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2025 Coronary Computed Tomography Angiography (CCTA)/Nuclear Cardiology and CCTA/Single Photon Emission Computed Tomography (SPECT) for Suspected Coronary Artery Disease (CAD) with Stable Symptoms Evaluation

Cardiology/Diagnostic Imaging

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CARD-CCTASPECNUC-HH

Last Review Date: 02/25/2025

Previous Review Date: 12/10/2024

Guideline Initiated: 06/30/2019

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CCTA Overview

Coronary Computed Tomographic Angiography (CCTA) is a non-invasive imaging modality that has become increasingly popular for the assessment of coronary artery disease.

However, it does have limitations. CTCA can be less effective in patients with heavy coronary artery calcification, which can obscure the details of the vessel lumen. It is also sensitive to heart rate variability, and arrhythmias can limit its efficacy. Additionally, image quality can be reduced in patients with morbid obesity, dense calcifications, multiple or small-diameter stents, elevated heart rates, or arrhythmias. Radiation exposure also poses a risk, but its only 3 msv which is 75% less than SPECT. The technology has supplanted SPECT especially by leading hospital institutions over the past 10 years.

Sensitivity and specificity of CCTA:

Meta-analysis research on the sensitivity and specificity of Coronary Computed Tomographic Angiography (CCTA) provides a comprehensive overview of its diagnostic accuracy. Studies often find sensitivity of CCTA more than 95%, with specificities of 70-80%. Hence these are excellent tests for assessing someone with unknown CAD and symptoms consistent with angina – CCTA is an excellent 'rule-out' test. These findings suggest that CCTA is a highly sensitive modality for detecting coronary artery disease, although its specificity can vary, potentially affecting its ability to distinguish between calcified but not unhealthy vessels and diseased vessels. Such meta-analyses are crucial for clinicians to understand the strengths and limitations of CCTA in various clinical scenarios.

Nuclear SPECT Overview

Nuclear SPECT (Single Photon Emission Computed Tomography) imaging is a non-invasive diagnostic tool used in cardiology to assess the health of the heart. It utilizes a radioactive tracer to create detailed images of the heart's blood flow and function. This technology is particularly useful for diagnosing coronary artery disease, evaluating chest pain, and determining the extent of injury after a heart attack.

The procedure involves injecting a small amount of radioactive substance into the bloodstream, then using a special camera to capture how the heart muscle absorbs the tracer, which can reveal areas of reduced blood flow or damage. It's a valuable test for cardiologists to decide on the best course of treatment, which may include interventions like angioplasty or bypass surgery. While SPECT imaging is generally safe, it does involve exposure to significant radiation measuring approximately 12 msv which is equivalent to 6,000 chest xrays.

SPECT imaging helps in risk stratification and prognosis in patients with known coronary artery disease (CAD), history of myocardial infarction, or those at high risk for CAD, such as individuals with diabetes mellitus, peripheral, or cerebral vascular disease. SPECT became the standard of non-invasive imaging for CAD in the 1990s.

Sensitivity and Specificity of SPECT:

The sensitivity and specificity of Single Photon Emission Computed Tomography (SPECT) in cardiology are critical measures of its diagnostic accuracy. Sensitivity refers to the test's ability to correctly identify patients with the disease, while specificity refers to the test's ability to correctly identify patients without the disease. A meta-analysis of 79 studies involving 8,964 patients showed that SPECT myocardial perfusion imaging (MPI) has a diagnostic sensitivity of 86% and a specificity of 74%. These figures indicate that SPECT MPI is highly effective in detecting coronary artery disease (CAD), with a strong ability to direct coronary intervention based on the perfusion abnormalities correlating closely with coronary artery perfusion territories. These variations highlight the importance of individualized patient assessment and the selection of appropriate testing protocols to ensure the most accurate diagnostic outcomes.

CCTA with SPECT Contraindications

CTA General Contraindications

Relative contraindications for computed tomography angiography (CTA) are **ANY** of the following: [2] [5]

- Allergy to contrast material
- Hemodynamic instability (eg, respiratory distress, severe hypotension, unstable arrhythmias)
- Inability to cooperate with procedure (eg, remain still, hold breath)
- Renal impairment (glomerular filtration rate [GFR] is less than 30 ml/min/1.73 m^2.)

Coronary Computed Tomography Angiography (CCTA) Contraindications

Computed tomography angiography (CTA) may be contraindicated when the individual's body mass index (BMI) is more than 40 (relative contraindication due to suboptimal image quality). [27]

Contraindications and Exclusions to Myocardial Perfusion Imaging (MPI)

Contraindications and exclusions to myocardial perfusion imaging (MPI) may include **ANY** of the following: [11]

- Angina is high risk, unstable or complicated acute coronary syndrome or acute myocardial infarction was less than 2 days ago.
- Atrial (pulmonary) hypertension is systemic and severe.
- Body mass index (BMI) is more than 40 (relative contraindication due to suboptimal image quality).
- Pregnant or lactating women
- Vasodilators are **contraindicated**.

Coronary Computed Tomography Angiography (CCTA) and Nuclear Single Photon Emission Computed Tomography (SPECT)

NCD 220.1
See also, **NCD 220.1**: Computed Tomography at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

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.

CCTA and Nuclear SPECT for Suspected Coronary Artery Disease (CAD) with Stable Symptoms Evaluation Guideline

A coronary computed tomography angiography or nuclear single photon emission computed tomography is considered medically appropriate for a coronary artery disease evaluation, when the documentation demonstrates **ANY** of the following:

1. Age is under 65 years old, angina is stable, **NO** previous diagnosis with coronary artery disease (CAD), CAD risk is intermediate or high and **ANY** of the following:
    a. CCTA is appropriate.
    b. SPECT is appropriate with **ANY** of the following:
        i. Atrial fibrillation or atrial flutter
        ii. Chronic kidney disease is stage 3.
        iii. **Contraindication to beta blocker or non-dihydropyridine calcium channel blocker**
        iv. Contrast allergy
        v. Premature ventricular contractiions (PVC) are greater than 20% of heartbeats in a minute.
        vi. Sinus tachycardia
        vii. **CANNOT** hold breath for CT scan

References: [11] [44] [5] [4]

2. Age is over 65 years old or older, **NO** previous diagnosis with CAD **AND** angina is stable; CCTA and SPECT are both appropriate.
References: [11] [44] [5] [4]

LCD 33423
See also, **LCD 33423**: Cardiac Computed Tomography & Angiography (CCTA) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 33457
See also , **LCD 33457** : Cardiac Radionuclide Imaging at https://www.cms.gov/medicare-coverage-database/search.aspx *if appropriate to healthplan membership.*

L33559
See also, **LCD33559**: Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*. (*__NOTE__: *As of 02/28/2025 there is not criteria in LCD 33947 for CT Heart. The criteria is for CCTA only*.)

LCD 33560
See also, **LCD 33560**: Cardiovascular Nuclear Medicine at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

L33947
See also, **LCD33947**: Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 33960
See also, **LCD 33960**: Cardiovascular Nuclear Medicine 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 35121
See also, **35121**: Coronary Computed Tomography Angiography (CCTA) 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*.

2025 Coronary Computed Tomography Angiography (CCTA)

Cardiology/Diagnostic Imaging

Coronary Computed Tomography Angiography (CCTA)

NCD 220.1
See also, **NCD 220.1**: Computed Tomography at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

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.

CCTA Guideline

A coronary computed tomography angiography (CCTA) is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Aneurysm or coronary anomaly (eg, arteriovenous malformations [AVM]), for evaluation and **EITHER** of the following:
    a. Clinical status change or there are new or worsening signs (eg, dizziness, pain, shortness of breath).
    b. Kawasaki disease **OR** multisystem inflammatory syndrome in children (MIS-C)

    References: [31] [16] [39]
2. Congenital or acquired coronary artery abnormality is suspected or known, in a pediatric individual, **AND** prior transesophageal echocardiogram (TEE) is non-diagnostic or indeterminate.
    References: [31] [13]
3. Coronary artery disease (CAD) is suspected, asymptomatic, and **ANY** of the following: (****NOTE***: *If symptomatic refer to CCTA and Nuclear SPECT for Suspected CAD with Stable Symptoms Evaluation guideline)*
    a. Electrocardiogram (ECG) shows evidence of myocardial ischemia (MI) with ischemic ST segment or T wave abnormalities.
    b. Left bundle branch block (LBBB)
    c. Q waves are pathologic.

    References: [31] [17]
4. Heart failure (systolic or diastolic) is newly diagnosed, ejection fraction (EF) is 40% or less **AND** etiology is **NOT** known, to determine ischemic versus non-ischemic disease.

References: [31] [9] [27]

5. Mitral regurgitation is known, to establish etiology.
   References: [31] [10]
6. Peri-procedural for **ANY** of the following:
   a. Pre-procedure for **ANY** of the following:
      i. Aneurysm repair planning
      ii. Electrophysiologic procedure planning for evaluation of anatomy prior to radiofrequency ablation
      iii. Prior to cardiac or other chest surgery to determine location of CABG
      iv. Valve surgery or transcatheter intervention, as an alternative to coronary angiography
   b. Post-procedure and **ANY** of the following:
      i. Percutaneous coronary intervention (eg, stents more than 3 mm) **OR** coronary artery bypass graft (CABG) history, **AND** individual is symptomatic (eg, chest pain, shortness of breath).
      ii. Post-operative to evaluate CABG patency when invasive coronary arteriography is **NOT** completed, non-diagnostic or indeterminate.

   References: [31] [11] [13] [38] [26]
7. Stress imaging and **ANY** of the following:
   a. Exercise ECG stress test with intermediate Duke Treadmill Score (-10 to +4)
   b. Pretest probability is intermediate or high.
   c. Stress imaging (prior) is normal, non-diagnostic or indeterminate **AND** CAD symptoms are new or worsening.

   References: [31] [23] [21] [20]

L33947
See also, **LCD33947**: Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

L33559
See also, **LCD33559**: Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*. (*__NOTE__: *As of 02/28/2025 there is not criteria in LCD 33947 for CT Heart. The criteria is for CCTA only*.)

LCD 33423
See also, **LCD 33423**: Cardiac Computed Tomography & Angiography (CCTA) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 35121
See also, **35121**: Coronary Computed Tomography Angiography (CCTA) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

CCTA Procedure Code

Table 1. CCTA associated Procedure Codes

Codes	Description
75574	Computed tomographic angiography, heart, coronary arteries and bypass grafts (when present), with contrast material, including 3D image postprocessing (including evaluation of cardiac structure and morphology, assessment of cardiac function, and evaluation of venous structures, if performed)

CCTA Summary of Changes

Coronary computed tomography angiography (CCTA) had the following version changes from 2024 to 2025:

- Added "Congenital or acquired" indication per ACR.
- Citations updated per the evidence.
- Removed "Symptoms including" under "CAD is suspected" indication to keep in line with current evidence.

- 7/10/20256 Mid-cycle update
  - Added time frame to "post-surgical assessment" in "Pre-procedural"

2025 Nuclear Cardiology

Cardiology/Diagnostic Imaging

Nuclear Cardiology NCD

NCD 220.6.1
See also, **NCD 220.6.1**: PET for Perfusion of the Heart at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

NCD 220.6.8
See also, **NCD 220.6.8**: FDG PET for Myocardial Viability at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

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.

Multiple Gated Acquisition (MUGA) Scan/Cardiac Blood Pool Imaging Guideline

Multiple gated acquisition (MUGA)/Cardiac blood pool imaging is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Cardiomyopathy (acquired or inherited) is suspected or known and **ANY** of the following:
   a. Known in a first degree relative (child, parent, sibling)
   b. Signs/symptoms (eg, chest pain, dyspnea, fatigue) are new or progressing and ischemic work-up (eg, cardiac markers [eg, creatinine kinase [CK], troponin], electrocardiogram [ECG]) is completed.

c. Suspected and prior imaging is non-diagnostic or indeterminate.

References: [7] [20]

2. Cardiotoxic medication use, transthoracic echocardiogram (TTE) is non-diagnostic or indeterminate and **ANY** of the following:
   a. Left ventricular (LV) function evaluation, for baseline and treatment monitoring
   b. Long-term surveillance after therapy is completed; follow-up every 6 to 12 months or at the discretion of the provider.
   c. Signs/symptoms (eg, chest pain, dyspnea, fatigue) are new or progressing.

   References: [7] [20]
3. Congenital heart disease is known and prior imaging is non-diagnostic or indeterminate.
   References: [7] [20]
4. Heart failure (HF) is suspected or known, based on signs/symptoms (eg, dyspnea, fatigue, orthopnea) or laboratory results (eg, complete blood count [CBC], ECG, electrolytes), prior imaging is non-diagnostic or indeterminate and **ANY** of the following:
   a. Diastolic or systolic assessment
   b. Etiology assessment
   c. Signs/symptoms are new or progressing with **NO** change in diet or medications.

   References: [7] [20] [22] [21]
5. LV function evaluation, when heart disease (eg, congenital, coronary artery disease [CAD], myocardial disease, valvular heart disease) is known and **ANY** of the following:
   a. Ejection fraction (EF) evaluation when prior imaging is non-diagnostic or indeterminate.
   b. Systolic dysfunction is known (EF less than 50%) from prior TTE, for treatment management.
   c. TTE is non-diagnostic or indeterminate, for treatment management.

   References: [7] [20] [22]
6. Myocardial infarction (MI) is acute, for LV function evaluation when prior imaging is non-diagnostic or indeterminate.
   References: [7] [20]
7. Revascularization and/or optimal medical therapy is achieved for implantable cardioverter-defibrillator/cardiac resynchronization therapy (ICD/CRT) **OR** device therapy pre-procedural planning.
   References: [7] [20]

8. Structural heart disease is known, signs/symptoms (eg, chest pain, dyspnea, fatigue) are new or progressing and ischemic work-up (eg, cardiac markers [eg, CK, troponin], ECG) is completed.
   References: [7] [20]
9. Ventricular tachycardia (VT) or ventricular fibrillation is sustained and prior imaging is non-diagnostic or indeterminate.
   References: [7] [20]

Myocardial Infarct Imaging Guideline

Myocardial infarct imaging (planar or single photon emission computerized tomography [SPECT]) is considered medically appropriate when the documentation demonstrates **ANY** of the following: (*__NOTE:__ *optimally performed 48-72 hours post-event.*)

1. Evaluation for subendocardial (non-Q-wave) infarction versus ischemia
   References: [20] [19] [10]
2. Myocardial infarction, acute, is suspected in the past 7 days and **ANY** of the following:
   a. Cardiac markers (eg, creatinine kinase [CK], troponin) are abnormal.
   b. Electrocardiogram (ECG), baseline, is abnormal.
   c. Left bundle branch block (LBBB)

   References: [20] [19]
3. Post cardioversion
   References: [20] [19]
4. Post-surgical, major cardiac procedure
   References: [20] [19] [12]
5. Significant chest trauma, presenting with chest pain
   References: [20] [19]

Contraindications and Exclusions to Myocardial Perfusion Imaging (MPI)

Contraindications and exclusions to myocardial perfusion imaging (MPI) may include **ANY** of the following:

- Angina is high risk, unstable or complicated acute coronary syndrome or acute myocardial infarction was less than 2 days ago.
  Reference: [11]

- Atrial (pulmonary) hypertension is systemic and severe.
  Reference: [11]
- Body mass index (BMI) is more than 40 (relative contraindication due to suboptimal image quality).
  Reference: [11]
- Pregnant or lactating women
  Reference: [11]
- Vasodilators are **contraindicated**.
  Reference: [11]

Myocardial Perfusion Imaging (MPI)

A myocardial perfusion imaging (MPI) (planar, single photon emission computerized tomography [SPECT]) is considered medically appropriate when the documentation demonstrates **ANY** of the following: (*__NOTE__: **STRONG RECOMMENDATION:** *An electrocardiogram [ECG] within 30 days of request for a myocardial perfusion imaging (MPI) is strongly recommended. The findings on the resting ECG may be important in determining the need for imaging, the selection of appropriate imaging protocol and may show evidence of ischemia at rest or interval myocardial infarction.*)

1. Chest pain or anginal equivalents are known and **ANY** of the following:
   a. Acute coronary syndrome (ACS) is suspected, **NO** ischemic changes on electrocardiogram (ECG) **AND** initial troponin is negative.
   b. Chest pain or anginal equivalents are persistent and **ANY** of the following:
      i. Ischemic heart disease is known and **NO** prior treatment.
      ii. **NO** obstructive coronary artery disease (CAD) and/or ischemic heart disease and ECG is completed.

   References: [23] [7] [8] [11] [3] [24] [14]
2. Acute coronary syndrome (ACS) history **WITHOUT** prior coronary evaluation (invasive or non-invasive)
   References: [23] [7] [8]
3. Arrhythmia is known, **NO** prior cardiac evaluation and **ANY** of the following:
   a. Anti-arrhythmic medications evaluation prior to starting regimen and CAD risk is high.
   b. Premature ventricular contractions (PVC) are frequent (30 or more an hour on remote monitoring) and CAD risk is low to intermediate.

c. Ventricular tachycardia (VT) and **ANY** of the following:

i. Exercise induced and CAD risk is intermediate.

ii. Non-sustained and CAD risk is intermediate or high.

iii. Sustained, clinically stable (**NO** altered mental status, chest pain, heart failure or hypotension) and CAD risk is intermediate to high.

References: [23] [7] [8]

4. Asymptomatic and **ANY** of the following: (*__NOTE__: *If symptomatic refer to CCTA and Nuclear SPECT for Suspected CAD with Stable Symptoms Evaluation guideline)*

a. Atherosclerotic cardiovascular disease (ASCVD) is high risk (more than 20%) **AND** calcium score is 400 Agatston to 1000 Agatston. (*__NOTE__: *Use ASCVD Risk Estimator Plus to determine risk level*: https:// tools.acc.org/ascvd-risk-estimator-plus/#!/calculate/estimate/)

b. CAD is suspected on prior CCTA or invasive coronary angiography (ICA).

c. Computed tomography (CT) heart with calcium scoring is more than 1000 Agatston.

d. Coronary vasculitis history with evidence of structurally abnormal coronary arteries (eg, aneurysm)

e. Left bundle branch block (LBBB) is new.

f. Left ventricular systolic dysfunction

g. Peripheral vascular disease (PVD) is **known**.

h. Prior testing is abnormal, non-diagnostic or indeterminate.

References: [23] [7] [8] [23]

5. Cardiomyopathy and **ANY** of the following: [18]

a. Cardiac amyloidosis is known to aid in the diagnosis of transthyretin amyloidosis cardiomyopathy (ATTR-CM). (**NOTE**: ***NOT*** *to be used for diagnosis of cardiac light chain amyloidosis*.) [6]

b. Ischemic cardiomyopathy is known for assessment of myocardial viability. [1]

c. Left ventricular (LV) hypertrophy is known, symptomatic (eg, chest pain, dyspnea, palpitations), with comorbidity (eg, arterial hypertension, diabetes mellitus, obesity) and transthoracic echocardiogram (TTE) is complete. [17]

d. Sarcoidosis, cardiac, is suspected or known. [15] [29]

e. Symptomatic (eg, dyspnea, fatigue, palpitations), when exercise stress test is completed **DESPITE ANY** of the following:

i. Prior angiography **EXCLUDES** CAD.

ii. Prior SPECT is normal.

References: [23] [7] [8] [18]

6. Chronic coronary disease is known, symptoms are progressing **OR** functional capacity worsens despite guideline directed medical therapy (GDMT) and **ANY** of the following:
   a. Myocardial ischemia is suspected or to determine extent of myocardial ischemia.
   b. Major adverse cardiovascular events (MACE), to evaluate risk estimate
   c. Treatment planning

   References: [23] [7] [8] [26]

7. Coronary artery abnormality/anomaly, congenital or acquired, is suspected or known, in a pediatric individual, and transthoracic echocardiogram (TTE) is non-diagnostic or indeterminate.
   References: [13] [23] [7]

8. Exercise treadmill is non-diagnostic or indeterminate and ECG demonstrates **ANY** of the following:
   a. Digoxin effect
   b. Left bundle branch block (LBBB)
   c. Left ventricular hypertrophy and repolarization is abnormal.
   d. Pre-excitation syndromes (eg, Wolff-Parkinson-White syndrome)
   e. ST depression is 1 mm or more demonstrated on recent ECG (within the last 30 days).
   f. Ventricular paced rhythm

   References: [23] [7] [8] [4]

9. Heart failure (HF) is known, **NO** previous CAD evaluation and **ANY** of the following:
   a. Ejection fraction (EF) is reduced (less than 40%).
   b. HF with preserved EF (EF is 50% or more) is new, risk of CAD is intermediate or high **AND NO** history of CAD.
   c. Viability and hibernation (reduced contractility) assessment is ongoing. [1]

   References: [23] [7] [8] [27]

10. Kawasaki disease and aneurysm is known.
    References: [23] [7] [8] [25]

11. Left ventricular systolic dysfunction is known and **EITHER** of the following:
    a. **NO** angina, to rule out CAD.
    b. **WITHOUT** severe valvular disease

    References: [23] [7] [8] [16]

12. Obesity is advanced (body mass index [BMI] is more than 35 up to 40 m^2/kg) **OR** women with large or dense breasts.
    References: [23] [7] [8]

13. Post-surgical assessments (within 90 days of procedure) for evaluation of complications or disease recurrence.
    References: [23] [7] [8] [30] [9]

14. Radiation therapy to anterior or left chest is known, for follow-up 5 years after initiation and every 5 years thereafter.
    References: [23] [7] [8]

Nuclear Cardiology LCD

LCD 33457
See also , **LCD 33457** : Cardiac Radionuclide Imaging at https://www.cms.gov/medicare-coverage-database/search.aspx *if appropriate to healthplan membership.*

LCD 33560
See also, **LCD 33560**: Cardiovascular Nuclear Medicine at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 33960
See also, **LCD 33960**: Cardiovascular Nuclear Medicine 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 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*.

Multiple Gated Acquisition (MUGA) Scan and Cardiac Blood Pool Imaging Procedure Codes

Table 1. Cardiac Blood Pool Imaging (Multigated Acquisition (MUGA) and Planar) Associated Procedure Codes

CODE	DESCRIPTION
78472	Cardiac blood pool imaging, gated equilibrium; planar, single study at rest or stress (exercise and/or pharmacologic), wall motion study plus ejection fraction, with or without additional quantitative processing
78473	Cardiac blood pool imaging, gated equilibrium; multiple studies, wall motion study plus ejection fraction, at rest and stress (exercise and/or pharmacologic), with or without additional quantification
78481	Cardiac blood pool imaging (planar), first pass technique; single study, at rest or with stress (exercise and/or pharmacologic), wall motion study plus ejection fraction, with or without quantification
78483	Cardiac blood pool imaging (planar), first pass technique; multiple studies, at rest and with stress (exercise and/or pharmacologic), wall motion study plus ejection fraction, with or without quantification
78494	Cardiac blood pool imaging, gated equilibrium, SPECT, at rest, wall motion study plus ejection fraction, with or without quantitative processing

Myocardial Infarct Imaging Procedure Codes

Table 1. Infarction Imaging Associated Procedure Codes

CODE	DESCRIPTION
78466	Myocardial imaging, infarct avid, planar; qualitative or quantitative
78468	Myocardial imaging, infarct avid, planar; with ejection fraction by first pass technique
78469	Myocardial imaging, infarct avid, planar; tomographic SPECT with or without quantification

Myocardial Perfusion Imaging (MPI) Procedure Codes

Table 1. Myocardial Perfusion Imaging Associated Procedure Codes

CODE	DESCRIPTION
78451	Myocardial perfusion imaging, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); single study, at rest or stress (exercise or pharmacologic)
78452	Myocardial perfusion imaging, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); multiple studies, at rest and/or stress (exercise or pharmacologic) and/or redistribution and/or reinjection
78453	Myocardial perfusion imaging, planar (including qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); single study, at rest or stress (exercise or pharmacologic)
78454	Myocardial perfusion imaging, planar (including qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); multiple studies, at rest and/or stress (exercise or pharmacologic) and/or redistribution and/or reinjection

Nuclear Cardiology Summary of Changes

Nuclear Cardiology had the following version changes from 2024 to 2025:

- Added the following to keep in line with current evidence:
  - Added "Cardiac amyloidosis" in Myocardial Infarct Imaging to keep in line with current research.
  - Added parameters to "ACS is suspected" under "Chest pain is known" in MPI
  - "Chest pain is acute" under "Chest pain is known"
  - "Stable" under "Chest pain is known"
  - "**NO** known CAD" under "Pretest probability is intermediate or high"
- 12/24/2024 update:
  - MPI:
    - Added the following to keep in line with current evidence:
      - "Kawasaki disease and aneurysm is known"
      - "Exercise treadmill is"
- 1/17/2025 update:
  - MPI:
    - Added the following to keep in line with current evidence:

        - "Left bundle branch block (LBBB) is new." under "Asymptomatic"
        - "Left ventricular systolic dysfunction" under "Asymptomatic"
    - Changed the following to keep in line with current evidence:
        - "Peri-procedural for **ANY** of the following:" to "Post-surgical assessments for evaluation of complications or disease recurrence.."
    - Removed the following as current evidence no longer supports the indication:
        - "Hypercholesterolemia family history" under "Chest pain or anginal equivalents"
        - Indications under "Left ventricular hypertrophy is known"
        - Indications under "Prior testing is abnormal, non-diagnostic or indeterminate" as they were redundant
        - "Men less than 40 years old or women less than 45 years old" under "Chest pain or anginal equivalents"
        - "Prior stress testing is completed and **ANY** of the following:"
- 4/23/2025: Mid-cycle update
    - Removed NCD 220.12 as there is no clinical indications included.
- 7/11/2025 Mid-Cycle update:
    - MPI:
        - Added examples to the following:
            - "Left ventricular hypertrophy" under "Cardiomyopathy"
            - "Symptomatic" under "Cardiomypathy"
        - Added time frame for "Post-surgical assessments"

Nuclear Cardiology Procedures References

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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:

11248 11249 11253 11282 11325 11328 11333 11349 11350 11351 11352 11354 11355 11356 11358 11359 11360 11361 11362 11365 11366 11367 11368 11369 11370 11374 11375 11394 11395 11396 11565

CCTA/Nuclear Cardiology Definitions

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 refers to weakness in an artery wall, 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. USA is an emergent diagnosis and would typically only be appropriate in an inpatient setting.

Anomaly is something different, abnormal, peculiar or not easily classified.

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.

Arteriovenous malformations (AVM) are congenital high-flow vascular malformations characterized by abnormal shunting of blood from high-flow feeding arteries to low-resistance veins via a cluster of aberrant blood vessels termed a central nidus, bypassing the normal capillary bed.

Atherosclerotic cardiovascular disease (ASCVD) is a condition involving the buildup of fibrofatty plaques within arterial walls, leading to significant narrowing and disruption of blood flow, which can result in acute coronary syndrome, myocardial infarction, angina, stroke, transient ischemic attack, peripheral artery disease, and aortic aneurysm, all of atherosclerotic origin.

ASCVD Risk Estimator Plus

ASCVD (atherosclerotic cardiovascular disease) Risk Estimator Plus by the American College of Cardiology is a tool to estimate an individual's 10 year ASCVD risk. The optimal recommended use is to establish a reference point, evaluate the impact of interventions, monitor risk over time, and engage health care discussions and care planning.

The information required to estimate ASCVD risk includes age, sex, race, total cholesterol, HDL cholesterol, systolic blood pressure, blood pressure lowering medication use, diabetes status and smoking status. The ASCVD Risk Estimator Plus is available online at https://tools.acc.org/ascvd-risk-estimator-plus/#!/calculate/estimate/

The ASCVD measures are:

- Low-risk is less than 5%
- Borderline risk is 5% to 7.4%
- Intermediate risk is 7.5% to 19.9%
- High risk is 20% or more

Atherosclerosis is plaque (fatty deposit) build-up in the arteries. The deposits are made up of cholesterol, fatty substances, cellular waste products, calcium and fibrin (a clotting material in the blood). As plaque builds up, the wall of the blood vessel thickens. This narrows the channel within the artery reducing blood flow and lessening the amount of oxygen and other nutrients reaching the body.

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.

Body mass index (BMI) is a person's weight in kilograms (or pounds) divided by the square of height in meters (or feet). A high BMI can indicate high body fatness. BMI screens for weight categories that may lead to health problems, but it does not diagnose the body fatness or health of an individual.

Cardiac ablation is a procedure performed in a cardiac catheterization laboratory during an electrophysiology study (EPS) for the purpose of destroying myocardial tissue by delivery of radio-frequency energy, electrical or cryo-energy. The procedure is used to correct heart arrhythmias.

Cardiac amyloidosis is a heart condition that occurs when abnormally folded proteins, called amyloid fibrils, build up in the heart muscle. These deposits can make it difficult for the heart to function normally and can lead to heart failure.

Cardiac blood pool imaging, also known as cardiac blood pool scan or ejection fraction study, is a test that measures how well the heart pumps blood. During the test, a small amount of a radioactive substance called a tracer is injected into a vein. A gamma camera detects the radioactive material as it flows through the heart and lungs.

Cardiac transplant, also known as a heart transplant, is a surgical procedure that replaces a person's damaged or diseased heart with a healthy donor heart. It's usually performed as a last resort for people with advanced heart failure or severe coronary artery disease when other treatments have failed.

Cardiac/myocardial perfusion single photon emission computed tomography (CSPECT) study, also called cardiac stress-rest test, is used to evaluate the heart's blood supply. Two sets of images showing blood flow are obtained: the first following a period of rest and the second following a period of stress. Myocardial perfusion SPECT is used to evaluate damage that might have been caused by a myocardial infarction and to assess the presence and extent of myocardial ischemia.

Cardiac sarcoidosis is an inflammatory granulomatous disease that can affect the heart. Up to one-quarter of the population with systemic sarcoidosis may have evidence of cardiac involvement. The clinical manifestations of cardiac sarcoidosis (CS) include heart block, atrial arrhythmias, ventricular arrhythmias and heart failure.

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.
Cardiotoxicity is damage to the heart and/or cardiovascular system (including heart valves and vessels) that can occur during or after cancer treatment or other treatments. It isn't common overall but may be common in people who take certain chemotherapy or targeted therapy drugs.
Cardioversion is a medical procedure that restores a normal heart rhythm and it can be performed using electrical shocks or medications.. It's used to treat atrial fibrillation (AFib) and other types of irregular heartbeat or arrhythmia.
Cerebrovascular disease refers to a group of conditions that affect the blood vessels supplying the brain and spinal cord, leading to ischemic or hemorrhagic injury.
Chronic coronary disease (CCD), also known as chronic coronary syndrome or stable ischemic heart disease, is defined as a clinical syndrome characterized by episodes of reversible mismatch in myocardial oxygen supply and demand, primarily due to coronary atherosclerosis, vasospasm or microvascular dysfunction.
Chronic kidney disease (CKD) is classified into five stages based on glomerular filtration rate (GFR):

- Stage 1: GFR 90 mL/min/1.73 m² or more with evidence of kidney damage.
- Stage 2: GFR 60 to 89 mL/min/1.73 m² with evidence of kidney damage.
- Stage 3a: GFR 45 to 59 mL/min/1.73 m²
- Stage 3b: GFR 30 to 44 mL/min/1.73 m²
- Stage 4: GFR 15 to 29 mL/min/1.73 m²
- Stage 5: GFR less than 15 mL/min/1.73 m², indicating kidney failure.

Computed tomography (CT) is an imaging test that uses X-rays to computer analysis to generate cross sectional images of the internal structures of the body that can be displayed in multiple planes.
Computed tomography angiography (CTA) is a medical test that combines a computed tomography (CT) scan with an injection of a special dye to produce pictures of blood vessels and tissues in a part of the body.
Congenital is a condition or trait present from birth.
Coronary angiogram, also known as angiography, is a procedure to evaluate the heart's blood vessels. It's a type of cardiac catheterization, a group of procedures that use narrow tubes called catheters inserted into blood vessels to diagnose or treat heart conditions.
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 calcification (CAC) is a condition where calcium builds up in the walls of the coronary arteries, which supply blood to the heart.

Coronary artery calcium (CAC) scan is a computed tomography (CT) imaging test. It takes cross-sectional images of the vessels that supply blood to the heart muscle to check for the buildup of calcified plaque. CAC scan measures the calcium in the lining of your coronary arteries, called the **coronary artery calcium score**. The CAC score (sometimes called an Agatston score) is calculated based on the amount of plaque observed in the CT scan. It may be converted to a percentile rank based on age and gender. The score can help identify risk for heart disease.

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 artery vasculitis (CAV) is a general term for inflammation of the coronary arteries, which can lead to a number of complications: aneurysm, occlusion, rupture, stenosis, pericarditis, myocarditis and vascular thrombosis.

Coronary Agatston Calcium (CAC) Score is calculated based on the extent of coronary calcification detected by an unenhanced low-dose CT scan (routinely done when a patient has a cardiac CT). It provides risk stratification for a major adverse cardiac event (MACE).

Grading of coronary artery disease (based on total calcium score):

- No evidence of CAD is a calcium score of 0
- Minimal is a calcium score of 1 to 11
- Mild is a calcium score of more than 11 to 100
- Moderate is a calcium score of more than 100 to 400
- Severe is a calcium score more than 400

Assessment of cardiovascular risk:

- Asymptomatic adults with intermediate cardiovascular risk are considered class IIa
- Asymptomatic adults with low-to-intermediate cardiovascular risk are considered class IIb
- Asymptomatic adults that are low cardiovascular risk are considered class III
- Asymptomatic adults with diabetes mellitus and are 40 years of age or older are considered class IIa

Coronary computed tomography angiography (CCTA) uses an injection of iodine-containing contrast material and CT scanning to examine the arteries that supply blood to the heart and determine whether they have been narrowed. The images generated during a CT scan can be reformatted to create three-dimensional (3D) images that may be viewed on a monitor, printed on film or by a 3D printer, or transferred to electronic media.

Creatine kinase, also known as creatine kinase (CK), is an enzyme found primarily in skeletal muscles, heart muscles, and the brain, and elevated levels can indicate muscle damage or disease.
Diabetes mellitus is a metabolic disease that occurs when the body can't produce enough insulin or can't use it properly. DM can also be caused by defects in insulin secretion or action.
Diaphoresis is a medical term for excessive sweating that's not caused by hot temperatures or physical activity. It's also known as secondary hyperhidrosis.
Diastolic heart failure , also known as heart failure with preserved ejection fraction (HFpEF), is characterized by the heart's inability to fill properly due to impaired relaxation and increased stiffness of the ventricular walls, while maintaining normal systolic function.
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

Dyspnea is the sensation of difficult, labored, or unpleasant breathing, often described as breathlessness, chest tightness, or difficulty breathing.
Echocardiography is a diagnostic test which uses ultrasound waves to make images of the heart chambers, valves and surrounding structures. It can measure cardiac output and is a sensitive test for fluid around the heart (pericardial effusion). It can also be used to detect abnormal anatomy or infections of the heart valves.
Ejection fraction (EF) is a measurement of how much blood the left ventricle pumps out with each contraction. It is measured in percentages with a normal measurement usually between 50 and 70%.
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.
Electrophysiologic study (EPS) is an invasive procedure used to diagnose and treat arrhythmias by placing catheters in the heart to record intracardiac electrograms and perform pacing, with risks including cardiac tamponade and life-threatening ventricular arrhythmias.
Functional Capacity is a measure of exercise tolerance (MET) that can be impacted by uncontrolled variables (familiarity with the exercise equipment, level of training and environmental

conditions in the exercise laboratory). MET is a common unit in capacity calculations. Capacity is a strong predictor of mortality and cardiovascular complications across the adult population.

Global Risk of Cardiovascular Disease is a measure of the absolute risk of a coronary heart disease (CHD)-related event over 10 years. The event can be "hard" (eg, myocardial infarction [MI], sudden cardiac death) or "soft" (eg, chest pain). The risk estimate is based on major risk factors and is calculated using an empiric equation. Examples of a risk calculator is the Framingham Risk calculator.

The risk levels are:

- Low risk if less than 10%
- Moderate risk is between 10% to 20%
- High risk is the 10 year absolute risk of more than 20%

Guideline-directed medical therapy (GDMT) for coronary artery disease and chronic coronary disease is a combination of medications and procedures that is recommended for patients with coronary artery disease (CAD) or chronic coronary disease and includes the following medications: at least 1 anti-platelet drug, a statin, a beta-blocker and and angiotensin-converting enzyme inhibitor or angiotensin receptor blocker. GDMT also includes a clinical evaluation and diagnostic testing.

Guideline directed medical therapy (GDMT) for Heart Failure is the cornerstone of pharmacological therapy for patients with heart failure with reduced ejection fraction (HFrEF) and consists of the four main drug classes: renin-angiotensin system inhibitors, evidence-based β-blockers, mineralocorticoid inhibitors and sodium glucose cotransporter 2 inhibitors.

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.

Heart failure with preserved ejection fraction (HFpEF) is a clinical syndrome that occurs when a patient has signs and symptoms of heart failure (HF) but a normal or near-normal left ventricular ejection fraction (LVEF).

Hemodynamic stability refers to the maintenance of adequate blood pressure and perfusion to ensure sufficient oxygen delivery to tissues without the need for excessive pharmacological support.

Table 1. Hemodynamic Assessment

Hemodynamic Parameters	Stable Circulation	Compensated Shock	Hypotensive Shock
Conscious Level	Clear and lucid	Clear and lucid	Restless, combative
Capillary refill	Brisk (less than 2 seconds)	Prolonged (greater than 2 seconds)	Very prolonged, mottled skin
Extremities	Warm and pink	Cool peripheries	Cold, clammy
Peripheral pulse	Good volume	Weak and thready	Feeble or absent
Heart Rate	Normal heart rate for age	Tachycardia for age	Severe tachycardia or bradycardia in late shock
Blood Pressure	Normal blood pressure and pulse pressure for age	Normal systolic pressure but rising diastolic pressure; Narrowing pulse pressure; Postural hypertension	Narrow pulse pressure (greater than or equal to 20 mm/Hg; Hypotension for age; Unrecordable blood pressure
Respiratory Rate	Normal respiratory rate for age	Tachypnea	Hyerpnea or Kussmaul's breathing (metabolic acidosis)
Urine Output	Normal	Reducing trend	Oliguria or anuria

Hibernation, a state of myocardial dysfunction where the heart muscle is viable but has reduced contractility. Hibernation can be partially or completely reversible if blood flow is restored.

Hypercholesterolemia, also known as high cholesterol, is a condition where there are high levels of cholesterol in the blood. It's a type of dyslipidemia, hyperlipoproteinemia, and hyperlipidemia.

Hypoxemia is a medical term that refers to low levels of oxygen in the blood. It's not a condition or illness, but rather a sign of a breathing or blood flow problem.

Implantable cardiac defibrillator (ICD) is a battery-powered device placed under the skin that keeps track of the heart rate. Thin wires connect the ICD to the heart. If an abnormal heart rhythm (heart beating chaotically or much to fast) is detected, the device will deliver a shock to restore a normal heartbeat.

Indeterminate findings are inconclusive or insufficient for treatment planning.

Ischemia is a deficient supply of blood to a body part (such as the heart or brain) due to obstruction of the inflow of arterial blood.

Ischemic cardiomyopathy is a type of dilated cardiomyopathy. It is a term that is used when the heart muscle is weakened as a result of coronary artery disease or myocardial infarction.

Kawasaki disease is an acute, self-limited vasculitis that predominantly affects children under 5 years old and can lead to coronary artery aneurysms if untreated. It is characterized by prolonged fever, rash, conjunctivitis, lymphadenopathy, mucocutaneous changes, and extremity changes such as erythema and edema.

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 dysfunction is the inability of the ventricle to fill to a normal end-diastolic volume, both during exercise as well as at rest, while left atrial pressure does not exceed 12 mm Hg.

Left ventricular ejection fraction (LVEF), also known as ejection fraction (EF), is defined as the percentage of blood ejected from the left ventricle during each contraction.

Left ventricular hypertrophy (LVH) is an increase in the thickness of the left ventricular wall, often due to chronic pressure or volume overload, and can lead to heart failure.

Light chain amyloidosis or primary amyloidosis, is the most common type of systemic amyloidosis. It is a protein misfolding and metabolism disorder in which insoluble fibrils are deposited in various tissues, causing organ dysfunction and eventually death.

Major adverse cardiovascular events (MACE) include cardiovascular death, non-fatal myocardial infarction (MI), and non-fatal stroke.

Metabolic equivalents are defined as caloric consumption (by means of breathing) of an active individual compared with their resting basal metabolic rate. It is based on how much oxygen the body consumes during activity compared to how much oxygen the body consumes at rest.

Mitral valve regurgitation is a condition where blood leaks from the mitral valve back into the heart. The mitral valve separates the two chambers of the heart's left side. When the valve doesn't close completely, blood flows backward into the upper heart chamber from the lower chamber.

Multigated acquisition (MUGA) scan is a noninvasvie nuclear imaging test also known as radionucleotide ventriculography (RVG) and gated equilibrium radionucleotide angiography (ERNA). that uses a radioactive isotope called technetium tagged to red blood cells (RBC) to evaluate the filling and pumping properties of the heart and physical structures by comparing the illuminated blood pool to the darkened walls on the image. Single or multiple measurements of left and/or right ventricular function are obtained. The method can be used to assess regional and global wall motion; cardiac chamber size and morphology; and ventricular systolic and diastolic function, including left and right ventricular ejection fractions.

Multisystem inflammatory syndrome in children (MIS-C) causes different body parts to become inflamed, including the heart, lungs, kidneys, brain, skin, eyes or gastrointestinal tract. MIS-C can be serious, even deadly, but most children who are diagnosed with this condition get better with medical care.

Myocardial infarction (MI) is an acute episode of coronary heart disease marked by the death or damage of heart muscle due to insufficient blood supply to the heart, usually as a result of a coronary artery becoming blocked by a blood clot formed in response to a ruptured or torn fatty arterial deposit.

Myocardial ischemia occurs when blood flow to the heart is reduced, preventing the heart muscle from receiving enough oxygen. The reduced blood flow is usually the result of a partial or complete blockage of the heart's arteries (coronary arteries).

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.

Non-diagnostic is a result that does not lead to a confirmed diagnosis.

Obstructive CAD is the most common type of coronary heart disease. It occurs when plaque, a fatty substance, builds up in the coronary arteries, causing them to narrow.

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.

Pediatric approximate ages are defined by the US Department of Health (USDH), the Food and Drug Administration (FDA), and the American Academy of Pediatrics (AAP) as the following:

- Infancy, between birth and 2 years of age
- Childhood, from 2 to 12 years of age
- Adolescence, from 12 to 21 years of age, further defined by the AAP into:
    1. Early (ages 11–14 years)
    2. Middle (ages 15–17 years),
    3. Late (ages 18–21 years)
    4. Older ages may be appropriate for children with special healthcare needs.

Percutaneous coronary intervention (PCI) is a non-surgical procedure that uses a catheter (a thin flexible tube) to place a small structure called a stent to open up blood vessels in the heart that have been narrowed by plaque buildup, a condition known as atherosclerosis.

Peripheral vascular disease is a blood circulation disorder that causes the blood vessels outside of the heart and brain to narrow, block or spasm.

Peri-procedural is the period before, during and after a procedure. The time frames vary based on surgical urgency and recovery ability the performance of a medical procedure.

Premature Ventricular Contraction (PVC) is a too-early heartbeat that originates in the ventricles (lower pumping chambers of the heart) and disrupts the heart's normal rhythm.

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.

Pretest probability of CAD by age, gender and symptoms

Table 2. 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
	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

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.

Renal failure, also known as kidney failure, is a condition where the kidneys are no longer able to function properly to remove waste and excess water from the blood.

Renal insufficiency is poor function of the kidneys that may be due to a reduction in blood-flow to the kidneys caused by renal artery disease.

Sarcoidosis is a chronic disease of unknown cause, that is characterized by the formation of nodules, especially in the lymph nodes, lungs, bones and skin.

Single-photon emission computed tomography (SPECT) is a nuclear imaging test that uses a radioactive substance and a special camera to create 3D images of the body's organs, tissue and bones. The images show how blood flows to tissues and organs.

ST segment encompasses the region between the end of ventricular depolarization and beginning of ventricular repolarization on the ECG.

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

Stent is a small, expandable tube that is placed into a hollow structure in the body. Stents are often used to treat narrowed or weak blood vessels, such as arteries, veins or the ureter.

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.

Subendocardial infarct results in necrosis exclusively inolving the innermost aspect of the myocardium. Usually a subendocardial infarct is the result of a partially occluded epicardial coronary artery,

Syncope is loss of consciousness resulting from insufficient blood flow to the brain.

Systolic heart failure is a specific type of heart failure that occurs in the heart's left ventricle.

T wave represents the repolarization of the ventricles. The interval from the beginning of the QRS complex to the apex of the T wave is referred to as the absolute refractory period. The last half of the T wave is referred to as the relative refractory period or vulnerable period.

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.

Transplant coronary vasculopathy, also known as cardiac allograft vasculopathy (CAV), is a chronic disease that affects the blood vessels of a transplanted heart. CAV is a long-term complication that occurs when the immune system attacks the transplanted heart, causing the blood vessels to narrow and eventually block.

Transpositon of the Great Arteries is a birth defect of the heart in which the two main arteries carrying blood out of the heart – the main pulmonary artery and the aorta – are switched in position, or "transposed."

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.

Transthyretin amyloid cardiomyopathy (ATTR-CM) is a rare but severe cause of restrictive cardiomyopathy caused by the accumulation of transthyretin fibrils in the myocardium. It can present with new or worsening heart failure or new conduction system disease.

Troponin is a protein that's found in the cells of the heart muscle. Normally, troponin levels in blood are so low that only the most sensitive types of tests can measure them. But if the heart muscle is damaged, troponin leaks into the bloodstream, and the troponin blood levels will rise.

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.
Vasculitis involves inflammation of the blood vessels. The inflammation can cause the walls of the blood vessels to thicken, which reduces the width of the passageway through the vessel. If blood flow is restricted, it can result in organ and tissue damage.
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.

Viability assessment is an imaging study used to assess how much heart muscle has been damaged by a heart attack or heart disease. This test is used to determine whether a patient may need angiography, cardiac bypass surgery, heart transplant or other procedures.

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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:

11248 11249 11253 11282 11325 11328 11333 11349 11350 11351 11352 11354 11355 11356 11358 11359 11360 11361 11362 11365 11366 11367 11368 11369 11370 11374 11375 11394 11395 11396 11565