic valve is known, for re-evaluation of size and morphology of aortic sinuses and ascending aorta, when the ascending aortic diameter is more than 4 cm and **ANY** of the following:
        i. Aortic diameter has a rapid change.
        ii. Aortic diameter is more than 4.5 cm.
    c. Known and symptoms are new or progressing.
    d. Routine surveillance of known VHD disease is as follows:
        i. Aortic stenosis is known, and **EITHER** of the following:
            A. Asymptomatic, stage C1, follow-up annually.
            B. Low-flow, low-gradient aortic stenosis, with preserved LVEF is known, for re-evaluation after control of hypertension.

ii. Mitral regurgitation is known, asymptomatic, stage C1, follow-up every 6 to 12 months.

iii. VHD (Bicuspid AV or aortic sclerosis) is stage A, follow-up every 3 to 5 years.

iv. Valvular regurgitation is mild (stage B), follow-up every 3 to 5 years.

v. VHD is moderate, **NO** change in clinical status of cardiac examination, follow-up every 1 to 2 years.

e. Systemic or acquired disease, associated with VHD, is known.

f. VHD or cardiac structure abnormality is suspected from clinical findings.

References: [2] [6] [13]

LCD 33577
See also, **L33577**: Transthoracic Echocardiography (TTE) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 33768
See also, **LCD 33768**: Transthoracic Echocardiography (TTE) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 34338
See also, **LCD 34338**: Transthoracic Echocardiography (TTE) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 37379
See also, **LCD 37379**: Echocardography at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 38786
See also, **LCD 38786**: Echocardiography for Myocardial Perfusion at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

TTE Procedure Codes

Table 1. Transthoracic Echocardiogram Associated Procedure Codes

CODE	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
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

ECHO Procedures Summary of Changes

Echocardiogram (ECHO) clinical guidelines from 2024 to 2025 had the following version changes:

- Stress echocardiogram had the following changes:
  - Added the following to keep in line with current research:
    - Contraindications
    - "Coronary artery stenosis" indication

        - "Dyspnea" indication
        - "Hypertrophic cardiomyopathy" indication
        - Indications under "Acute coronary syndrome"
        - Indications under "Valvular disease"
        - "Left ventricular systolic dysfunction" indication
        - Pediatric preamble
    - Removed the following as research does not support the indication:
        - "Anomalous coronary arteries" indication
        - Indications under "Peri-procedural"
        - "Myocardial bridging" indication
        - "Occupational risk evaluation" indication
        - "Post-radiation therapy"
    - Citations updated per the evidence.
- Transesophageal echocardiogram (TEE) had the following changes:
    - Added the following to keep in line with current research
        - Contraindications (absolute and relative)
        - Pediatric Preamble
        - "Systemic or genetic disorders associated with heart disease when prior TTE is non- diagnostic, indeterminate or insufficient." indication
    - Citations updated per the evidence.
- Transthoracic echocardiogram (TTE) had the following changes:
    - Added the following to keep in line with current research:
        - "Acquired heart disease" indication
        - "Asymptomatic, athletic sport participation is anticipated" indication
        - "First-degree relative" indication
        - "Hemodynamic instability" indication
        - "Inheritable heart disease" indication
        - "Intracardiac shunt" indication

ECHO Procedures Definitions

Acute aortic syndrome (AAS) is group of life-threatening aortic conditions that include aortic dissection, intramural hematoma, and penetrating atherosclerotic ulcer.
Acute coronary syndrome (ACS) is a sudden, severe event in which the obstruction of a coronary artery interferes with blood flow to the heart muscle. It encompasses acute ischemic heart disease (eg, angina, myocardial infarction). ACS is diagnosed on the basis of rapidly accelerating symptoms of myocardial ischemia, with objective evidence of acute ischemia from an electrocardiogram and/or elevated circulating markers of myocardial injury.
Aneurysm occurs when part of an artery wall weakens, allowing it to abnormally balloon out or widen.
Angina pectoris is the medical term for chest pain or discomfort due to coronary heart disease. It occurs when the heart muscle does not get as much blood as it needs. This may happen because one or more of the heart's arteries is narrowed or blocked, also called ischemia.

- Atypical chest pain or discomfort that lacks the characteristics of typical angina and is described as burning, sharp or stabbing brought on by deep breathing, coughing or movement of arms or torso, and lasting for seconds. The term non-cardiac should be used if heart disease is not suspected.
- Microvascular angina is a type of angina or chest pain that may be a symptom of coronary microvascular disease (MVD). Coronary MVD is a heart disease that affects the heart’s smallest coronary artery blood vessels. Spasms within the walls of these very small arterial blood vessels cause reduced blood flow to the heart muscle leading to a type of chest pain referred to as microvascular angina. Angina that occurs in coronary MVD may differ from the typical angina that occurs in heart disease. The chest pain usually lasts longer than 10 minutes, and it can last longer than 30 minutes.
- Prinzmetal angina may also be referred to as variant angina, Prinzmetal's variant angina or angina inversa. Prinzmetal’s angina almost always occurs at rest, usually between midnight and early morning. These attacks can be very painful. The pain from variant angina is caused by a spasm in the coronary arteries (which supply blood to the heart muscle). The coronary arteries can spasm as a result of any of the following: exposure to cold weather, stress, medicines that tighten or narrow blood vessels, smoking or cocaine use.
- Typical angina, also known as stable angina or angina pectoris, is defined as: 1) substernal/ retrosternal chest pain, pressure, tightness or squeezing, described as dull, heavy, or crushing, and/or radiating to the mid-sternal or anterior chest; with possible associated symptoms (eg, dyspnea, nausea, lightheadedness) 2) provoked by exertion or emotional stress and 3) relieved by rest and/or nitroglycerin.

- Unstable angina (USA) is defined as angina that is of new onset and occurs at rest or with minimal exertion. USA can also occur from previously known stable angina in terms of increased frequency or duration of chest pain, resistance to previously effective medications, or provocation with decreasing levels of exertion or stress.

Aortic Coarctation is a birth defect in which a part of the aorta is narrower than usual.
Aortic dissection is a serious condition in which the integrity of the body's main artery (aorta) is compromised and blood passes through the inner lining and between the layers of the arterial wall.
Aortic dissection types:

- **Type A** is the most common and dangerous type involves a tear in the part of the aorta where it exits the heart. The tear may also occur in the upper aorta (ascending aorta), which may extend into the abdomen.
- **Type B** involves a tear in the lower aorta only (descending aorta), which may also extend into the abdomen

Arrhythmia is an irregular or abnormal heart rhythm. Arrhythmia refers to any change from the normal sequence of electrical impulses of the heart, causing abnormal heart rhythms. The electrical impulses may happen too fast, too slowly or erratically – causing the heart to beat too fast, too slowly or erratically.
Atrial fibrillation (AF) is a cardiac rhythm disorder characterized by uncontrolled atrial activation without effective atrial contraction. On the electrocardiogram (ECG), P waves are absent. AF is characterized by rapid oscillations or fibrillatory waves that vary in amplitude, shape and timing associated with an irregular ventricular response.

- **Paroxysmal AF** terminates spontaneously or with intervention within 7 days of onset. Episodes typically convert back to sinus rhythm within 48 hours.
- **Persistent AF** is continuous AF sustained beyond 7 days.

Atrial flutter is a rhythm disorder characterized by coordinated electrical activity in the atria, and the electrocardiogram (ECG) shows a saw tooth pattern of the flutter waves.

- Typical atrial flutter is localized to the right atrium.
- Atypical atrial flutter refers to atrial flutter arising in the left atrium.

Atrial septal defect (ASD) is an opening in the septal wall that separates the two top chambers of the heart (the atria) that occurs before the birth of an individual. The defect can allow oxygen-rich blood to leak into the oxygen-poor blood chambers in the heart.
Bicuspid aortic valve is an inherited form of heart disease in which two of the three leaflets of the aortic valve fuse together during development in utero, creating a less efficient two leaflet valve. The aortic valve plays a crucial role in ensuring the unidirectional flow of blood from

Bundle branch block is a type of conduction disorder involving partial or complete interruption of the flow of electrical impulses through the right or left bundle branches. Normally, electrical impulses travel down the right and left branches of the ventricles at the same speed, allowing both ventricles to contract simultaneously. When there is a "block ” in one of the branches, electrical signals have to take a different path through the ventricle and one ventricle contracts a fraction of a second slower than the other, causing an arrhythmia.

Cardiac event monitor is a device used to record heart rate and rhythm for long-term monitoring of symptoms that occur less than daily. The time frame for use can be up to 30 days.

Cardiac pretest probability refers to the possibility that an individual has coronary artery disease (CAD), to provide an estimate before the diagnostic test result is known. It is based on the likelihood of the suspected disease given presenting symptoms.

Cardiac shunt is an abnormal communication between the systemic and pulmonary circulations, allowing blood to flow directly from one circuit to the other without passing through the lungs or body as it normally would.

Cardiogenic shock (CS) is a serious and life-threatening condition that occurs when the heart is unable to pump enough blood to the body’s vital organs and is commonly triggered by heart attack or heart failure.

Cardiac tamponade is a medical emergency characterized by the accumulation of fluid, blood, pus, or gas in the pericardial space, which compresses the heart, impairs its filling, and reduces cardiac output. The condition can result from pericardial disease, trauma, or complications of medical procedures.

Cardiomegaly is an enlarged heart seen on any imaging test. An enlarged heart may be the result of a short-term stress on the body, such as pregnancy or a medical condition, weakening of the heart muscle, coronary artery disease, heart valve problems or abnormal heart rhythms. Certain conditions may cause the heart muscle to become thicker or cause one of the chambers of the heart to dilate, making the heart larger. Depending on the condition, an enlarged heart may be temporary or permanent.

Cardiomyopathy is a disease of the heart muscle that makes it harder for the heart to pump blood to the rest of the body. Cardiomyopathy can lead to heart failure. The main types of cardiomyopathy include dilated, hypertrophic and restrictive cardiomyopathy.

Conduction disorders are disturbances in the electrical impulses that control heart rhythm, potentially leading to abnormal heartbeats or arrhythmias.

Congenital long QT syndrome is a hereditary cardiac disease characterized by a prolongation of the QT interval on basal ECG with a high risk of life-threatening arrhythmias.

Coronary artery bypass graft (CABG) is a surgical procedure performed to shunt blood around a narrowing or blockage in the coronary artery of the heart. This procedure involves attaching one end of a segment of blood vessel (eg, a vein of the leg) that was removed from another part of the body into the aorta, and the other end of the segment into the coronary artery beyond the obstructed area, to increase blood flow.

Coronary artery disease (CAD) is caused by plaque buildup in the walls of the arteries that supply blood to the heart (called coronary arteries) and other parts of the body.
Coronary computed tomography angiography (CCTA) is a non-invasive test that uses a computed tomography (CT) scanner to obtain a 3-dimensional image of the heart, including blood vessels that supply blood to the heart muscle (coronary arteries). During the CCTA, contrast dye is injected into the vein so that the coronary arteries can be seen. CCTA provides images to identify a narrowing or blockage of the coronary arteries caused by plaque and allows for accurate visualization of the 3-dimensional heart structure (to include the valves of the heart).
Cyanosis is the bluish discoloration of the skin and/or mucous membranes resulting from inadequate oxygenation of the blood, typically visible when there is at least 5 g/L of unsaturated hemoglobin in tissue.
Diastolic dysfunction is the functional abnormality of diastolic relaxation, filling, or distensibility of the left ventricle (LV
DiGeorge Syndrome, also known as 22q11.2 deletion syndrome, is a genetic disorder characterized by a spectrum of clinical manifestations including immune deficiency, congenital heart defects, and characteristic facial anomalies due to a microdeletion on chromosome 22q11.2. Congenital heart defects are common, with tetralogy of Fallot, interrupted aortic arch, and ventricular septal defects being among the most frequent.
Down syndrome is a congenital condition characterized especially by developmental delays, usually mild to moderate impairment in cognitive functioning, short stature, upward slanting eyes, a flattened nasal bridge, broad hands with short fingers and decreased muscle tone caused by trisomy of the human chromosome numbered 21.
The Duke treadmill score (DTS) is a weighted index combining treadmill exercise time using standard Bruce protocol, maximum net ST segment deviation (depression or elevation), and exercise-induced angina. It was developed to provide prognostic information for the evaluation of suspected coronary heart disease.

- Duke Treadmill scores (typically range from -25 to +15) and associate risk:
  - Low risk is a score of +5 or more.
  - Moderate risk is a score of -10 to +4
  - High risk is a score of -11 or less

Dyslipidemia is a high level of lipids (cholesterol, triglycerides, or both) or a low high-density lipoprotein (HDL) cholesterol level.
Dyspnea is difficult or labored respirations.
Echocardiogram (ECHO) is a test that uses high frequency sound waves (ultrasound) to make pictures of the heart. The test is also called echocardiography or diagnostic cardiac ultrasound. An echo uses sound waves to create pictures of the heart's chambers, valves, walls and the blood vessels (aorta, arteries, veins). A probe called a transducer is passed over the chest. The probe

produces sound waves that bounce off the heart and "echo" back to the probe. These waves are changed into pictures viewed on a video monitor.

Edema an abnormal infiltration and excess accumulation of serous fluid in connective tissue or in a serous cavity.

Electrocardiogram (ECG or EKG) is a test that measures and records the electrical activity of the heart. The ECG electrical activity is divided into the P wave, PR interval, QRS complex, QT interval, ST segment, T wave and U wave. An ECG is useful in establishing many cardiac diagnoses.

Embolic stroke of undetermined source (ESUS) is the classification of cerebral vascular accident used to describe a non-lacunar ischemic stroke, suspected to be embolic but with no identifiable etiology (cryptogenic).

Embolus is anything (eg, blood clot, air bubble, fatty deposit) that moves through vasculature and when it reaches a vessel that is too small to let it pass, the blood flow is occluded.

Endocarditis is inflammation of the inside lining of the heart chambers and heart valves (endocardium). It is caused by a bacterial or rarely, a fungal infection.

Fractional flow reserve (FFR) is a ratio of the maximal myocardial blood flow in the presence of a stenosis to the theoretical normal maximal flow in the same distribution. FFR is calculated by using the distal coronary pressure of the stenosis divided by the aortic pressure during maximal hyperemia (increased amount of blood in vessel).

Framingham cardiovascular risk score is a validated calculation tool to estimate the 10 year gender-specific cardiovascular risk of an individual based on the Framingham Heart Study. The Framingham Heart Study group recommends the 2018 Prevention Guidelines Tool CV Risk Calculator to calculate/estimate the 10-year and lifetime risks for atherosclerotic cardiovascular disease (ASCVD).[1]

Geno-type postive, pheno-type negative, refers to individuals who carry a genetic mutation associated with a disease but do not exhibit any symptoms or clinical signs of the disease.

Heart failure (HF) (also known as **congestive heart failure [CHF]**) is a condition that develops when the heart is unable to pump enough blood for the body's needs. HF occurs when the heart cannot fill with enough blood or is too weak to pump properly. Decompensated heart failure is sudden worsening (exacerbation) of heart failure symptoms (eg, difficulty breathing, lower extremity edema, fatigue) to where the heart can no longer continue to compensate for its full function.

High-risk occupation is a job in which the related job duties are associated with public safety. Common occupations include pilots (ship, airline), drivers (train, bus), police officers, firefighters, toll bridge workers and heavy equipment operators.

[1]The Framingham Heart Study, "Cardiovascular Disease (10-year risk)," [Online]. Available: https://framinghamheartstudy.org/fhs-risk-functions/cardiovascular-disease-10-year-risk/. [Accessed August 2022].

Hemodynamic instability is a condition caused by abnormal or unstable blood pressure that results in improper circulation and organs of the body do not receive adequate blood flow. It is characterized by chest pain, confusion, abnormal heart rate, loss of consciousness, restlessness, shortness of breath, cold hands, arms, legs or feet, etc.

Hypertension (high blood pressure) is when the force of the blood flowing through blood vessels, is consistently too high. Blood pressure is made up of two numbers: systolic and diastolic. Systolic pressure is the pressure when the ventricles pump blood out of the heart. Diastolic pressure is the pressure between heartbeats when the heart is filling with blood. [2,3]

Blood Pressure Classification[4]

Table 1. Blood Pressure Classification

Blood Pressure Category	Systolic mm Hg (upper number)	and/or	Diastolic mm Hg (lower number)
Normal	Less than 120	and	Less than 80
Elevated	120-129	and	Less than 80
High blood pressure (Hypertension) Stage 1	120-139	or	80-89
High blood pressure (Hypertension) Stage 2	140 or higher	or	90 or higher
Hypertensive Crisis	Higher than 180	and/or	Higher than 120

Hypertrophic cardiomyopathy (HCM) is a congenital or acquired disorder, characterized by marked ventricular hypertrophy with diastolic dysfunction but without increased afterload (eg, due to valvular aortic stenosis, coarctation of the aorta, systemic hypertension). In obstructive HCM, the wall (septum) between the two bottom chambers of the heart thickens. The walls of the pumping chamber can also become stiff. It may block or reduce the blood flow from the left ventricle to the aorta. **Left ventricular outflow tract (LVOT)** obstruction is a common feature of HCM and a cause of symptoms and exercise limitation. LVOT obstruction is defined as a peak LVOT gradient of more than 30 mmHg at rest or more than 50 mmHg with provocation. Most people with HCM have LVOT. In non-obstructive HCM, the heart's main pumping chamber still becomes stiff. This limits how much blood the ventricle can take in and pump out, but blood flow is not blocked. [5,6]

[2]American Heart Association (AHA), "Health Topics." [Online]. Available: www.heart.org

[3]U.S. Department of Health & Human Services, National Heart, Blood and Lung Institute (NIH), "Health Topics." [Online]. Available: www.nhlbi.nih.gov/lbi.nih.gov

[4]American Heart Association (AHA), "Health Topics." [Online]. Availabile: www.heart.org

[5]Merck & Co., Inc., "Hypertrophic Cardiomyopathy." [Online]. Available:www.merckmanuals.com

[6]American Heart Association (AHA). "Health Topics." [Online]. Available: www.heart.org

Hypoxemia is an abnormally low level of oxygen in the arterial blood. It is generally defined as a PaO2 level below 60 mm Hg or an SaO2 below 92%.

Implantable cardiac defibrillator (ICD) is a mechanical device that is placed within the body and is designed to recognize certain types of arrhythmias such as ventricular tachycardia and ventricular fibrillation. The defibrillator corrects the heart rhythm when needed by delivering precisely calibrated and timed electrical shocks to restore a normal heartbeat.

Ischemia is an inadequate blood supply to an organ or part of the body, especially the heart muscles.

Kawasaki disease is typically diagnosed in young children, but older children and adults can also develop this condition. Kawasaki disease is of unknown origin, is not considered contagious, and normally begins with a fever that lasts at least five days. The classic symptoms may include a rash, red eyes, lips or mouth, swollen lymph nodes or red hands and feet. The disease can affect the coronary arteries which carry oxygen-rich blood to the heart, which can lead to serious heart problems.

Left bundle branch block (LBBB) is a delay or obstruction along the electrical pathway to the heart's left ventricle, which can be caused by underlying heart problems. There are often no symptoms involved, however, symptomatic persons can experience syncope or pre-syncope, fatigue and shortness of breath.

Left ventricular hypertrophy (LVH) is a term for a heart's left pumping chamber that has thickened and may not be pumping efficiently. In response to this pressure overload, the inner walls of the heart may respond by getting thicker. These thickened walls can cause the left ventricle to weaken, stiffen and lose elasticity, which may prevent healthy blood flow.

Left ventricular outflow tract gradient is a measure that predicts the likelihood of heart failure and cardiovascular death in those with hypertrophic cardiomyopathy, and determines the need for myectomy and alcohol septal ablation.

Loeys-Dietz syndrome is a disorder that affects the connective tissues of the body and increases the risk of aneurysm in arteries such as the aorta.

Long QT syndrome (LQTS) is an abnormal feature of the heart's electrical system that can lead to a potentially life-threatening arrhythmia called torsades de pointes. Torsades de pointes may result in syncope or sudden cardiac death.

Marfan syndrome is a congenital connective tissue disorder that is primarily associated with cardiac pathology (eg, mitral valve prolapse, aortic root dilation), skeletal pathology (eg, lengthening of long bones, joint laxity) and ocular pathology (eg, ectopia lentis).

Mean pulmonary arterial pressure (mPAP) is a pressure greater than 20 mm Hg measured by right heart catheterization at rest in the supine position.

Mitral regurgitation (MR) is a common type of valvular heart disease that can result from a primary structural abnormality of the mitral valve (MV), or a secondary dilatation of an anatomically normal MV due to a dilated left ventricle caused by ischemic or dilated cardiomyopathy.

Table 2. Chronic Primary Mitral Regurgitation (MR) Stages [a.]

Stage	Definition	Valve Anatomy	Valve Hemodynamics	Symptoms
A	At Risk	• Mild mitral valve prolapse with normal coaptation • Mild valve thickening and leaflet restriction	• NO MR jet or central jet area of less than 20% LA on Doppler • Vena contracta is less than 0.3 cm	• None
B	Progressive	• Moderate to severe mitral valve prolapse with normal coaptation • Rheumatic valve changes with leaflet restriction and loss of central coaptation • Prior IE	• Central jet MR is 20% to 40% LA or late systolic eccentric jet MR • Vena contracta is less than 0.7 cm • Reguritant volume is less than 60 mL • Reguritant fraction is less than 50% • ERO is less than 0.40 cm^2 • Angiographic grade 1+ to 2+	• None
C	Asymptomatic, Severe	• Severe mitral valve prolapse with loss of coaptation or flail leaflet • Rheumatic valve changes with leaflet restriction and loss of central coaptation • Prior IE • Thickening of leaflets with radiation heart disease	• Central jet MR is more than 40% LA or holosystolic eccentric jet MR • Vena contracta 0.7 cm or more • Reguritant volume 60 mL or more • Regurgitant fraction 50 % or more • ERO 0.40 cm^2 or more • Angiographic grade 3+ to 4+	• None

Stage	Definition	Valve Anatomy	Valve Hemodynamics	Symptoms
D	Symptomatic, Severe	• Severe mitral valve prolapse with loss of coaptation or flail leaflet • Rheumatic valve changes with leaflet restriction and loss of central coaptation • Prior IE • Thickening of leaflets with radiation heart disease	• Central jet mitral regurgitation is more than 40% LA or holosystolic eccentric jet MR • Vena contracta 0.7 cm or more • Reguritant volume 60 mL or more • Regurgitant fraction 50 % or more • ERO 0.40 cm^2 or more • Angiographic grade 3+ to 4+	• Exercise tolerance decreased • Dyspnea on exertion

[a.]Otto C, Nishimura R, Bonow R, et al. 2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation 143(5), pp. e72-e227; December 17, 2020.

Myocardial infarction (MI), also called a heart attack, occurs when the blood flow that brings oxygen to the heart muscle is severely reduced or cut off completely. The coronary arteries that supply the heart muscle with blood flow can become narrowed from a buildup of fat, cholesterol and other substances that together are called plaque. This process is known as atherosclerosis. When plaque within a coronary artery breaks, a blood clot forms around the plaque and can block the flow of blood through the artery to the heart muscle. Ischemia results when there is an inadequate blood supply to the heart muscle causing damage or death of part of the heart muscle, resulting in an MI.

Myocardial perfusion imaging (MPI) uses an intravenously administered radio-pharmaceutical to depict the distribution of blood flow in the myocardium. Perfusion imaging identifies areas of relatively reduced myocardial blood flow associated with ischemia or scar. The relative distribution of perfusion can be assessed at rest, during cardiovascular stress or both. This test is often called a nuclear stress test.

Table 3. New York Heart Association (NYHA) Functional Classification for Heart Failure

CLASS	SYMPTOMS EXPERIENCED
Class I (Mild)	Cardiac disease, but no symptoms and no limitation in ordinary physical activity (eg, shortness of breath when walking, climbing stairs).
Class II (Mild)	Mild symptoms (eg, mild shortness of breath and/or angina) and slight limitation during ordinary activity.
Class III (Moderate)	Marked limitation in activity due to symptoms, even during less-than-ordinary activity, (eg, walking short distances [20–100 m]). Comfortable only at rest. Class IIIa: no dyspnea at rest. Class IIIb: recent dyspnea at rest.
Class IV (Severe)	Severe limitations. Experience symptoms while at rest. Unable to carry on any physical activity without discomfort.

Orthopnea describes shortness of breath that occurs while lying flat and is relieved by sitting or standing. Orthopnea can occur progressively over time or spontaneously, depending on the underlying cause. Individuals may describe needing to use multiple pillows to sleep due to breathlessness.

Ostium Secundum Atrial Septal Defect (ASD) is a common congenital heart defect that causes shunting of blood between the systemic and pulmonary circulations. It is most associated with paradoxic embolus (blood clot that moves from venous to arterial circulation) leading to stroke.

Paroxysmal is a sudden attack or increase of symptoms of a disease (such as pain, coughing, shaking, etc.) that often occurs again and again.

Pericardial Effusion is a condition in which extra fluid collects between the heart and the pericardium (the sac around the heart) causing pressure on the heart and preventing blood from pumping normally. The lymph vessels may also be blocked, which can cause infection. Pericardial effusions may be caused by cancer or cancer treatment, infection, injury, autoimmune disorders, thyroid or kidney problems or other conditions.

Pericarditis is inflammation of the pericardium (membrane enclosing the heart), often with fluid accumulation. Pericarditis may be caused by many disorders (eg, infection, myocardial infarction, trauma, tumors or metabolic disorders) but is often idiopathic. Symptoms include chest pain or tightness, often worsened by deep breathing. Cardiac output may be greatly reduced if cardiac tamponade (closure or blockage) or constrictive pericarditis develops.

Premature ventricular complex (PVC) is an early ventricular depolarization with or without mechanical contraction.

- **Frequent PVC** is at least 1 PVC on a 12-lead ECG or more than 30 PVCs per hour.
- **Monomorphic PVC(s)** are felt to arise from the same focus. Slight changes in QRS morphology due to different exit sites from the same focus can be present.

CAD pre-test probability by age, gender and symptoms

Table 4. Pretest probability of CAD by age, gender and symptoms [a.]

Age (years)	Gender	Typical/ Definite Angina Pectoris	Atypical/Probable Angina Pectoris	Non-Anginal Chest Pain	Asymptomatic
≤39	Men	Intermediate	Intermediate	Low	Very Low
	Women	Intermediate	Very Low	Very Low	Very Low
40-49	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Low	Very Low	Very Low
50-59	Men	High	Intermediate	Intermediate	Low

Age (years)	Gender	Typical/ Definite Angina Pectoris	Atypical/Probable Angina Pectoris	Non-Anginal Chest Pain	Asymptomatic
	Women	Intermediate	Intermediate	Low	Very Low
≥60	Men	High	Intermediate	Intermediate	Low
	Women	High	Intermediate	Intermediate	Low

[a]·Patel, M.R., Bailey, S.R., et al (2012). ACCF/SCAI/AATS/AHA/ASE/ASNC/HFSA/HRS/SCCM/SCCT/ SCMR/STS 2012 Appropriate Use Criteria for Diagnostic Catheterization. Journal of Thoracic and Cardiovascular Surgery, 144 (1), 39-71.

High: Greater than 90% pre-test probability

Intermediate: Between 10% and 90% pre-test probability

Low: Between 5% and 10% pre-test probability

Very Low: Less than 5% pre-test probability

Progressive familial heart block type I and II are genetic conditions characterized by inherited disruptions in cardiac electrical conduction, with type I affecting the bundle branch and type II affecting the atrioventricular node.

Pulmonary hypertension is increased pressure in the pulmonary circulation that results in thickening and narrowing of the pulmonary arteries. Pulmonary hypertension can be either primary, the cause being idiopathic (unknown origin) or it can be secondary which occurs as a result of an identified medical condition.

Q wave represents initial depolarization of the interventricular septum and is defined as the first negative deflection following the P wave and occurring before the R wave.

Right bundle branch block (RBBB) is an electrocardiogram finding that occurs when the physiologic electrical conduction system of the heart, specifically in the His-Purkinje system, is altered or interrupted resulting in a widened QRS and electrocardiographic vector changes.

Stenosis is a narrowing or constriction of the diameter of a bodily passage or orifice.

Stress Echocardiogram (echo) is a test used to assess the heart's function and structures. A stress echocardiogram (stress echo) is a test done to assess how well the heart works under stress. The "stress" can be triggered by either exercise on a treadmill, bicycle or pharmacologic (dobutamine). Exercise stress test combines echocardiography with exercise to evaluate the heart's function at rest and with exertion. A dobutamine stress echocardiogram (DSE) may be used if you can't exercise. Dobutamine is put in a vein and causes the heart to beat faster and it mimics the effects of exercise on the heart.

Ischemic stroke occurs when blood flow through an artery that supplies oxygen-rich blood to the brain becomes blocked, causing the sudden death of localized brain cells. The blockage is often the result of a blood clot and less often due to an embolus.

Supraventricular Tachycardia (SVT) is a rapid rhythm with atrial and/or ventricular rates of more than 100 bpm at rest, which originate and are sustained in atrial or atrioventricular node tissue above the bundle of His. The condition is caused by reentry phenomena or automaticity

at or above the atrioventricular node and includes atrioventricular nodal reentrant tachycardia, atrioventricular reciprocating and atrial tachycardia.

Syncope is a transient loss of consciousness and postural tone (ability to maintain or change position intentionally) due to insufficient cerebral perfusion. The loss of consciousness is associated with prompt recovery, not needing resuscitation.

Thrombosis is the formation of a blood clot (partial or complete blockage) within blood vessels, whether venous or arterial, limiting the natural flow of blood and resulting in clinical sequela.

Transesophageal echocardiography (TEE) uses high-frequency sound waves (ultrasound) to make detailed pictures of the heart and the blood vessels that lead to and from it. Unlike a standard echocardiogram, the echo transducer that produces the sound waves for TEE is attached to a thin tube that passes through the mouth and throat, and into the esophagus. The esophagus is close to the upper chambers of the heart and clear images of the heart structures and valves can be obtained.

Transient ischemic attack (TIA) is a brief interruption of the blood supply to the brain that causes a temporary impairment of vision, speech or movement. The episode usually lasts for just a few moments but may be a warning sign of a full scale stroke.

Transthoracic echocardiogram (TTE) involves placing a device called a transducer on the chest. The device sends ultrasound waves through the chest wall to the heart. As the ultrasound waves bounce off the structures of the heart, a computer converts them into pictures on the computer screen. A TTE uses sound waves to create pictures of the heart chambers, valves, walls and the blood vessels attached to your heart. The test is also called echocardiography or diagnostic cardiac ultrasound.

Turner's syndrome is a genetically determined condition that is typically associated with the presence of only one complete X chromosome and no Y chromosome. It is characterized by a female phenotype with underdeveloped (and usually infertile) ovaries and short stature.

Valsalva maneuver is the action of attempting to exhale with the nostrils and mouth or the glottis, closed. This increases pressure in the middle ear and the chest, as when bracing to lift heavy objects and is used as a means of equalizing pressure in the ears.

Valvular heart disease is a condition when any valve in the heart has damage or is diseased. When heart valves are diseased, the heart cannot effectively pump blood throughout the body and has to work harder to pump, either while the blood is leaking back into the chamber or against a narrowed opening. This can lead to heart failure, sudden cardiac arrest and death.

Ventricular fibrillation (VF) also called V-fib, is a serious cardiac rhythm disorder in which disordered electrical activity causes the heart’s lower chambers (ventricles) to quiver or fibrillate, instead of contracting (beating) normally. This prohibits the heart from pumping blood, causing collapse and cardiac arrest. This type of arrhythmia is a life-threatening medical emergency.

Ventricular tachycardia (VT) is a rhythm disorder caused by abnormal electrical signals in the ventricles of the heart.

- **Monomorphic ventricular tachycardia** is ventricular tachycardia with stable QRS morphology.
- **Non-sustained ventricular tachycardia (NSVT)** is defined as 3 or more consecutive beats originating from the ventricle, lasting less than 30 seconds, at a rate more than 100 beats per minute (bpm).
- **Polymorphic ventricular tachycardia** is a ventricular rhythm, with a rate greater than 100 bpm with a varying QRS pattern that terminates spontaneously (causing syncope if lasting more than a few seconds) or will deteriorate into ventricular fibrillation, causing cardiac arrest.
- **Sustained ventricular tachycardia (SVT)** is defined as a ventricular rhythm more than 100 bpm (widened QRS complex with duration greater than 120 ms) lasting more than 30 seconds or requiring termination due to hemodynamic instability.

Echocardiogram Procedures References

[1] Al-Khatib, S.M., Stevenson, M., . . . Page, R.L. (2017). 2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death. *Circulation, 138*(13), e274-e389.

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Disclaimer section

Purpose

The purpose of the HealthHelp's clinical guidelines is to assist healthcare professionals in selecting the medical service that may be appropriate and supported by evidence to safely improve outcomes. Medical information is constantly evolving, and HealthHelp reserves the right to review and update these clinical guidelines periodically. HealthHelp reserves the right to include in these guidelines the clinical indications as appropriate for the organization's program objectives. Therefore the guidelines are not a list of all the clinical indications for a stated procedure, and associated Procedure Code Tables may not represent all codes available for that state procedure or that are managed by a specific client-organization.

Clinician Review

These clinical guidelines neither preempt clinical judgment of trained professionals nor advise anyone on how to practice medicine. Healthcare professionals using these clinical guidelines are responsible for all clinical decisions based on their assessment. All Clinical Reviewers are

instructed to apply clinical indications based on individual patient assessment and documentation, within the scope of their clinical license.

Payment

The use of these clinical guidelines does not provide authorization, certification, explanation of benefits, or guarantee of payment; nor do the guidelines substitute for, or constitute, medical advice. Federal and State law, as well as member benefit contract language (including definitions and specific contract provisions/exclusions) take precedence over clinical guidelines and must be considered first when determining eligibility for coverage. All final determinations on coverage and payment are the responsibility of the health plan. Nothing contained within this document can be interpreted to mean otherwise.

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National and Local Coverage Determination (NCD and LCD)

NOTICE
To ensure appropriate review occurs to the most current NCD and/or LCD, always defer to https://www.cms.gov/medicare-coverage-database/search.aspx.

Background

National Coverage Determinations (NCD) and Local Coverage Determinations (LCD) are payment policy documents outlined by the Centers for Medicare and Medicaid Services (CMS) and the government's delegated Medicare Audit Contractors (MACs) that operate regionally in jurisdictions.
CMS introduced variation between different jurisdictions/Medicare Audit Contractors (MACs) and their associated covered code lists with the transition to ICD 10. The variation resulted in jurisdictions independently defining how codes are applied for exclusions, limitations, groupings, ranges, etc. for the medical necessity indications outlined in the NCD and LCD. Due to this variation, there is an inconsistent use/application of codes and coverage determinations across the United States between the different MACs.

In addition, **WITHOUT** notice, CMS can change the codes that indicate medical necessity and the format of the coverage determinations/associated documents (eg, Articles). This is an additional challenge for organizations to keep up with ongoing, unplanned changes in covered codes and medical necessity indications.

Medical Necessity Codes

Due to the variation in code application between jurisdictions/MACs and that updates can happen without notification, HealthHelp is not able to guarantee full accuracy of the codes listed for any Coverage Determination, and advises that prior to use, the associated Coverage Determination Articles are reviewed to ensure applicability to HealthHelp's programs and any associated NCDs and LCDs.

For Internal Use Only:

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