2027
Evolent Clinical Guidelines for Medical Necessity Review

Interventional Cardiology

Effective January 1, 2027 – December 31, 2027

Guidelines for Clinical Review Determination

Preamble

Evolent is committed to the philosophy of supporting safe and effective treatment for patients. The medical necessity criteria that follow are guidelines for the provision of diagnostic imaging. These criteria are designed to guide both providers and reviewers to the most appropriate diagnostic tests based on a patient's unique circumstances. In all cases, clinical judgment consistent with the standards of good medical practice will be used when applying the guidelines. Determinations are made based on both the guideline and clinical information provided at the time of the request. It is expected that medical necessity decisions may change as new evidence-based information is provided or based on unique aspects of the patient's condition. The treating clinician has final authority and responsibility for treatment decisions regarding the care of the patient.

Guideline Development Process

These medical necessity criteria were developed by Evolent for the purpose of making clinical review determinations for requests for therapies and diagnostic procedures. The developers of the criteria sets included representatives from the disciplines of radiology, internal medicine, nursing, cardiology, and other specialty groups. Evolent's guidelines are reviewed yearly and modified when necessary following a literature search of pertinent and established clinical guidelines and accepted diagnostic imaging practices.

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Evolent Clinical Guideline 7251 for Abdominal Aortic and Iliac Arterial and Venous Ultrasound

Guideline Number: Evolent_CG_7251	**Applicable Codes**	
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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for an abdominal aortic ultrasound/duplex scan.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Abdominal Aorta and Iliac Arteries

Evaluation of the abdominal aorta can be performed for multiple reasons including screening in asymptomatic patients, diagnosis of suspected aneurysm, suspected other aortoiliac pathology such as inflammatory conditions, wall abnormalities, or obstruction to flow related to atherosclerosis, embolism or tumor.

- Once in a lifetime screening for AAA in men 65 to 75 years of age with a smoking history or those with a family history of AAA. Specifically, these patients have no other clinical

history or finding to support investigating the abdominal aorta. The test is performed only using B mode grayscale ultrasound and should be requested using CPT code 76706. CPT codes 93978 or 93979 cannot be used for this once in a lifetime screening. [6–8] (**AUC Score 8**) [9]

- In men or women, with or without a smoking history, with first-degree relatives having abdominal aortic aneurysm (AAA) [6,10] (**AUC Score 8**) [9]
- In men or women < 65 years old with smoking history, hypertension, hyperlipidemia **OR** inherited vascular connective tissue disorder [6]
- In patients with abdominal pain, flank pain, and lower back pain [10,11]
- In patients with femoral, thoracic, or popliteal aneurysms [12]
- In patients with palpable or pulsatile abdominal mass or abdominal bruit [11]
- In patients with lower extremity peripheral artery disease (LE-PAD) presenting with intermittent claudication symptoms or Chronic Limb threatening Ischemia (CLTI) [13,14]
- In patients with thromboembolic events or neurologic deficit in a lower extremity [6]

Surveillance of Abdominal Aortic Dilation and Aneurysm

- In patients with an AAA of 2.5-2.9 cm every 10 years [7]
- In patients with an AAA of 3.0-3.9 cm every 3 years [6,7,10]
- In patients with an AAA of 4.0-4.9 cm every year [6,7] (**AUC Score 7**) [9]
- In men with an AAA of ≥ 5.0 cm (threshold for AAA repair is ≥ 5.5 cm diameter in men) **OR** women with an AAA of ≥ 4.5 cm every 6 months (threshold for AAA repair is ≥ 5.0 cm diameter in women) [6,7]

Surveillance of Iliac Artery Aneurysm

- In patient with iliac artery aneurysm [15]:
  - 2.0 - 2.4 cm in diameter every 3 years
  - 2.5 - 2.9 cm in diameter every 2 years
  - ≥ 3.0 cm in diameter every 6 months (threshold for repair is 3.5 cm)

Surveillance after Abdominal Aortic Aneurysm Intervention

- In patients with AAA after open repair within 1 post-operative year and every 5 years thereafter [7]
- In patients who have had aortoiliac surgery for indication other than aneurysm, e.g. aortobifemoral bypass, a baseline at one month, then 6 months, then 12 months then yearly if stable [16]
- In patients with AAA treated with EVAR (endovascular abdominal aortic aneurysm repair), baseline surveillance imaging with cardiovascular CT is typically performed within 1 month postoperatively [7], and timing of an ultrasound is defined as follows:

- In the absence of endoleak or sac enlargement, ultrasound can be done at 12 months and then every year [6,7,10] (**AUC Score 7**) [9]
- In patients with type II endoleak observed, ultrasound can be done one month after EVAR and at 6-month intervals [10] during the first year and every 2-3 years thereafter [7]
- In patients with type II endoleak associated with an aneurysm sac, ultrasound can be done at 6-month intervals for 24 months and then annually [10] (**AUC Score 8**) [9]
- In low-risk patients (early sac shrinkage > 10 mm and < 70 years old with no endoleak), ultrasound can be done every 2 years [7]

Inferior Vena Cava (IVC) and Iliac Veins [17–19]

- Prior to or during IVC placement to support treatment planning or IVC filter placement
- To evaluate for the presence of an IVC filter
- In the evaluation of suspected deep vein thrombophlebitis in conjunction with a venous duplex of the lower extremity, or selectively after such a lower venous test is positive for thrombophlebitis
- In the evaluation of lower extremity swelling in conjunction with a lower extremity venous duplex or separately after a lower extremity venous test is found to be normal
- In the evaluation of unilateral leg swelling especially if left sided for possible May - Thurner Syndrome
- Evaluation of abdominal wall venous collaterals
- In the evaluation of suspected venous ulceration despite absent or previously treated lower extremity venous reflux
- In the presence of absence of common femoral vein phasic flow
- In the evaluation of Pelvic Congestion Syndrome and other abdomino-pelvic venous disorders

CODING AND STANDARDS

Codes

Code	Description
76706	Ultrasound, abdominal aorta, real time with image documentation, screening study for abdominal aortic aneurysm (AAA)
93978	Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts; complete study

Code	Description
93979	Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts; unilateral or limited study

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

An abdominal ultrasound uses reflected sound waves to obtain anatomic and physiologic information of the abdominal aorta. It is commonly performed to diagnose an abdominal aortic aneurysm. An abdominal aortic aneurysm is defined as an increased internal diameter of the abdominal aorta of 3.0 cm or greater.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AAA: Abdominal aortic aneurysm

CLTI: Chronic Limb Threatening Ischemia

EVAR: Endovascular abdominal aortic aneurysm repair

IVC: Inferior Vena Cava

SUMMARY OF EVIDENCE

The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm [10]

Study Design: This guideline was developed by the Society for Vascular Surgery (SVS) and involved a systematic review of the literature to generate practice recommendations using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system.

Target Population: The guideline focused on patients with abdominal aortic aneurysms (AAA), including those undergoing elective and emergent repair.

Key Factors: The guideline provided recommendations for the care of patients with AAA, including the general approach to the patient, treatment options, anesthetic considerations, perioperative management, and long-term management. It emphasized the importance of surveillance imaging, the use of endovascular repair for ruptured aneurysms, and the need for antibiotic prophylaxis before dental procedures for patients with an aortic prosthesis.

2022 ACC/AHA Guideline for the Diagnosis and management of Aortic Disease [6]

Study Design: This guideline was developed by the American Heart Association (AHA) and American College of Cardiology (ACC) Joint Committee on Clinical Practice Guidelines. It involved a comprehensive literature search and review of studies, reviews, and other evidence conducted on human subjects.

Target Population: The guideline focused on patients with aortic disease, including those with asymptomatic, stable symptomatic, and acute aortic syndromes.

Key Factors: The guideline provided recommendations for the diagnosis, genetic evaluation, family screening, medical therapy, endovascular and surgical treatment, and long-term surveillance of patients with aortic disease. It emphasized the role of shared decision-making, the importance of institutional interventional volume, and multidisciplinary team expertise in the care of patients with aortic disease.

ACCF/ACR/AIUM/ASE/ASN/ICAVL/SCAI/SCCT/SIR/SVM/SVS 2012 Appropriate Use Criteria for Peripheral Vascular Ultrasound and Physiological Testing Part I: Arterial Ultrasound and Physiological Testing [9]

Study Design: This study was a comprehensive review conducted by the American College of Cardiology Foundation (ACCF) in partnership with various specialty societies. It involved a review of common clinical scenarios where noninvasive vascular testing, including ultrasound, is frequently considered.

Target Population: The study focused on patients with peripheral vascular disease, including those with suspected or known non-coronary arterial disorders such as atherosclerotic occlusive disease, abdominal aortic aneurysms, and other less common disorders like fibromuscular dysplasia and arterial dissection.

Key Factors: The study emphasized the importance of appropriate use criteria (AUC) for peripheral vascular ultrasound and physiological testing. It categorized clinical scenarios into appropriate, uncertain, and inappropriate use based on a scoring system. The study highlighted

the need for standardized scanning protocols, interpretation by credentialed physicians, and the impact of ultrasound on clinical decision-making and therapeutic interventions.

ANALYSIS OF EVIDENCE

Shared Conclusions [6,9,10]

All three articles agree on the importance of using abdominal aortic ultrasound for the diagnosis and management of aortic diseases. They emphasize the need for standardized protocols and credentialed professionals to ensure accurate and effective use of ultrasound. Additionally, they highlight the role of ultrasound in guiding clinical decision-making and therapeutic interventions.

In summary, while all three articles highlight the importance of abdominal aortic ultrasound, they differ in their focus and scope. Mohler et al 2012 emphasizes appropriate use criteria, Isselbacher et al 2022 provides a comprehensive guideline for aortic disease management, and Chaikoff et al 2018 focuses on the care of patients with AAA.

POLICY HISTORY

Date	Summary
May 2026	• Guideline name changed to Abdominal Aortic and Iliac Arterial and Venous Ultrasound • Clarified indications for abdominal aortic and iliac arteries, as well as indications for surveillance of arterial aneurysms • Added indications for procedures evaluating the inferior vena cava and iliac veins • Added technical description to codes • Updated references
June 2025	• Added third bullet to General Information • Checked Medicare Advantage Line of Business • Added Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7252 for Ambulatory Rhythm Monitoring

Guideline Number: Evolent_CG_7252	**Applicable Codes**	
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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations*

Purpose

To identify appropriate use for ambulatory rhythm monitoring.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR AMBULATORY RHYTHM MONITORING [6]

- Palpitations are the most common indication for ambulatory heart rhythm monitoring
- Evaluation of arrhythmia drug therapy change including dosage alterations
- Patients with suspected epilepsy in whom treatment has been ineffective [7]
- Patients with unexplained falls suspected to have an arrhythmic origin [7]
- Suspected pacemaker malfunction, based on history and physical exam

- Syncope:
  - Symptom/rhythm correlation remains the cornerstone of the diagnostic efforts in syncope to confirm the involvement of the cardiac electrical system in the origin of syncope. The choice of monitoring modality depends on the frequency of the events
- Symptoms that may be due to cardiac arrhythmias and for which ambulatory monitoring is appropriate, include:
  - Shortness of breath
  - Transient chest pain
  - Palpitations (when physical examination and/or standard ECG have not satisfactorily explained the patient's complaints)
- Transient episode of cerebral ischemia, documented cerebrovascular accident (CVA), or recent evidence of cryptogenic stroke, to evaluate for a causation rhythm disturbance (e.g., atrial fibrillation or flutter) [8]
- Patient with a recent acute coronary syndrome:
  - ST-elevation myocardial infarction (STEMI) and non-STEMI when the ejection fraction is borderline (35-40%), or when frequent ventricular ectopy was noted during hospitalization
- Cardiomyopathy:
  - Hypertrophic cardiomyopathy
  - Arrhythmogenic right ventricular cardiomyopathy
  - Dilated or restrictive cardiomyopathy
  - Ischemic cardiomyopathy
- For patients found to have a significant cardiac arrhythmia or conduction disorder (**see list below**) in whom cardiac monitoring is planned for the evaluation and management of the patient:
  - Symptomatic Ectopy
    - Premature ventricular contraction (PVCs) [9]
    - Premature atrial contraction (PACs)
    - Supraventricular tachycardia (SVT) (sustained or non-sustained) [9]
    - Ventricular tachycardia (VT) (sustained or non-sustained) [9]
    - Ventricular fibrillation/flutter [9]
  - Unexplained or symptomatic bradycardia
  - Suspected sinus node dysfunction
  - Paroxysmal atrial fibrillation/flutter [8]
  - Torsade de pointes
  - Wandering atrial pacemaker

- Cardiac arrest, [9] when electrophysiology testing or implantable cardioverter defibrillator (ICD) implantation are not planned

- Post cardiovascular surgery:
  - Indicated for outpatient arrhythmia monitoring of rhythm disturbances noted during hospitalization
- Inherited channelopathies:
  - First degree relatives of patients with idiopathic ventricular fibrillation
  - Long and short QT syndromes
  - Brugada syndrome
  - Early repolarization with high-risk features (see **background**)
  - Catecholaminergic polymorphic ventricular tachycardia
- Conduction disorders:
  - New or Intermittent Left Bundle Branch Block (LBBB)
  - High-Degree Atrioventricular (AV) block
  - Second Degree AV Block
  - Transient Complete Heart Block
  - Preexcitation on ECG (Wolf-Parkinson-White), symptomatic or asymptomatic
- Congenital Heart Disease (CHD):
  - Congenital aortic stenosis
  - Pediatrics patients with repaired CHD or with significant residual hemodynamic abnormalities
  - In adults with dextro-Transposition of the Great Arteries (d-TGA) and atrial switch with new or progressive symptoms of heart failure [10]
  - In adults with congenitally corrected transposition of the great arteries (CCTGA) without symptoms to screen for high-grade atrioventricular block [10]
- Autonomic Function Analysis:
  - Heart rate variability may be performed using Holter monitoring. It provides sudden cardiac death risk stratification data post-MI and in patients with heart failure. It has proved useful in patients with resynchronization devices (CRT) to evaluate optimal timing of biventricular pacing.

SELECTION OF DEVICES FOR AMBULATORY RHYTHM MONITORING [6,11]

The choice of a specific cardiac monitor should be determined on the basis of the frequency and nature of symptoms/events [11]

Holter Monitor

Indicated for:

- Screening for unrecognized rhythm disturbances in patients with symptoms that may be related to transient arrhythmias
- Determination of the frequency of known rhythm disturbances (PVCs, runs of NSVT, etc.)
- Identification of asymptomatic atrial fibrillation in patients with TIA or CVA
- Evaluation of unexplained syncope
- Evaluation of palpitations or subjective rhythm complaints that occur frequently enough to be detected within a short period (24-72 hours) of monitoring
- Holter monitoring (48-72 hours) is the modality of first choice in screening patients to detect the frequency of asymptomatic or minimally symptomatic dysrhythmias

Holter monitoring is typically used for **short term (1-2 days), and rarely longer term (up to 2 weeks)** study duration. [12]

Event Recorder

Indicated for:

- Evaluation of frequent, but typically not daily, *symptomatic* episodes potentially related to tachycardia, bradycardia, or conduction disorders. Although auto-activation features exist, these devices are most useful when the patient can identify the symptom and activate the recording feature.

Event Recorders are usually worn for 2-4 weeks.

Wireless Patch Monitoring Systems

Indicated for:

- An alternative to external loop recorder or Holter monitor for both symptomatic and asymptomatic dysrhythmias, likely to occur within 2-4 weeks
- Since it is leadless, can be accurately self-applied, and is largely water resistant, it may be more comfortable and less cumbersome than an external loop recorder, potentially improving compliance
- Unlike Holter monitors and other external monitors, it offers only 1-lead recording

Mobile Cardiac Outpatient Telemetry

Indicated for:

- Evaluation of spontaneous symptoms, potentially related to tachycardia, bradycardia or conduction disorder, that are too brief, too subtle, or too infrequent to be readily documented with patient-activated monitors or Holter monitors

- Useful to assess the presence and frequency of asymptomatic but potentially significant dysrhythmias, including, but not limited to atrial fibrillation, ventricular ectopy, and bradycardias
- May be utilized when other forms of monitoring do not identify the source of symptoms (e.g., Holter Monitoring)

Implantable Loop Recorder (ILR)

Indicated for:

- Monitoring electrical activity of the heart over an extended period, **for up to 3 years**, to capture a spontaneous event when symptoms occur less than monthly or a few times per year
- Recurrent, infrequent, unexplained symptoms, potentially related to tachycardia, bradycardia or conduction disorder after a nondiagnostic initial workup (including Holter, Patch Monitor, or Mobile Cardiac Outpatient Telemetry), with or without structural heart disease
- ILR may be implanted after cryptogenic stroke to rule out unrecognized atrial fibrillation if Holter monitor, patch recorder or MCOT has failed to identify a causative rhythm disturbance. (A short-term monitoring system must be utilized before the ILR may be used)

INDICATIONS FOR REMOVAL OF LOOP RECORDER SYSTEMS

- Implantable loop recorder (ILR) may be removed for:
  - End of battery life
  - Pain, discomfort, infection at ILR site, or patient desires the device to be removed [13]

LIMITATIONS

- Loop recorder implantation in presence of another electrical device (AICD/PPM/CRT device etc.) is not indicated
- Loop recorder implantation post atrial fibrillation ablation is not routinely indicated and will be addressed on a case-by-case basis

CODING AND STANDARDS

Codes

Code	Description
33285	Insertion, subcutaneous cardiac rhythm monitor, including programming
33286	Removal, subcutaneous cardiac rhythm monitor
93224	External electrocardiographic recording up to 48 hours by continuous rhythm recording and storage; includes recording, scanning analysis with report, review and interpretation by a physician or other qualified health care professional
93225	External electrocardiographic recording up to 48 hours by continuous rhythm recording and storage; recording (includes connection, recording, and disconnection)
93226	External electrocardiographic recording up to 48 hours by continuous rhythm recording and storage; scanning analysis with report
93227	External electrocardiographic recording up to 48 hours by continuous rhythm recording and storage; review and interpretation by a physician or other qualified health care professional
93228	External mobile cardiovascular telemetry with electrocardiographic recording, concurrent computerized real time data analysis and greater than 24 hours of accessible ECG data storage (retrievable with query) with ECG triggered and patient selected events transmitted to a remote attended surveillance center for up to 30 days; review and interpretation with report by a physician or other qualified health care professional
93229	External mobile cardiovascular telemetry with electrocardiographic recording, concurrent computerized real time data analysis and greater than 24 hours of accessible ECG data storage (retrievable with query) with ECG triggered and patient selected events transmitted to a remote attended surveillance center for up to 30 days; technical support for connection and patient instructions for use, attended surveillance, analysis and transmission of daily and emergent data reports as prescribed by a physician or other qualified health care professional
93241	External electrocardiographic recording for more than 48 hours up to 7 days by continuous rhythm recording and storage; includes recording, scanning analysis with report, review and interpretation

Code	Description
93242	External electrocardiographic recording for more than 48 hours up to 7 days by continuous rhythm recording and storage; recording (includes connection and initial recording)
93243	External electrocardiographic recording for more than 48 hours up to 7 days by continuous rhythm recording and storage; scanning analysis with report
93244	External electrocardiographic recording for more than 48 hours up to 7 days by continuous rhythm recording and storage; review and interpretation
93245	External electrocardiographic recording for more than 7 days up to 15 days by continuous rhythm recording and storage; includes recording, scanning analysis with report, review and interpretation
93246	External electrocardiographic recording for more than 7 days up to 15 days by continuous rhythm recording and storage; recording (includes connection and initial recording)
93247	External electrocardiographic recording for more than 7 days up to 15 days by continuous rhythm recording and storage; scanning analysis with report
93248	External electrocardiographic recording for more than 7 days up to 15 days by continuous rhythm recording and storage; review and interpretation
93268	External patient and, when performed, auto activated electrocardiographic rhythm derived event recording with symptom-related memory loop with remote download capability up to 30 days, 24-hour attended monitoring; includes transmission, review and interpretation by a physician or other qualified health care professional
93270	External patient and, when performed, auto activated electrocardiographic rhythm derived event recording with symptom-related memory loop with remote download capability up to 30 days, 24-hour attended monitoring; recording (includes connection, recording, and disconnection)
93271	External patient and, when performed, auto activated electrocardiographic rhythm derived event recording with symptom-related memory loop with remote download capability up to 30 days, 24-hour attended monitoring; transmission and analysis

Code	Description
93272	External patient and, when performed, auto activated electrocardiographic rhythm derived event recording with symptom-related memory loop with remote download capability up to 30 days, 24-hour attended monitoring; review and interpretation by a physician or other qualified health care professional

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Ambulatory ECG Monitoring

Ambulatory ECG Monitoring is the continuous monitoring on an outpatient basis of the electrical activity of the heart while the patient undergoes their usual activities. The duration of the monitoring period should be long enough to capture heart rhythm abnormalities based on the patient's description of the frequency of their symptoms.

Holter Monitor

Holter monitors are continuous single and multi-lead external recorders wire-lead devices. These utilize standard wet gel electrodes worn continuously to record ECG data. Recordings may be in 2-channel (two independent bipolar leads), 3-channel, 12-channel, or EASI lead formats. They are traditionally used for 24–48 hr., although some models permit recording periods up to 30 consecutive days. They are most effective when patients maintain a diary of activities and symptoms, and mark occurrence of symptoms by pressing a button on the device. Data are analyzed post recording on a dedicated workstation.

Event Recorders

External event recorders are activated and record only at the time of detection (either automatically by the device or manually activated by the patient). They use gel electrodes connected via wires to the recording device. Event recorders are worn continuously, for varying

periods of time, typically 2-weeks to one-month. They record the rhythm in a continuously renewed loop, but when activated, will store the data from the rhythm in memory. This information can be downloaded to the physician's office at the convenience of the patient post-event. Newer models can transmit triggered data automatically over a cellular network to a remote monitoring system.

Simpler non-looping post event recorders are not worn continuously. Rather, these portable devices with built-in electrodes are applied directly on the chest (or held by both hands) to record a very brief duration single-lead ECG signal during symptoms. They require that the patient be aware of the rhythm disturbance, that it lasts long enough to mobilize the device, and that the patient is able to cooperate with its use.

Patch ECG Monitors

Continuous, usually single-lead external recorders with wireless transmission (patch ECG monitors) are wearable adhesive patches with embedded electrodes that store rhythm data collected either automatically or when activated by the patient. These on-skin wearable devices eliminate the need for patient cable wires and discrete electrodes; they are comfortable to wear and water-resistant, and do not interfere with patients' daily routines. Patients can press a button to mark symptomatic episodes. Up to 7–14 days of ambulatory monitoring yields a high rate of arrhythmia identification.

MCOT

Mobile cardiac outpatient telemetry (MCOT) devices are worn continuously and have been produced with varying monitor configurations. They are capable of real-time streaming, transmitting a loop, or a single event electrogram directly to the reading center via a wireless link. Newest iterations can connect via Wi-Fi to transmit data.

The MCOT data are processed in a reading center on the back end of the monitoring system. The arrhythmic events are analyzed by trained technicians, and alarms are distributed to patient caregivers. Many MCOT devices are also equipped with real-time signal processing algorithms providing detection of cardiac arrhythmias.

ILR

The implantable loop recorder (ILR) is a patient-activated monitoring system that records ECG tracings and is indicated for patients who experience transient symptoms that may suggest a cardiac arrhythmia. The device is a programmable cardiac event recorder with looping memory and is implanted subcutaneously usually in a left pectoral or mammary location with a battery life of 15-36 months. The electrodes that sense the heart's activity are on the surface of the device, so no trans venous leads are required. This device allows continuously looping rhythm monitoring. Data are stored either when manually activated by a patient or automatically when high or low-rate parameters are met.

Early Repolarization Syndrome (ERS) High Risk Features [9]

- Family history of unexplained SD < 40 years
- Family history of ERS

- High risk Early Repolarization Pattern (ERP)
  - J-waves > 2 mm
  - Dynamic changes in J point and flat or downsloping ST morphology

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AICD: automatic implanted cardioverter defibrillator

AUC: appropriate use score

AV: atrioventricular

BBB: bundle branch block

BrS: Brugada Syndrome

CHD: congenital heart disease

CRT: cardiac resynchronization therapy

CVA: cerebrovascular accident

d-TGA: dextro-Transposition of the Great Arteries

EASI: A modified set-up that can derive 12-lead ECG signals from only 5 ECG channels

ECG: electrocardiogram

ERP: early repolarization pattern

ERS: early repolarization syndrome

ICD: implantable cardioverter defibrillator

ILR: implantable loop recorder

LBBB: left bundle branch block

MCOT: mobile cardiac outpatient telemetry

MCT: mobile cardiac telemetry

MI: myocardial infarction

mm: millimeter

PAC: premature atria complexes

PPM: permanent pacemaker

PVC: premature ventricular complexes

QT: QT interval is section on ECG

s: seconds

SCD: sudden cardiac death

SD: sudden death

ST: ST segment on ECG

STEMI: ST elevation myocardial infarction

SQTS: Short QT Syndrome

SVT: supraventricular tachycardia

VT: ventricular tachycardia

WPW: Wolfe-Parkinson-White

SUMMARY OF EVIDENCE

ESC Working Group on e-Cardiology Position Paper: accuracy and reliability of electrocardiogram monitoring in the detection of atrial fibrillation in cryptogenic stroke patients [8]

Study Design: This position paper by the European Society of Cardiology Working Group on e-Cardiology discusses the accuracy and reliability of electrocardiogram (ECG) monitoring in detecting atrial fibrillation (AF) in cryptogenic stroke patients.

Target Population: Cryptogenic stroke patients, particularly those with subclinical AF.

Key Factors:

- The paper presents the definition, epidemiology, and clinical impact of cryptogenic ischemic stroke and its association with occult AF.
- It discusses classification methods for ischemic stroke and patient selection criteria for long-term ECG monitoring.
- The paper evaluates non-invasive and invasive ECG monitoring tools, highlighting the advantages of implantable cardiac monitors.
- Institutional and organizational issues such as reimbursement, patient management, data ownership, and handling are briefly touched upon.

2017 ISHNE-HRS expert consensus statement on ambulatory ECG and external cardiac monitoring/telemetry [6]

Study Design: This expert consensus statement by the International Society for Holter and Noninvasive Electrocardiology (ISHNE) and the Heart Rhythm Society (HRS) reviews ambulatory ECG (AECG) and external cardiac monitoring/telemetry.

Target Population: Patients with intermittent cardiac arrhythmias, those undergoing arrhythmic drug therapy, and those needing prognosis assessment in specific clinical contexts.

Key Factors:

- The statement reviews how contemporary AECG devices acquire and process ECG signals and their clinical applications.
- It discusses the appropriate utilization of these devices in managing cardiovascular disease and promoting standards for improving AECG accuracy.
- The document provides background and framework for applying AECG techniques in clinical practice and research.
- It includes detailed sections on modalities, technology, equipment, signal acquisition, processing, and interpretation.

2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death [9]

Study Design: These guidelines by the European Society of Cardiology (ESC) focus on the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death.

Target Population: Patients with ventricular arrhythmias and those at risk of sudden cardiac death.

Key Factors:

- The guidelines cover definitions, epidemiology, diagnostic tools, and therapeutic strategies for ventricular arrhythmias and sudden cardiac death.
- They provide recommendations for public basic life support, access to automated external defibrillators, and genetic testing.
- The document includes algorithms for evaluating patients with newly documented ventricular arrhythmias and managing specific structural heart diseases.
- It discusses the role of implantable cardioverter defibrillators, catheter ablation, and pharmacotherapy in long-term management.

ANALYSIS OF EVIDENCE

Shared Findings [6,8,9]:

- **Importance of Long-term Monitoring**: All three articles emphasize the significance of long-term ECG monitoring for detecting arrhythmias, particularly atrial fibrillation and ventricular arrhythmias. Long-term monitoring increases the likelihood of detecting infrequent arrhythmias that may not be captured during short-term recordings.
- **Technological Advancements**: The articles highlight the advancements in AECG technology, including the integration of multiple biological signal sensors and the use of wireless data transmission. These advancements improve the diagnostic yield and ease

of use of AECG devices.

- **Clinical Applications**: The articles discuss the clinical applications of AECG devices in managing cardiovascular disease, including the detection of arrhythmias, assessment of prognosis, and guiding therapeutic interventions.

Conclusion [6,8,9]:

In summary, while all three articles emphasize the importance of long-term ECG monitoring and technological advancements in AECG devices, they differ in their focus on specific conditions, evaluation of monitoring tools, and recommendations for public health. Dilaveris et al 2022 focuses on atrial fibrillation detection in cryptogenic stroke patients, Steinberg et al 2017 provides a comprehensive overview of AECG technology, and Zeppenfeld et al 2022 offers detailed guidelines for managing ventricular arrhythmias and preventing sudden cardiac death.

POLICY HISTORY

Date	Summary
April 2026	• Adjusted congenital heart disease indication for Ambulatory Rhythm Monitoring • Adjusted indications for Ambulatory Rhythm Monitoring devices • Added code description
June 2025	• Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • No clinical changes • Adjusted applicable lines of business – Medicare Advantage checked • Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7253 for Ankle-Brachial Index in Peripheral Artery Disease

Guideline Number: Evolent_CG_7253	**Applicable Codes**	
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Original Date: April 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for ankle-brachial index in lower extremity peripheral artery disease.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR ANKLE-BRACHIAL INDEX IN PERIPHERAL ARTERY DISEASE

Ankle Brachial Index (ABI) With or Without Pulse Volume Recording (PVR)

- NOTE: photoplethysmographic evaluation of an ankle to brachial index (not an ABI) is considered a screening test and is not reimbursable First time study: History or physical exam findings (see **Background**) suggestive of peripheral artery disease (PAD) [6] **(AUC**

Score 9) [7]

- Known PAD [7]:
  - New or worsening signs or symptoms **(AUC Score 7-9)** [7]
  - Surveillance after revascularization (asymptomatic or stable signs/symptoms) [7,8]:
    - Baseline (generally within 30 days post procedure) **(AUC Score 8)** [7]
    - 3-, 6-,9-, and 12 months post procedure and *annually* following vein bypass graft **(AUC Score 6-8)** [7] with more frequent surveillance when:
      - Uncorrected abnormalities are detected
    - 6- and 12 months post procedure and *annually* following prosthetic bypass graft **(AUC Score 5-7)** [7]
    - 6-, 9-, and 12- months post procedure and then *every 12 months* following angioplasty/stent **(AUC Score 6-7)** [7]

ABI Only

- Screening for lower extremity PAD [6,9] **(AUC Score 7)** [7]
  - Patients at increased risk for PAD (see **Background**)

Exercise ABI [6]

- Further evaluation of suspected chronic symptomatic PAD with normal or borderline resting ABI (see **Background**)

CODING AND STANDARDS

Codes

Code	Description
93922	Limited bilateral noninvasive physiologic studies of upper or lower extremity arteries, (eg, for lower extremity: ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries plus bidirectional, Doppler waveform recording and analysis at 1-2 levels, or ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries plus volume plethysmography at 1-2 levels, or ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries with, transcutaneous oxygen tension measurement at 1-2 levels)
93923	Complete bilateral noninvasive physiologic studies of upper or lower extremity arteries, 3 or more levels (eg, for lower extremity: ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis

Code	Description
	pedis arteries plus segmental blood pressure measurements with bidirectional Doppler waveform recording and analysis, at 3 or more levels, or ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries plus segmental volume plethysmography at 3 or more levels, or ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries plus segmental transcutaneous oxygen tension measurements at 3 or more levels), or single level study with provocative functional maneuvers (eg, measurements with postural provocative tests, or measurements with reactive hyperemia)
93924	Noninvasive physiologic studies of lower extremity arteries, at rest and following treadmill stress testing, (ie, bidirectional Doppler waveform or volume plethysmography recording and analysis at rest with ankle/brachial indices immediately after and at timed intervals following performance of a standardized protocol on a motorized treadmill plus recording of time of onset of claudication or other symptoms, maximal walking time, and time to recovery) complete bilateral study

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Ankle Brachial Index (ABI) [(6)]: The Ankle Brachial Pressure Index, known more commonly as an ABI, is calculated by dividing the resting systolic blood pressure at the dorsalis pedis and posterior tibial arteries by the systolic blood pressures in the arm and is expressed as a ratio. The ABI is the higher of the two measurements. Photoplethysmographic techniques to measure ABI are not an acceptable substitute for a doppler derived ABI. The ABI can be spurious if there is heavy arterial calcification making the blood pressures unrecordable or falsely elevated.

- **ABI Reference Ranges**:
  - Abnormal: ≤ 0.90
  - Borderline: 0.91-0.99

- Normal: 1.00-1.40
- Rest pain: ≤ 0.40
- Noncompressible: > 1.40

Pulse Volume Recording (PVR) [10]

PVR is a non-invasive method of evaluating the arterial pressure waveform profile and hence the degree of ischemia.

Patients at Increased Risk for PAD [6]

- Age ≥ 65 years old
- Age 50-64 years old, with risk factors for atherosclerosis (e.g., diabetes, history of smoking, dyslipidemia, hypertension), chronic kidney disease, or family history of PAD
- Age < 50 years old, with diabetes and an additional risk factor for atherosclerosis
- Known atherosclerotic disease in another vascular bed (e.g., coronary, carotid, subclavian, renal, mesenteric artery stenosis, or abdominal aortic aneurysm)

History and Physical Examination Findings Suggestive of PAD [6]

- History
  - Typical claudication
    - Pain type: aching, burning, cramping, discomfort, or fatigue
    - Location: buttock, thigh, calf, or ankle
    - Onset/offset: exertional, relief after rest (< 10 min for typical claudication)
  - Atypical claudication:
    - Other nonjoint-related exertional lower extremity symptoms or symptoms of impaired walking function
      - Lower extremity muscular discomfort associated with walking that requires > 10 min rest to resolve
      - Leg weakness, numbness, or fatigue during walking without pain
  - Ischemic rest pain
  - History of nonhealing or slow-healing lower extremity wound ≥ 2-week duration
  - Erectile dysfunction
- Physical Examination
  - Abnormal lower extremity pulse palpation (femoral, popliteal, dorsalis pedis, or posterior tibial arteries)
  - Vascular bruit (e.g., epigastric, periumbilical, groin)
  - Nonhealing lower extremity wound ≥ 2-week duration
  - Lower extremity gangrene
  - Evidence of atheroemboli in the lower extremities

- Other physical findings suggestive of ischemia (e.g., asymmetric hair growth, nail bed changes, calf muscle atrophy, or elevation pallor/dependent rubor)

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Guideline-Directed Medical Therapy [11]

Patients with peripheral artery disease (PAD) require a comprehensive program of guideline-directed management and medical therapy (GDMT) including:

- Pharmacotherapy
  - Pharmacological treatment for PAD typically includes antiplatelet and statin medication
- Structured exercise
- Lifestyle modifications
  - Risk factors such as diabetes mellitus and hypertension should be appropriately managed
  - Smoking cessation is also a crucial part of therapy for patients who are smokers

Acronyms/Abbreviations

ABI: Ankle-brachial index

PAD: Peripheral artery disease

PVR: Pulse volume recording

SUMMARY OF EVIDENCE

2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease [6]

Study Design: This document is a clinical practice guideline developed by the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines.

Target Population: Patients with lower extremity peripheral artery disease (PAD) across multiple clinical presentation subsets (asymptomatic, chronic symptomatic, chronic limb-threatening ischemia, and acute limb ischemia).

Key Factors: The guideline provides recommendations for the management of lower extremity PAD, including the use of ABI for diagnosis. It emphasizes the importance of recognizing clinical subsets of PAD, conducting a comprehensive history and physical examination, and using diagnostic testing such as resting ABI and additional physiological testing. The guideline also addresses health disparities, risk amplifiers, and special considerations for older patients.

ACCF/ACR/AIUM/ASE/ASN/ICAVL/SCAI/SCCT/SIR/SVM/SVS 2012 Appropriate Use Criteria for Peripheral Vascular Ultrasound and Physiological Testing Part I: Arterial Ultrasound and Physiological Testing [7]

Study Design: This document is an appropriate use criteria report developed by the American College of Cardiology Foundation and other specialty societies.

Target Population: Patients undergoing peripheral vascular ultrasound and physiological testing, including those with suspected or known peripheral artery disease.

Key Factors: The report provides criteria for the appropriate use of peripheral vascular ultrasound and physiological testing, including ABI. It covers various clinical scenarios, such as evaluation for lower extremity atherosclerotic disease, surveillance of known lower extremity PAD, and screening for lower extremity atherosclerotic disease in asymptomatic individuals with comorbidities. The criteria are based on a review of common clinical scenarios and current clinical practice guidelines.

The Society for Vascular Surgery practice guidelines on follow-up after vascular surgery arterial procedures [8]

Study Design: This document is a practice guideline developed by the Society for Vascular Surgery.

Target Population: Patients undergoing follow-up after vascular surgery arterial procedures.

Key Factors: The guideline provides recommendations for follow-up after various vascular surgery procedures, including the use of ABI for surveillance. It emphasizes the importance of routine surveillance to detect significant problems early and manage them effectively. The guideline also discusses the use of duplex ultrasound and other imaging methods for follow-up and the need for individualized follow-up plans based on the patient's clinical situation

ANALYSIS OF EVIDENCE

Shared Findings [6–8]

- All three documents emphasize the importance of diagnostic testing, particularly the use of ABI, in the management of peripheral artery disease.
- They all highlight the need for routine surveillance and follow-up to detect and manage complications early.

Conclusion [6–8]

In summary, while all three documents share common themes regarding the importance of diagnostic testing and routine surveillance, they differ in their specific focus areas and the populations they address. Gornik et al 2024 provides a broader approach to PAD management, including health disparities and risk amplifiers, whereas Mohler et al 2012 and Zierler et al 2019 focus more on the appropriate use of diagnostic testing and follow-up after interventions.

POLICY HISTORY

Date	Summary
May 2026	• Clarified indications for ABI With or Without PVR and exercise ABI • Added technical description to codes • Updated Background section
June 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • No clinical changes • Adjusted applicable lines of business – Medicare Advantage checked

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline

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Evolent Clinical Guideline 7254 for Coronary Artery Bypass Graft

Guideline Number: Evolent_CG_7254	**Applicable Codes**	
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Original Date: April 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Coronary Artery Bypass Graft (CABG).

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR CABG

Stable Ischemic Heart Disease [6,7]

One-Vessel Disease

- Proximal left anterior descending coronary artery (LAD) or left circumflex coronary artery (LCX) involvement
  - With ischemic symptoms on 1 antianginal drug
    - Intermediate or high-risk findings on non-invasive stress imaging **(AUC Score**

7) [7]

- With ischemic symptoms on ≥ 2 antianginal drugs
  - Low-risk findings on non-invasive stress imaging **(AUC Score 7)** [7]
  - Intermediate or high-risk findings on non-invasive stress imaging **(AUC Score 8)** [7]
  - No stress test/indeterminate stress test results and fractional flow reserve (FFR) ≤ 0.80 **(AUC Score 7)** [7]

Two-Vessel Disease

- No proximal LAD involvement
  - With ischemic symptoms on ≥ 2 antianginal drugs
    - Intermediate or high-risk findings on non-invasive stress imaging **(AUC Score 7)** [7]
    - No stress test/indeterminate stress test results and FFR ≤ 0.80 in both vessels **(AUC Score 7)** [7]
- Proximal LAD involvement
  - Asymptomatic
    - Intermediate or high-risk findings on non-invasive stress imaging with diabetes **(AUC Score 7)** [7]
  - With ischemic symptoms on no antianginal drugs
    - Intermediate or high-risk findings on non-invasive stress imaging without or with diabetes **(AUC Score 7)** [7]
    - No stress test/indeterminate stress test results and FFR ≤ 0.80 in both vessels with diabetes **(AUC SCORE 7)** [7]
  - With ischemic symptoms on 1 antianginal drug
    - Low-risk findings on non-invasive stress imaging with diabetes **(AUC 7)** [7]
    - Intermediate or high-risk findings on non-invasive stress imaging without diabetes **(AUC SCORE 7)** [7] or with diabetes **(AUC SCORE 8)** [7]
    - No stress test/indeterminate stress test results and FFR ≤ 0.80 in both vessels without diabetes **(AUC SCORE 7)** [7] or with diabetes **(AUC SCORE 8)** [7]
  - With ischemic symptoms on ≥ 2 antianginal drugs
    - Low-risk findings on non-invasive stress imaging without diabetes **(AUC SCORE 7)** [7] or with diabetes **(AUC SCORE 8)** [7]
    - Intermediate or high-risk findings on non-invasive stress imaging without diabetes **(AUC SCORE 8)** [7] or with diabetes **(AUC SCORE 9)** [7]
    - No stress test/indeterminate stress test results and FFR ≤ 0.80 in both vessels without or with diabetes **(AUC SCORE 8)** [7]

Three-vessel Disease (or more)

- Low disease complexity
  - Asymptomatic (without or with antianginal drugs)
    - Intermediate or high-risk findings on non-invasive stress imaging with or without diabetes **(AUC SCORE 7)** [7]
  - Symptomatic on no antianginal drugs
    - Intermediate or high-risk findings on non-invasive stress imaging without diabetes **(AUC SCORE 7)** [7] or with diabetes **(AUC SCORE 8)** [7]
  - Symptomatic on 1 antianginal drug
    - Intermediate or high-risk findings on non-invasive stress imaging without or with diabetes **(AUC SCORE 8)** [7]
    - Low-risk findings on non-invasive stress imaging with diabetes **(AUC SCORE 7)** [7]
  - Symptomatic on ≥ 2 antianginal drugs
    - Low-risk findings on non-invasive stress imaging without diabetes **(AUC SCORE 7)** [7] or with diabetes **(AUC SCORE 8)** [7]
    - Intermediate or high-risk findings on non-invasive stress imaging without diabetes **(AUC SCORE 8)** [7] or with diabetes **(AUC SCORE 9)** [7]
- Intermediate or high disease complexity
  - Asymptomatic without or with antianginal drugs
    - Low-risk findings on non-invasive stress imaging with diabetes **(AUC SCORE 7)** [7]
    - Intermediate or high-risk findings on non-invasive stress imaging without diabetes **(AUC SCORE 7)** [7] or with diabetes **(AUC SCORE 8)** [7]
  - Symptomatic on no antianginal drugs
    - Low-risk findings on non-invasive stress imaging without or with diabetes **(AUC SCORE 7)** [7]
    - Intermediate or high-risk findings on non-invasive stress imaging without diabetes **(AUC SCORE 7)** [7] or with diabetes **(AUC SCORE 8)** [7]
  - Symptomatic on 1 antianginal drug
    - Low-risk findings on non-invasive stress imaging without diabetes **(AUC SCORE 7)** or with diabetes **(AUC SCORE 8)** [7]
    - Intermediate or high-risk findings on non-invasive stress imaging without or with diabetes **(AUC SCORE 8)** [7]
  - Symptomatic on ≥ 2 antianginal drugs
    - Low-risk findings on non-invasive stress imaging without diabetes **(AUC SCORE 8)** [7] or with diabetes **(AUC SCORE 9)** [7]

- Intermediate or high-risk findings on non-invasive stress imaging without or with diabetes **(AUC SCORE 9)** [7]

Acute Coronary Syndrome (Post-STEMI (ST-Elevation Myocardial Infarction) or Non-STEMI)

- Post Acute Coronary Syndrome (ACS) with “culprit only” revascularization and plan for staged CABG of non-culprit lesion [8]

Left Main Coronary Artery Stenosis

- Asymptomatic without or with antianginal drugs
  - Without or with additional CAD, without multivessel involvement or with low disease burden in other vessels, with ostial, midshaft, or bifurcation involvement **(AUC SCORE 8)** [7]
  - With bifurcation involvement and intermediate or high disease burden in other vessels **(AUC SCORE 8)** [7]
  - With ostial or midshaft stenosis and intermediate or high disease burden in other vessels **(AUC SCORE 9)** [7]
- Symptomatic on no antianginal drugs
  - With ostial, midshaft, or bifurcation involvement, without multivessel involvement or with low disease burden in other vessels **(AUC SCORE 8)** [7]
  - With ostial, midshaft or bifurcation involvement, with low disease burden in left main coronary artery (LMCA) and/or intermediate or high disease burden in other vessels **(AUC SCORE 9)** [7]
- Symptomatic on ≥ 1 antianginal drug **(AUC SCORE 9)** [7]

Prior Internal Mammary Artery (IMA) To LAD Graft

- Graft is Patent
  - Symptomatic patients on ≥2 antianginal drugs, with stenoses affecting ≥2 territories and intermediate or high-risk findings on non-invasive stress imaging **(AUC SCORE 6)** [7]
- Graft is NOT Patent
  - Asymptomatic patients, with or without antianginal therapy
    - With intermediate or high-risk findings on non-invasive stress imaging (**AUC Score 7**) [7]
  - Symptomatic patients
    - Not on antianginal therapy
      - Stenoses affecting 2 territories with intermediate or high-risk findings on non-invasive stress imaging (**AUC Score 6**) [7]

- Stenoses affecting ≥3 territories with intermediate or high-risk findings on non-invasive stress imaging (**AUC Score 7**) [7]

- On 1 antianginal drug
  - Stenoses affecting ≥2 territories with intermediate or high-risk findings **(AUC SCORE 7)** [7]
  - Stenoses affecting ≥3 territories with low-risk findings on non-invasive stress imaging **(AUC SCORE 6)** [7]
- On ≥2 antianginal drugs
  - Stenoses affecting ≥2 territories with intermediate or high-risk findings on non-invasive stress imaging **(AUC SCORE 8)** [7]
  - Stenoses affecting 2 (**AUC Score 6**) or ≥3 territories **(AUC SCORE 7)** [7] with low-risk findings on non-invasive stress imaging [7]

NOTE: CABG can be considered as a concurrent procedure for patients with stable ischemic heart disease (SIHD) and AUC scores ≥ 7 undergoing other surgical procedures.

CODING AND STANDARDS

Codes

Code	Description
33510	Coronary artery bypass, vein only; single coronary venous graft
33511	Coronary artery bypass, vein only; 2 coronary venous grafts
33512	Coronary artery bypass, vein only; 3 coronary venous grafts
33513	Coronary artery bypass, vein only; 4 coronary venous grafts
33514	Coronary artery bypass, vein only; 5 coronary venous grafts
33516	Coronary artery bypass, vein only; 6 or more coronary venous grafts
33533	Coronary artery bypass, using arterial graft(s); single arterial graft
33534	Coronary artery bypass, using arterial graft(s); 2 coronary arterial grafts
33535	Coronary artery bypass, using arterial graft(s); 3 coronary arterial grafts
33536	Coronary artery bypass, using arterial graft(s); 4 or more coronary arterial grafts

Code	Description
35600	Harvest of upper extremity artery, 1 segment, for coronary artery bypass procedure, open
36140	Introduction of needle or intracatheter, upper or lower extremity artery
+33508	Endoscopy, surgical, including video-assisted harvest of vein(s) for coronary artery bypass procedure (List separately in addition to code for primary procedure)
+33517	Coronary artery bypass, using venous graft(s) and arterial graft(s); single vein graft (List separately in addition to code for primary procedure)
+33518	Coronary artery bypass, using venous graft(s) and arterial graft(s); 2 venous grafts (List separately in addition to code for primary procedure)
+33519	Coronary artery bypass, using venous graft(s) and arterial graft(s); 3 venous grafts (List separately in addition to code for primary procedure)
+33521	Coronary artery bypass, using venous graft(s) and arterial graft(s); 4 venous grafts (List separately in addition to code for primary procedure)
+33522	Coronary artery bypass, using venous graft(s) and arterial graft(s); 5 venous grafts (List separately in addition to code for primary procedure)
+33523	Coronary artery bypass, using venous graft(s) and arterial graft(s); 6 or more venous grafts (List separately in addition to code for primary procedure)
+33530	Reoperation, coronary artery bypass procedure or valve procedure, more than 1 month after original operation (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Coronary Artery Disease (CAD) is narrowing or blockage of the coronary arteries (blood vessels that carry blood and oxygen to the heart). Coronary artery disease is usually caused by atherosclerosis (a buildup of fatty material and plaque inside the coronary arteries) which may cause chest pain, shortness of breath during exercise, and heart attacks.

Ischemic symptoms, aka angina pectoris, include tightness, heaviness, pressure, squeezing, or other discomfort in the chest or adjacent areas. Ischemia may also present with fatigue, faintness, or dyspnea.

Non-invasive testing includes stress testing and imaging modalities with or without contrast.

Guideline Directed Medical Therapy

Guideline directed medical therapy (GDMT) are outlined by joint American College of Cardiology (ACC)/American Heart Association (AHA) in cardiovascular clinical practice guidelines as Class I recommendation. These are maximally tolerated medications for a cardiovascular condition, when prescribed, have shown to improve healthcare outcomes such as survival along with significant reduction in major adverse cardiovascular events and hospitalization. For all recommended drug treatment regimens, the prescriber should confirm the dosage with product insert material and carefully evaluate for contraindications and interactions.

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

CABG: coronary artery bypass graft

FFR: fractional flow reserve

GDMT: guideline directed medical therapy

IMA: Internal Mammary Artery

LAD: left anterior descending coronary artery

LCA: Left coronary artery

LCX: left circumflex coronary artery

LMCA: left main coronary artery

SUMMARY OF EVIDENCE

2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization [6]

Study Design: This document is a clinical practice guideline by the American College of Cardiology/American Heart Association/Society for Cardiovascular Angiography and Interventions (ACC/AHA/SCAI) for coronary artery revascularization. It includes recommendations based on systematic literature reviews and expert consensus.

Target Population: Patients with significant coronary artery disease undergoing coronary revascularization.

Key Factors:

Methodology: A comprehensive literature search was conducted from May 2019 to September 2019, encompassing studies, reviews, and other evidence conducted on human subjects that were published in English from PubMed, EMBASE, the Cochrane Collaboration, CINHL Complete, and other relevant databases. Additional relevant studies, published through May 2021, were also considered.

Scope: The guideline replaces the 2011 coronary artery bypass graft surgery and the 2011 and 2015 percutaneous coronary intervention guidelines, providing a patient-centric approach to guide clinicians in the treatment of patients with significant coronary artery disease undergoing coronary revascularization.

Recommendations: The document provides recommendations for various aspects of coronary artery revascularization, including improving equity of care, shared decision-making, preprocedural assessment, defining lesion severity, revascularization in STEMI and NSTE-ACS, and special populations and situations.

Outcomes: The guideline emphasizes the importance of improving patient outcomes through participation in clinical data registries, quality improvement programs, and collaboration with high-volume centers.

ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2017 Appropriate use Criteria for Coronary Revascularization in Patients with Stable Ischemic Heart Disease [7]

Study Design: The study involved the development of Appropriate Use Criteria (AUC) for coronary revascularization in patients with stable ischemic heart disease (SIHD). The process included drafting clinical scenarios based on patient presentations encountered in everyday practice. These scenarios were evaluated by an independent rating panel using a scoring scale from 1 to 9.

Target Population: The study focused on patients with stable ischemic heart disease (SIHD), including those with single-vessel, two-vessel, three-vessel, and left main coronary artery disease. It also considered patients with prior coronary artery bypass graft (CABG) surgery and those undergoing procedures for which coronary revascularization may be considered.

Key Factors:

Clinical Scenarios: The scenarios included information on symptom status, risk level as assessed by noninvasive testing, coronary disease burden, and in some cases, fractional flow reserve testing, presence or absence of diabetes, and SYNTAX score.

Scoring: Each indication was scored as “Appropriate” (7 to 9), “May Be Appropriate” (4 to 6), or “Rarely Appropriate” (1 to 3).

Revascularization Options: The study evaluated the appropriateness of revascularization options, including percutaneous coronary intervention (PCI) and CABG surgery, for various clinical scenarios.

Emphasis: The study emphasized the importance of guideline-directed medical therapy and antianginal therapy in the management of patients with SIHD.

Patient Preference: The study highlighted the role of shared decision-making and patient preferences in the selection of revascularization options.

ANALYSIS OF EVIDENCE

Shared Findings [6,7]

Both articles emphasize the importance of CABG in treating significant coronary artery disease (CAD), particularly in complex cases. They agree on several key points:

- **CABG for Left Main Disease**:
  - Both articles recommend CABG for patients with significant left main coronary artery disease, especially when the disease is complex or involves bifurcation.
- **CABG for Multivessel Disease**:
  - CABG is recommended for patients with three-vessel disease, particularly when the disease is complex (e.g., high SYNTAX score).
- **CABG for Patients with Diabetes**:
  - Both articles highlight that CABG is preferred over PCI for patients with diabetes and multivessel CAD, due to better long-term outcomes.
- **CABG for Left Ventricular Dysfunction**:
  - CABG is recommended for patients with severe left ventricular dysfunction (ejection fraction <35%) to improve survival.

Conclusions [6,7]

In summary, both articles highlight the critical role of CABG in treating complex coronary artery disease, with shared conclusions on its benefits for left main disease, multivessel disease, patients with diabetes, and those with left ventricular dysfunction.

POLICY HISTORY

Date	Summary
May 2026	● Added an indication for Acute Coronary Syndrome Post-STEMI (ST-Elevation Myocardial Infarction) or Non-STEMI ● Added indications for prior Internal Mammary Artery to LAD when the graft is patent ● Clarified indications for prior Internal Mammary Artery to LAD when the graft is not patent ● Added technical description to codes ○ Removed Place/Site of Service Inpatient Hospital Code 21 ● Updated references
December 2025	● Added the following CPT Codes to reflect Evolent prior authorization scope: 35600, 36140
May 2025	● Updated references ● Edited language for greater conformity throughout guideline ● Added Summary of Evidence and Analysis of Evidence ● Added third general information bullet

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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1. Patel MR, Spertus JA, Brindis RG, et al. ACCF Proposed Method for Evaluating the Appropriateness of Cardiovascular Imaging. *J Am Coll Cardiol*. 2005;46(8):1606-1613. doi:10.1016/j.jacc.2005.08.030
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Evolent Clinical Guideline 7256 for Aorto-Renal Endarterectomy or Bypass Surgery

Guideline Number: Evolent_CG_7256	Applicable Codes	
"Evolent" refers to Evolent Health LLC and Evolent Specialty Services, Inc. *© 2016 - 2027 Evolent. All rights Reserved.*		
Original Date: May 2016	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Renal artery stenosis (RAS) is the narrowing of one or both renal arteries. Surgery may be recommended for people with RAS caused by fibromuscular dysplasia or RAS that does not improve with medication. In an endarterectomy, the plaque is cleaned out of the artery, leaving the inside lining smooth and clear. To create a bypass, a vein or synthetic tube is used to connect the kidney to the aorta.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR AORTO-RENAL ENDARTERECTOMY OR BYPASS SURGERY

NOTE: Appropriate imaging must be completed, which may include Magnetic Resonance Angiography (MRA) Renal, Computed Tomography Angiography (CTA) Renal, and/or Renal Angiogram.

For patients who are not a candidate for percutaneous intervention (PI), aorto-renal endarterectomy or bypass surgery is indicated when any **ONE** of the following criteria for surgery is met:

- Cardiac disturbance syndromes
  - Hemodynamically significant RAS and recurrent, unexplained congestive heart failure (CHF) **(AUC Score 6)** or sudden, unexplained pulmonary edema **(AUC Score 7)** [6,7]
  - Hemodynamically significant RAS and unstable angina **(AUC Score 6)** [6,7]
  - Recurrent CHF with unilateral moderate RAS with resting translesional mean gradient of ≥ 10 mmHg (**AUC Score 5**) [8]
- Hypertension
  - Hemodynamically significant RAS and any **ONE** of the following [6,7]:
    - Accelerated, resistant, or malignant hypertension
    - Hypertension with an unexplained unilateral small kidney
    - Hypertension with intolerance to medication
  - Fibromuscular dysplasia (FMD) with early onset of accelerated, malignant, or resistant hypertension [6,7]
  - Resistant hypertension (see **Definitions**) when any **ONE** of the following criteria are met:
    - Evidence of bilateral or solitary severe RAS **(AUC Score 7)** [8]
    - Evidence of unilateral severe RAS **(AUC Score 6)** [8]
    - Severe unilateral RAS and high-risk lesion or complex anatomy **(AUC Score 4)** [8]
  - Nonproteinuric hypertension with unilateral renal artery disease [9]
- Kidney Dysfunction
  - Progressive CKD with bilateral (> 70%) RAS or RAS in a solitary kidney [6,10]
  - Chronic renal insufficiency with unilateral RAS (> 70%) [6,10]
  - CKD Stage 4 with bilateral moderate RAS and resting mean translesion gradient of ≥ 10 mmHg with kidney size > 7 cm in pole-pole length **(AUC Score 8)** [8]
  - CKD Stage 4 and global renal ischemia (unilateral severe RAS with solitary kidney or bilateral severe RAS) without other explanation **(AUC Score 7)** [8]
  - CKD Stage 2 with bilateral severe RAS **(AUC Score 5)** [8]
  - CKD Stage 3 stable for one year, with bilateral severe RAS **(AUC Score 5)** [8]
- Evidence of progressive renal artery occlusion [9]
- Identifiable activation of renin-angiotensin system with hyperreninemia or with unilateral RAS, lateralization of renal vein renin [9]

- Angiotensin-dependent glomerular filtration rate (eGFR) [9]
- Renal artery dissection; renal artery aneurysm and renal artery atherosclerosis > 50% in a transplanted kidney
- Special populations [9]:
  - Transplant RAS with or without calcineurin inhibitors
  - Episodic, circulatory congestion with bilateral atherosclerotic renovascular disease
  - Progressive loss of eGFR with occlusive atherosclerotic renovascular disease and no other kidney disease (ischemic nephropathy)
  - Aortic disease with renovascular protection as part of endovascular repair
  - Left-ventricular assist device
  - Radiation-induced renovascular disease with clinical syndromes
  - Other diseases (eg, Takayasu arteritis, extrinsic vascular compression)
  - Pediatric patients with mid aortic syndrome or fibromuscular variants

NOTE: Atherosclerotic renovascular disease with hemodynamically insignificant stenosis does not benefit from vascular intervention when treated with optimal guideline-directed medical therapy (GDMT). [9,11]

LIMITATIONS

The following are potential exclusions:

- Advanced disease: creatinine level > 3-4 mg/dL and/or kidney length < 8 cm
- Limited life expectancy
- Bleeding diathesis and/or recent myocardial infarction (MI)
- Pregnancy

CODING AND STANDARDS

Codes

Code	Description
35560	Bypass graft, with vein; aortorenal

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

- Resistant hypertension: blood pressure target not achieved despite being on maximally tolerated GDMT (3 drug-therapy at optimal doses, including a diuretic) [7]

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

AAA: Abdominal aortic aneurysm

ACCF: American College of Cardiology Foundation

AHA: American Heart Association

AUC: Appropriate use criteria

CHF: Congestive heart failure

CKD: Chronic kidney disease

CTA: Computed tomography angiography

DUS: Duplex ultrasound

EACTS: European Association for Cardio-Thoracic Surgery

eGFR: Glomerular filtration rate

ESC: European Society of Cardiology

ESVM: European Society of Vascular Medicine

FMD: Fibromuscular dysplasia

GDMT: Guideline-directed medical therapy

MI: Myocardial infarction

MRA: Magnetic resonance angiography

PAD: Peripheral artery disease

PI: Percutaneous intervention

RAS: Renal artery stenosis

SCAI: Society for Cardiovascular Angiography and Interventions

VASCERN: European Reference Network on Rare Multisystemic Vascular Diseases

SUMMARY OF EVIDENCE

Management of Patients With Peripheral Artery Disease (Compilation of 2005 and 2011 ACCF/AHA Guideline Recommendations) [6]

Study Design: This document is a compilation of the 2005 and 2011 ACCF/AHA guideline recommendations for the management of patients with peripheral artery disease (PAD). It includes recommendations developed by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines in collaboration with several other societies.

Target Population: The guidelines are intended for patients with peripheral artery disease, including those with lower extremity PAD, renal artery disease, mesenteric artery disease, and aneurysms of the abdominal aorta and its branch vessels.

Key Factors: The document provides detailed recommendations on various aspects of PAD management, including vascular history and physical examination, diagnostic methods, treatment options (such as lipid-lowering drugs, antihypertensive drugs, diabetes therapies, smoking cessation, antiplatelet and antithrombotic drugs), exercise and rehabilitation, endovascular and surgical treatments, and follow-up care.

2024 ESC Guidelines for the Management of Peripheral Arterial and Aortic Diseases [10]

Study Design: The guidelines are developed by the task force on the management of peripheral arterial and aortic diseases of the European Society of Cardiology (ESC). The document is endorsed by several reputable organizations, including the European Association for Cardio-Thoracic Surgery (EACTS), the European Reference Network on Rare Multisystemic Vascular Diseases (VASCERN), and the European Society of Vascular Medicine (ESVM). The guidelines are based on a critical review and evaluation of published literature, including clinical trials and meta-analyses.

Target Population: The target population for these guidelines includes patients with peripheral arterial and aortic diseases, specifically those with renal artery disease. The guidelines address both atherosclerotic and non-atherosclerotic causes of RAS, as well as special populations such as patients with fibromuscular dysplasia.

Key Factors: Duplex Ultrasound (DUS) is recommended as the first-line imaging modality for patients with suspicion of RAS, with additional imaging used for anatomical definition and procedural planning. Clinical decision-making emphasizes the severity of stenosis, the presence of kidney viability, and high-risk clinical features such as resistant hypertension, worsening renal function, or cardiac destabilization syndromes.

Treatment Strategy: Revascularization should be considered in selected patients with severe RAS (> 70%) and high-risk clinical features, including those with bilateral disease or a solitary functioning kidney. The guidelines note that open surgical revascularization (ie, aorto-renal bypass or endarterectomy) should be considered in patients with complex anatomy or after failed endovascular therapy, highlighting its role as a definitive option when durable outcomes are needed.

SCAI Appropriate Use Criteria for Peripheral Arterial Interventions: An Update [8]

Study Design: This document presents Appropriate Use Criteria developed by the Society for Cardiovascular Angiography and Interventions (SCAI) using a modified Delphi consensus methodology. It incorporates evidence from randomized controlled trials, prospective registries, and meta-analyses to evaluate the appropriateness of revascularization strategies across clinical scenarios.

Target Population: The focus is on patients with RAS, particularly those with hypertension, chronic kidney disease, or cardiac destabilization syndromes (eg, heart failure and angina exacerbations).

Key Factors: Hemodynamically severe renal artery stenosis is defined by ≥70% diameter stenosis or by moderate stenosis (50–70%) with significant translesional pressure gradients or fractional flow reserve abnormalities. Revascularization is most relevant in patients with resistant hypertension, ischemic nephropathy, or cardiac destabilization syndromes, and in those with global renal ischemia (eg, bilateral disease or a solitary functioning kidney).

Treatment Strategy: Revascularization is considered appropriate when expected clinical benefits (eg, improved blood pressure control, stabilization of renal function, and reduction in cardiac events) outweigh procedural risks, particularly in patients with hemodynamically significant disease. Open surgical revascularization, including aorto-renal bypass or endarterectomy, represents an important option for complex anatomy or when durable correction of renal hypoperfusion is required, though overall evidence emphasizes selective use rather than routine intervention.

ANALYSIS OF EVIDENCE

Analysis [6,8,10]**:**

The evidence from these articles supports the selective use of revascularization, including open surgical approaches such as aortorenal bypass or endarterectomy, in patients with

hemodynamically significant renal artery disease and high-risk clinical features. Across guidelines, surgical revascularization is generally reserved for patients with complex anatomy, failed endovascular therapy, or situations requiring durable correction of renal hypoperfusion, rather than as a first-line strategy. The choice of intervention depends primarily on patient characteristics, anatomical complexity, and overall clinical context, rather than specific comparative evidence between surgical techniques.

Shared Conclusions:

- Importance of Revascularization: All three articles emphasize that revascularization may benefit selected patients with renal artery disease, particularly those with resistant hypertension, renal dysfunction, or cardiac destabilization syndromes, although routine intervention in unselected populations is not supported.
- Patient Selection: The articles concur that patient selection is crucial for determining the appropriate intervention. Factors such as the severity of symptoms, anatomical considerations, and comorbidities must be evaluated to decide between endarterectomy and bypass surgery.

POLICY HISTORY

Date	Summary
May 2026	• Replaced indications with those for renal artery intervention to clarify medical necessity criteria for bypass surgery • Removed Medical Necessity section and moved appropriate imaging requirement to Indications • Renamed Potential Exclusions section to Limitations • Updated Summary of Evidence and Analysis of Evidence to reflect literature for updated indications
July 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• No substantive clinical content changes • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Updated references
January 2025	• This guideline replaces UM 1268 Aorto-Renal Endarterectomy or Bypass Surgery

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7257 for Arterial Duplex in Peripheral Artery Disease

Guideline Number: Evolent_CG_7257	Applicable Codes	
"Evolent" refers to Evolent Health LLC and Evolent Specialty Services, Inc. *© 2011 - 2027 Evolent. All rights Reserved.*		
Original Date: April 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for arterial duplex of the extremities. Duplex ultrasound imaging of the major arteries in the extremities is for assessing any abnormalities in the blood flow.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR ARTERIAL DUPLEX OF EXTREMITIES

Duplex scans are medically necessary ONLY if the outcome will potentially impact the clinical management of the patient. Accordingly, a duplex scan should only be performed after an ABI (or similar physiological study) has been performed and is abnormal or unreliable and anatomical information will aid in planning further management.

Lower Extremity Peripheral Artery Disease (PAD) [6–10]

- Suspected acute limb ischemia (i.e., pale, pulseless, cold, painful limb **(AUC Score 9)** [8]
- Following vascular trauma with suspected vascular injury
- For the evaluation of suspected popliteal entrapment or popliteal cystic degeneration
- Known PAD [8] with new or worsening signs or symptoms (**AUC Score 7-9**) [8]
- Functionally limiting claudication with inadequate response to guideline-directed medical therapy (GDMT) when revascularization is being considered [7]
- Chronic limb threatening ischemia (CLTI) to assist in revascularization strategy [7]
- Suspected PAD with inconclusive resting ankle brachial index (ABI) and physiological testing (including exercise ABI) [7]
- Palpable leg mass with possible aneurysm [6]
- Evaluation for possible aneurysm contralateral to the finding of a leg aneurysm [6,10]
- Suspected femoral artery pseudoaneurysm following a catheter-related procedure [8]:
    - Initial evaluation:
        - Pulsatile groin mass **(AUC Score 9)** [8]
        - Bruit or thrill over groin **(AUC Score 8)** [8]
        - Significant hematoma **(AUC Score 7)** [8]
        - Severe groin pain post procedure **(AUC Score 7)** [8]
- Surveillance after revascularization (asymptomatic or stable signs/symptoms) [8,9]:
    - Baseline (generally within 30 days post procedure) **(AUC Score 8)** [8]
    - 3-, 6- ,9- ,and 12 months post procedure and *annually* following vein bypass graft **(AUC Score 6-8)** [8] with more frequent surveillance when:
        - Uncorrected abnormalities are detected
    - 6-, 9-, and 12- months post angioplasty/stent procedure and then *every 12 months* **(AUC Score 6-7)** [8]
        - Additional imaging may be warranted only if clinical presentation suggests unrecognized or progressive restenosis.
    - 6- and 12 months post procedure then *annually* following prosthetic bypass graft **(AUC Score 5-7)** [8]
- Aneurysm surveillance [6,10]:
    - Annual follow-up asymptomatic femoral artery true aneurysm
    - Annual follow-up asymptomatic popliteal artery aneurysm

Upper Extremity PAD [8]

- Arm or hand pain with repetitive use **(AUC Score 8)** [8]
- Finger discoloration, ulcer, or gangrene **(AUC Score 8)** [8]
- Unilateral cold painful hand **(AUC Score 8)** [8]
- Unilateral Raynaud's phenomenon **(AUC Score 5)**
- Suspected positional arterial obstruction (e.g., thoracic outlet syndrome) **(AUC Score 7)** [8]
- Upper extremity trauma with suspicion of vascular injury **(AUC Score 8)** [8]
    - Or with new or worsening symptoms [8]
- Discrepancy in arm pulses or blood pressure discrepancy of > 20 mm Hg between arms (**AUC Score 6**) [8]
- Peri-clavicular bruit (**AUC Score 5**)
- Pre-op radial artery harvest (e.g., for CABG) **(AUC Score 7)** [8]
- Presence of pulsatile mass or hand ischemia after upper extremity vascular access **(AUC Score 8)** [8]
- Presence of bruit after upper extremity access for intervention **(AUC Score 8)** [8]
- Post revascularization:
    - Baseline within 30 days **(AUC Score 8)** [8]
    - New or worsening symptoms (**AUC Score 8**) [8]
    - Surveillance (asymptomatic or stable signs/symptoms)
        - After 6 months, then annually following vein bypass graft **(AUC Score 7)** [8]
        - After 6 months (**AUC Score 6**), [8] then annually **(AUC Score 7)** [8] after prosthetic bypass graft

LIMITATIONS [7]

- Leg swelling
- Nonspecific pain in a limb
- Screening for PAD
- When requested to be performed at the same time as a noninvasive physiologic test such as an ABI

CODING AND STANDARDS

Codes

Code	Description
93925	Duplex scan of lower extremity arteries or arterial bypass grafts; complete bilateral study
93926	Duplex scan of lower extremity arteries or arterial bypass grafts; unilateral or limited study
93930	Duplex scan of upper extremity arteries or arterial bypass grafts; complete bilateral study
93931	Duplex scan of upper extremity arteries or arterial bypass grafts; unilateral or limited study

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

History and Physical Examination Findings Suggestive of Lower Extremity PAD [7]

- **History**
  - Typical claudication:
    - Pain type: aching, burning, cramping, discomfort, or fatigue
    - Location: buttock, thigh, calf, or ankle
    - Onset/offset: exertional, relief after rest (< 10 min for typical claudication)
  - Atypical claudication:

        - Other nonjoint-related exertional lower extremity symptoms or symptoms of impaired walking function
            - Lower extremity muscular discomfort associated with walking that requires > 10 min rest to resolve
            - Leg weakness, numbness, or fatigue during walking without pain
    - Ischemic rest pain
    - History of nonhealing or slow-healing lower extremity wound ≥ 2-week duration
    - Erectile dysfunction
- **Physical Examination**
    - Abnormal lower extremity pulse palpation (femoral, popliteal, dorsalis pedis, or posterior tibial arteries)
    - Vascular bruit (e.g., epigastric, periumbilical, groin)
    - Nonhealing lower extremity wound ≥ 2-week duration
    - Lower extremity gangrene
    - Evidence of atheroemboli in the lower extremities
    - Other physical findings suggestive of ischemia (e.g., asymmetric hair growth, nail bed changes, calf muscle atrophy, or elevation pallor/dependent rubor)

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Guideline-Directed Medical Therapy [11]

Patients with peripheral artery disease (PAD) require a comprehensive program of guideline-directed management and medical therapy (GDMT) including:

- Pharmacotherapy
    - Pharmacological treatment for PAD typically includes antiplatelet and statin medication
- Structured exercise
- Lifestyle modifications
    - Risk factors such as diabetes mellitus and hypertension should be appropriately managed

- Smoking cessation is also a crucial part of therapy for patients who are smokers

Acronyms/Abbreviations

ABI: Ankle brachial index

CABG: Coronary Artery Bypass Grafting

CLTI: Chronic limb-threatening ischemia

GDMT: Guideline-directed medical therapy

PAD: Peripheral artery disease

SUMMARY OF EVIDENCE

Management of Patients With Peripheral Artery Disease (Compilation of 2005 and 2011 ACCF/AHA Guideline Recommendations) [6]

Study Design: This document is a compilation of the 2005 and 2011 ACCF/AHA guideline recommendations for the management of patients with peripheral artery disease (PAD). It includes recommendations developed by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines in collaboration with several other societies.

Target Population: The guidelines are intended for patients with peripheral artery disease, including those with lower extremity PAD, renal artery disease, mesenteric artery disease, and aneurysms of the abdominal aorta and its branch vessels.

Key Factors: The document provides detailed recommendations on various aspects of PAD management, including vascular history and physical examination, diagnostic methods, treatment options (such as lipid-lowering drugs, antihypertensive drugs, diabetes therapies, smoking cessation, antiplatelet and antithrombotic drugs), exercise and rehabilitation, endovascular and surgical treatments, and follow-up care.

2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease [7]

Study Design: This document is the 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS guideline for the management of lower extremity peripheral artery disease. It was developed by the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines in collaboration with several other organizations.

Target Population: The guidelines are intended for clinicians treating patients with lower extremity peripheral artery disease across its multiple clinical presentation subsets, including asymptomatic PAD, chronic symptomatic PAD, chronic limb-threatening ischemia, and acute limb ischemia.

Key Factors: The document provides comprehensive recommendations on the clinical assessment, diagnostic testing, medical therapy, preventive foot care, exercise therapy, revascularization techniques, management of chronic limb-threatening ischemia, and acute limb

ischemia. It also addresses special considerations such as risk amplifiers, health disparities, and management of PAD in older patients.

ACCF/ACR/AIUM/ASE/ASN/ICAVL/SCAI/SCCT/SIR/SVM/SVS 2012 Appropriate Use Criteria for Peripheral Vascular Ultrasound and Physiological Testing Part I: Arterial Ultrasound and Physiological Testing [8]

Study Design: This document is the 2012 Appropriate Use Criteria for Peripheral Vascular Ultrasound and Physiological Testing, Part I: Arterial Ultrasound and Physiological Testing. It was developed by the American College of Cardiology Foundation Appropriate Use Criteria Task Force in partnership with several other societies.

Target Population: The criteria are intended for patients undergoing peripheral vascular ultrasound and physiological testing for various arterial disorders, including cerebrovascular disease, renal artery stenosis, mesenteric artery stenosis, abdominal aortic disease, and lower and upper extremity arterial disease.

Key Factors: The document provides detailed criteria for the appropriate use of peripheral vascular ultrasound and physiological testing based on various clinical scenarios. It includes indications for testing, surveillance after revascularization, and follow-up care. The criteria are intended to guide clinicians in maximizing the appropriate use of noninvasive vascular laboratory testing for the care of patients with peripheral vascular disorders

ANALYSIS OF EVIDENCE

Shared Findings [6–8]

- All three documents emphasize the importance of comprehensive clinical assessment and diagnostic testing for the management of PAD and other arterial disorders.
- They all highlight the significance of medical therapy, including the use of lipid-lowering drugs, antihypertensive drugs, and antiplatelet therapy, in reducing the risk of cardiovascular events in patients with PAD.
- The documents stress the importance of exercise therapy and preventive foot care in improving patient outcomes and preventing complications.
- They all recognize the need for revascularization techniques, including endovascular and surgical treatments, in managing severe cases of PAD and other arterial disorders.

Conclusion [6–8]

In summary, while all three documents share common goals in improving the management of PAD and other arterial disorders, they differ in their specific focus areas and the scope of their recommendations. Anderson et al. 2013 provides a broad overview of PAD management, Gornik et al. 2024 focuses on lower extremity PAD, and Mohler et al. 2012 emphasizes the appropriate use of diagnostic testing.

POLICY HISTORY

Date	Summary
May 2026	● Added requirement for an ABI ● Added requirement that the duplex scan can only be ordered if it will impact clinical decision making ● Added the following indications: ○ Following vascular trauma with suspected vascular injury ○ For the evaluation of suspected popliteal entrapment or popliteal cystic degeneration ● Removed the following indications: ○ History or physical exam findings suggestive of peripheral artery disease ○ Annual surveillance of known PAD on GDMT (stable signs/symptoms) ● Added technical description to codes ● Updated references
June 2025	● Added a Summary of Evidence and Analysis of Evidence
May 2025	● Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices ● No clinical changes ● Removed code description ● Adjusted applicable lines of business – Medicare Advantage checked

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

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Evolent Clinical Guideline 7258 for Device Interrogation and Programming

Guideline Number: Evolent_CG_7258	**Applicable Codes**	
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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

The purpose of device interrogation and programming is to monitor the device's performance and determine medical necessity for device programming of an Automatic Implantable Cardioverter Defibrillator (AICD), Subcutaneous Implantable Cardioverter Defibrillator (SICD), Cardiac Resynchronization Therapy-Defibrillator (CRT-D) or Pacemaker (CRT-P), Permanent Pacemaker (PPM), Implantable Loop Recorder (ILR), or Life Vest/Wearable Defibrillator.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR DEVICE INTERROGATION

In-Person Device Interrogation and Programming [6]

- Recommended at 2-12 weeks after implantation
- May be performed routinely every 6-12 months for pacemakers and every 3 months for

implantable ICDs to ensure the integrity of the device components and to improve longevity

- Should be performed for any Cardiovascular Implantable Electronic Devices (CIEDs) when alerts are triggered by remote monitoring
- May be performed when patient complaints, ECG tracings, or remote monitoring suggest device malfunction or suboptimal device programming (such as pacemaker syndrome, failure to sense or pace, lead impedance issues, or ICD therapy delivery)

Transtelephonic Monitoring (6)

- Used only in patients with Cardiovascular Implantable Electronic Monitoring (CIEMs) that do not have remote monitoring or remote interrogation capabilities

Remote Monitoring (6)

- Recommended for all patients with CIEMs equipped with this capability
- Should be utilized for all patients whose CIEMs or leads are under recall or advisory status
- Frequency should be programmed to minimize device battery drain (typically every three months), unless circumstances (such as lead or pulse generator advisory or patient rhythm disturbances) demand closer surveillance

Remote Pacemaker Interrogation (7,8)

- Routine remote interrogation may be performed every 3 months from last interrogation
- Cardiac Resynchronization Therapy with Pacemaker (CRT-P) interrogation may be performed every 3 months, either in-person or remotely
- When device interrogation reveals that the battery is approaching elective replacement indicator (90 days or less), interrogation may be performed monthly

NOTE: Interrogation includes device programming, if performed on the same day

AICD Interrogation (7,8)

- Routine/surveillance Automatic Implantable Cardiac Defibrillator (AICD)/ Cardiac Resynchronization Therapy with ICD (CRT-D) / subcutaneous Implantable Cardioverter Defibrillator (ICD) interrogation may be performed every 3 months, either in-person or remotely
- When device interrogation reveals that the battery is approaching elective replacement indicator (90 days or less), interrogation may be performed monthly

NOTE: Interrogation includes device programming, if performed on the same day

Wearable ICD Interrogation (9)

- Life Vest™ or wearable defibrillator interrogation may be performed every 30 days

Loop Recorder Interrogation [6]

- Routine loop recorder interrogation in person or remotely may be done monthly

Urgent Interrogation [7]

- Appropriate when recent shock therapy from an ICD or any symptom or finding since previous CIED (ICD, pacemaker, or loop recorder) evaluation for which an interrogation earlier than recommended guideline frequency could help yield a diagnosis, or if permanent adjustment(s) were made during the last evaluation
- Indicated when recent interrogation shows battery voltage in elective replacement indicator range or end of life indicator range (may differ by device type and manufacturer)

NOTE: Interrogation includes device programming, if performed on the same day

Physiologic Interrogation [6]

- Available when the patient has an implanted device which monitors transthoracic impedance as an index of fluid volume status, or the patient has an implanted device that monitors pulmonary artery pressure
- Monitoring may be performed in-person or remotely every 30 days when there is documentation that the data will be used to adjust diuretic or other heart failure therapies
- Monitoring may be performed urgently when the patient reports new or worsening symptoms of heart failure when the information obtained will be used to adjust medical therapy

Exclusions

- Remote and in-person interrogation cannot be reported at the same time

INDICATIONS FOR DEVICE PROGRAMMING

Routine Device Programming

- Device Programming is indicated within 72 hours of device implantation or pulse generator change and may be indicated during a routine follow-up visit 2-12 weeks after device implantation. [6,10]
- Device Programming may also be indicated during routine follow-up visits that occur every 3-12 months for pacemakers, and every 3-6 months for ICDs and resynchronization devices. [6]

Patient-related Indications

- Changes in the clinical status or cardiovascular symptom frequency/severity that may

affect device function [7]

- Changes in disease therapy or medication regimen if the change may influence the underlying cardiac rhythm or device functioning [11]
    - A lower rate cutoff is recommended for patients taking antiarrhythmic medications that may reduce the heart rate at which clinical tachycardia is achieved

Disease-specific Programming [6]

- In patients with heart failure, AICD or CRT-D device programming for AV optimization to prevent recurrent heart failure decompensation is recommended
- Unnecessary shocks due to rapid responses to supraventricular tachydysrhythmias (e.g., atrial fibrillation and flutter) and T-wave oversensing may occur. Device reprogramming may be indicated to reduce these occurrences.

Device-related Indications

- Device evaluation during Interrogation demonstrates lead malfunctioning, lead recall(s), or that the battery is approaching its end of life [6]
- When the device delivers frequent or inappropriate shocks, device programming is indicated to optimize the programming therapy zones by modifying the device's operational parameters. Examples of operational parameters that can be adjusted during device programming include, but are not limited to [11]:
    - Rate Threshold Sensing for identifying VT/VF
    - The duration of an identified VT/VF that partitions non-sustained vs. sustained VT/VF
    - Antitachycardia pacing
    - Discrimination of SVT vs VT
    - T-wave and lead-related oversensing
- Device programming is indicated when one or more of the operational parameters are causing excessive battery depletion [6]
- Device programming is also indicated when new permanent changes were done during the last device evaluation or deemed necessary after a recent remote interrogation

Indications related to Remote Monitoring [7]

- For patients with devices that permit remote monitoring, alert parameters for cardiac events should be optimized to the patient's unique pathophysiology during office visit. Accordingly, device programming may be indicated if the device is over- or under-reporting actionable cardiac events and/or shock therapies.
- For patients with ILR, Programming is indicated when there is frequent under sensing and/or oversensing. After alerts relating to actionable cardiac events, electrograms should be immediately reviewed to establish the diagnosis

Other Considerations

- Defibrillation threshold (DFT) testing for ICDs, including SICD, which may indicate a need for unique lead configurations, may be appropriate at the time of device implantation or generator replacement. [11] Examples of changeable parameters include shock vectors, intensity, and timing.

Limitations

- When a patient is monitored both during clinic visits and trans-telephonically or remotely, the combined frequency of monitoring will be considered in evaluating the reasonableness of the frequency of monitoring services received by the patient.
- There are no frequency guidelines available for programming of Life Vest after initial set up.

CODING AND STANDARDS

Codes

Codes	Description
Device Interrogation	
93261	Interrogation device evaluation (in person) with analysis, review and report by a physician or other qualified health care professional, includes connection, recording and disconnection per patient encounter; implantable subcutaneous lead defibrillator system
93288	Interrogation device evaluation (in person) with analysis, review and report by a physician or other qualified health care professional, includes connection, recording and disconnection per patient encounter; single, dual, or multiple lead pacemaker system, or leadless pacemaker system
93289	Interrogation device evaluation (in person) with analysis, review and report by a physician or other qualified health care professional, includes connection, recording and disconnection per patient encounter; single, dual, or multiple lead transvenous implantable defibrillator system, including analysis of heart rhythm derived data elements
93290	Interrogation device evaluation (in person) with analysis, review and report by a physician or other qualified health care professional, includes connection, recording and disconnection per patient encounter; implantable cardiovascular physiologic monitor system, including analysis of 1 or more recorded physiologic cardiovascular data elements from all internal and external sensors

Codes	Description
93291	Interrogation device evaluation (in person) with analysis, review and report by a physician or other qualified health care professional, includes connection, recording and disconnection per patient encounter; subcutaneous cardiac rhythm monitor system, including heart rhythm derived data analysis
93292	Interrogation device evaluation (in person) with analysis, review and report by a physician or other qualified health care professional, includes connection, recording and disconnection per patient encounter; wearable defibrillator system
93293	Transtelephonic rhythm strip pacemaker evaluation(s) single, dual, or multiple lead pacemaker system, includes recording with and without magnet application with analysis, review and report(s) by a physician or other qualified health care professional, up to 90 days
93294	Interrogation device evaluation(s) (remote), up to 90 days; single, dual, or multiple lead pacemaker system, or leadless pacemaker system with interim analysis, review(s) and report(s) by a physician or other qualified health care professional
93295	Interrogation device evaluation(s) (remote), up to 90 days; single, dual, or multiple lead implantable defibrillator system with interim analysis, review(s) and report(s) by a physician or other qualified health care professional
93296	Interrogation device evaluation(s) (remote), up to 90 days; single, dual, or multiple lead pacemaker system, leadless pacemaker system, or implantable defibrillator system, remote data acquisition(s), receipt of transmissions and technician review, technical support and distribution of results
93297	Interrogation device evaluation(s), (remote) up to 30 days; implantable cardiovascular physiologic monitor system, including analysis of 1 or more recorded physiologic cardiovascular data elements from all internal and external sensors, analysis, review(s) and report(s) by a physician or other qualified health care professional
93298	Interrogation device evaluation(s), (remote) up to 30 days; subcutaneous cardiac rhythm monitor system, including analysis of recorded heart rhythm data, analysis, review(s) and report(s) by a physician or other qualified health care professional

Codes	Description
93724	Electronic analysis of antitachycardia pacemaker system (includes electrocardiographic recording, programming of device, induction and termination of tachycardia via implanted pacemaker, and interpretation of recordings)
G2066	Interrogation device evaluation(s), (remote) up to 30 days; implantable cardiovascular physiologic monitor system, implantable loop recorder system, or subcutaneous cardiac rhythm monitor system, remote data acquisition(s), receipt of transmissions and technician review, technical support and distribution of results
Device Programming	
93260	Programming device evaluation (in person) with iterative adjustment of the implantable device to test the function of the device and select optimal permanent programmed values with analysis, review and report by a physician or other qualified health care professional; implantable subcutaneous lead defibrillator system
93279	Programming device evaluation (in person) with iterative adjustment of the implantable device to test the function of the device and select optimal permanent programmed values with analysis, review and report by a physician or other qualified health care professional; single lead pacemaker system or leadless pacemaker system in one cardiac chamber
93280	Programming device evaluation (in person) with iterative adjustment of the implantable device to test the function of the device and select optimal permanent programmed values with analysis, review and report by a physician or other qualified health care professional; dual lead pacemaker system
93281	Programming device evaluation (in person) with iterative adjustment of the implantable device to test the function of the device and select optimal permanent programmed values with analysis, review and report by a physician or other qualified health care professional; multiple lead pacemaker system
93282	Programming device evaluation (in person) with iterative adjustment of the implantable device to test the function of the device and select optimal permanent programmed values with analysis, review and report by a physician or other qualified health care professional; single lead transvenous implantable defibrillator system

Codes	Description
93283	Programming device evaluation (in person) with iterative adjustment of the implantable device to test the function of the device and select optimal permanent programmed values with analysis, review and report by a physician or other qualified health care professional; dual lead transvenous implantable defibrillator system
93284	Programming device evaluation (in person) with iterative adjustment of the implantable device to test the function of the device and select optimal permanent programmed values with analysis, review and report by a physician or other qualified health care professional; multiple lead transvenous implantable defibrillator system
93285	Programming device evaluation (in person) with iterative adjustment of the implantable device to test the function of the device and select optimal permanent programmed values with analysis, review and report by a physician or other qualified health care professional; subcutaneous cardiac rhythm monitor system
93640	Electrophysiologic evaluation of single or dual chamber pacing cardioverter-defibrillator leads including defibrillation threshold evaluation (induction of arrhythmia, evaluation of sensing and pacing for arrhythmia termination) at time of initial implantation or replacement;
93641	Electrophysiologic evaluation of single or dual chamber pacing cardioverter-defibrillator leads including defibrillation threshold evaluation (induction of arrhythmia, evaluation of sensing and pacing for arrhythmia termination) at time of initial implantation or replacement; with testing of single or dual chamber pacing cardioverter-defibrillator pulse generator
93745	Initial set-up and programming by a physician or other qualified health care professional of wearable cardioverter-defibrillator includes initial programming of system, establishing baseline electronic ECG, transmission of data to data repository, patient instruction in wearing system and patient reporting of problems or events

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

1. **Cardiac Implantable Electrical Device (CIED):** An implanted device that either monitors, or regulates the heart rate, rhythm, or function. These devices include permanent pacemakers (PPM), implantable cardioverter-defibrillators (ICD), and implantable loop recorders (ILR).
2. **AICD/CRT-D, PPM/CRT-P/Subcutaneous ICD interrogation:** Measurement of previously programmed parameters including but not limited to, battery voltage, lead capture and sensing function, heart rhythm, absence, or presence of therapy for ventricular tachyarrhythmias. Once the device battery longevity is reaching effective replacement indicator (ERI) or once it has reached end of life (EOL) the device will create an alert for replacement.
3. **Automatic implantable cardioverter defibrillator (AICD) or implantable cardioverter defibrillator (ICD):** Electronic device designed to detect and treat life-threatening tachyarrhythmia or brady-arrhythmias. The device consists of a pulse generator and electrodes for sensing, pacing and defibrillation.
4. **Cardiac Resynchronization Therapy-Defibrillators (CRT-D) and Cardiac Resynchronization Therapy-Pacemakers (CRT-P):** Cardiac device with multiple leads for defibrillation and cardiac pacing, capable of pacing and sensing function in the right atrium and both ventricles of the heart. Resynchronization of left ventricular depolarization is achieved by coordinating the excitation of the septum and the lateral wall, improving LV efficiency.
5. **Implantable loop recorder (ILR):** Patient- and auto-activated monitoring system that records ECG tracings and is indicated for patients who experience transient symptoms that suggest a cardiac arrhythmia. The physician utilizes a programmer to retrieve, display, and print data.
6. **ILR interrogation:** Downloading previously programmed parameters and the heart rate and rhythm during recorded episodes from both patient-initiated, and device detected events, when present.

7. **Life Vest/Wearable Defibrillator (WCD) Interrogation:** Previously programmed parameters, battery status, and the heart rate and rhythm during recorded episodes from both patient-initiated, and device detected events, when present.
8. **Life Vest/Wearable Defibrillator (WCD):** Worn by patients with medical issues that place them at risk for sudden cardiac death (SCD). Use of the wearable ICD (WCD) permits time to assess a patient's long-term arrhythmic risk and to determine if permanent ICD implantation is appropriate. It continuously monitors the patient's heart rate and, if a life-threatening heart rhythm is detected, delivers a shock intended to restore normal heart rhythm. [9] Current WCDs have embedded remote monitoring capability, allowing clinicians to monitor data downloaded from a patient's WCD. The patient downloads through the base station/battery charger. The device is connected via Bluetooth, signals are encrypted and sent wirelessly via cellular networks to the secure network website where it is archived for review. [12]
9. **Pacemaker:** Medical device which uses electrical impulses, delivered by electrodes in contact with heart muscle, to regulate the heart rate when the normal pacemaker is too slow or there is a block in the electrical conduction system.
10. **Remote Interrogation (RI):** Remote evaluation of CIEDs using a wand-based radiofrequency platform to transfer data from patient's device to a home transceiver, then via telephone (analog phone line or cellular wireless data network) to a central repository. [6]
11. **Remote Monitoring (RM):** Remote evaluation of CIEDs using automated platform by set radiofrequency transmissions sent wirelessly to a transceiver (located near the patient) then to central repository by analog landline or wireless data networks. Minimal information includes battery status, lead integrity, and arrhythmic events. [6]
12. **Subcutaneous ICD (SICD):** (pulse generator) is implanted under the skin on the side of the chest below the arm pit. The pulse generator is connected to the electrode which is implanted under the skin from the device pocket along the rib margin to the breastbone with the use of the insertion tool. There are no electrodes/leads placed on (epicardial) or in (endocardial) the heart.
13. **Trans telephonic Monitoring (TTM)**: Remote evaluation of CIEDs by analog transmission over a telephone line. Very limited information is available, and this method of monitoring has largely been supplanted by remote monitoring and interrogation. [6]
14. **Leadless Pacemaker**: A self-contained medical device that includes pacemaker electronics and battery that is inserted directly into right side of the heart without the need for a surgical pocket and pacemaker leads. [13]
15. **Physiologic Data Interrogation:** Some devices are equipped to provide information related to the patient's volume status. The Optivol™ system uses transthoracic impedance calculated between the CIED's endocardial lead and pulse generator to reflect blood volume and lung water. This has yielded mixed clinical results. Multicenter trials have calculated positive predictive values ranging from 38.1% to 60% for the worsening of systolic heart failure. Another device using a remotely monitored implantable pulmonary artery hemodynamic sensor was tested in a large, randomized trial. Its utilization was shown to reduce HF hospitalization by 37%. [6]
16. **Device Programming** (is a non-invasive process that allows the physician to set, or

modify, the operational parameters of the implanted cardiac device. Examples of Device Programming include:

- For AICD, SICD, CRT-D, CRT-P, and PPM:
  - Documented manual iterative temporary or permanent changes of capture and sensing thresholds.
  - Changes in the pacing output of a pacing lead, heart rhythm, upper and lower heart rates, sensor rate response, AV intervals, pacing voltage, pulse duration, sensing value and checking battery voltage.
  - In addition to these programming parameters, ventricular tachycardia detection and therapies are programmed based on device interrogation when medically necessary.
- For an ILR:
  - Tachycardia and bradycardia rate adjustment based on interrogation when medically necessary.
- For a Life Vest/Wearable Defibrillator:
  - Sensing thresholds and ventricular tachycardia detection and defibrillation therapies based on device interrogation when medically necessary. Note, there are no pacing capabilities in a Life Vest, and Programming is usually done during the initial setup of the device.

17. **Defibrillator Threshold (DFT) Test** - It is an integral part of implantable cardioverter-defibrillator implantation. It is usually performed at the time of initial implantation or after generator replacement. It involves testing of the device and leads using arrhythmia induction and termination by delivering a shock through programmed parameters, and establishing the dose of energy needed to restore normal rhythm,

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(4)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AICD: Automatic Implantable Cardiac Defibrillator

AUC: appropriate use criteria

AV: Atrioventricular

CIEDs: Cardiovascular Implantable Electronic Devices

CIEM: Cardiovascular Implantable Electronic Monitoring

CRT-D: Cardiac Resynchronization Therapy with ICD

CRT-P: Cardiac Resynchronization Therapy with Pacemaker

DFT: Defibrillation Threshold

ECG: electrocardiogram

EOL: end of life

ERI: elective replacement indicator

ICD: Implantable Cardioverter Defibrillator

ILR: Implantable Loop Recorder

PPM: Permanent Pacemaker

RI: Remote Interrogation

RM: Remote Monitoring

SCD: sudden cardiac death

SICD: Subcutaneous Implantable Cardioverter Defibrillator

TTM: Transtelephonic Monitoring

VF: Ventricular Fibrillation

VT: Ventricular Tachycardia

WCD: Wearable Cardiac Defibrillator

SUMMARY OF EVIDENCE

2023 HRS/EHRA/APHRS/LAHRS expert consensus statement on practical management of the remote device clinic [7]

Study Design: This is an expert consensus statement developed by the Heart Rhythm Society (HRS) in partnership with the European Heart Rhythm Association (EHRA), the Asia Pacific Heart Rhythm Society (APHRS), and the Latin American Heart Rhythm Society (LAHRS). It provides comprehensive guidance for managing remote monitoring clinics for patients with cardiovascular implantable electronic devices (CIEDs).

Target Population: The document is intended for cardiac electrophysiologists, allied professionals, and hospital administrators involved in managing remote monitoring clinics for patients with CIEDs.

Key Factors:

- The document addresses remote monitoring clinic staffing, appropriate clinic workflows, patient education, and alert management.
- It provides evidence-based recommendations impacting all aspects of remote monitoring services.
- The document identifies gaps in current knowledge and provides guidance for future

research directions.

HRS Expert Consensus Statement on remote interrogation and monitoring for cardiovascular implantable electronic devices [6]

Study Design: This is an expert consensus statement developed by the Heart Rhythm Society (HRS) in collaboration with the American College of Cardiology (ACC), the American Heart Association (AHA), the European Heart Rhythm Association (EHRA), the Pediatric and Congenital Electrophysiology Society (PACES), and the Asia Pacific Heart Rhythm Society (APHRS). It focuses on remote interrogation and monitoring for cardiovascular implantable electronic devices (CIEDs).

Target Population: The document is intended for healthcare providers involved in the management of patients with CIEDs.

Key Factors:

- The document provides recommendations for remote interrogation and monitoring, including the clinical benefits, follow-up optimization, patient safety, and device surveillance.
- It discusses the roles and responsibilities of the remote monitoring team members, data management, and reimbursement, legal, and privacy considerations.
- The document emphasizes the importance of structured follow-up and the integration of remote monitoring into clinical practice.

2015 HRS/EHRA/APHRS/SOLAECE expert consensus statement on optimal implantable cardioverter-defibrillator programming and testing [11]

Study Design: This is an expert consensus statement developed by the Heart Rhythm Society (HRS) in partnership with the European Heart Rhythm Association (EHRA), the Asia Pacific Heart Rhythm Society (APHRS), and the Latin American Heart Rhythm Society (LAHRS). It provides guidance on optimal implantable cardioverter-defibrillator (ICD) programming and testing.

Target Population: The document is intended for healthcare providers involved in the management of patients with ICDs.

Key Factors:

- The document addresses bradycardia mode and rate programming, tachycardia detection programming, tachycardia therapy programming, and intraprocedural testing of defibrillation efficacy.
- It provides evidence-based recommendations for optimizing ICD programming to improve patient outcomes and reduce inappropriate therapies.
- The document highlights the importance of individualized programming based on patient-specific clinical conditions

ANALYSIS OF EVIDENCE

Shared Findings:

- Remote Monitoring Benefits: All three documents emphasize the benefits of remote monitoring in improving patient outcomes, reducing hospital visits, and early detection of device malfunctions.
- Patient Satisfaction: High patient satisfaction and improved quality of life are common themes in both Ferrick et al 2023 and Slotwiner et al 2015.
- Reduction in Inappropriate Shocks: Both Slotwiner et al 2015 and Wilkoff et al 2016 highlight the importance of reducing inappropriate ICD shocks.

Conclusion:

In summary, while all three documents highlight the benefits of remote monitoring and the importance of reducing inappropriate shocks, they differ in their focus areas and the level of detail provided in programming recommendations and future research directions.

POLICY HISTORY

Date	Summary
April 2026	• Added indication for In-Person Device Interrogation and Programming • Added code description • Removed code 93644
July 2025	• This guideline replaces Evolent Clinical Guideline 7277 for Device (PPM, AICD, CRT-D, Subcut-ICD, ILR) Programming • This guideline replaces Evolent Clinical Guideline 7278 for Device Interrogation

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7259 for Aortic Root, Ascending Aorta and Aortic Arch Surgery

Guideline Number:	Applicable Codes	
Evolent_CG_7259		
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Original Date:	**Last Revised Date:**	**Implementation Date:**
April 2011	April 2026	January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for open or endovascular surgery of the ascending aorta.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

Special Note

Providers must involve patients in a shared decision-making process involving reason(s) for as well as the type of procedure(s) that could be used, including potential outcomes. These should include the optimal medical, endovascular, and open surgical therapies. This process must be reflected in notes provided.

INDICATIONS (6)

Aneurysms

Aortic Root and Ascending Aorta

NOTE: Requests for concomitant subclavian, brachiocephalic, or carotid artery bypass procedures, access procedures, and adjunctive endovascular procedures should be approved as needed.

- Ruptured/symptomatic aneurysms irrespective of etiology.
- Sporadic Aneurysms:
  - ≥ 5.5 cm
  - < 5.5 cm with growth rate of ≥ 0.3 cm/y in 2 consecutive years or ≥ 0.5 cm in one year
  - ≥ 5.0 cm *
  - ≥ 5.0 cm undergoing repair or replacement of a tricuspid aortic valve
  - ≥ 4.5 cm undergoing repair or replacement of an aortic bicuspid valve *
  - > 5.0 cm undergoing repair or replacement of bicuspid valve
  - ≥ 5.0 cm concomitant with cardiac surgery for indications other than aortic valve repair or replacement
  - In patients with a height more than 1 standard deviation above or below the mean who have an asymptomatic aneurysm of the aortic root or ascending aorta and a maximal cross-sectional aortic area/height ratio of ≥ 10 cm^2/m *
  - In patients who have either an aortic size index of ≥ 3.08 cm/m^2 or an aortic height index of ≥ 3.21 cm/m^2 *
- Nonsyndromic Aneurysm and no identifiable genetic cause
  - Timing and size are informed by known aortic diameters at the time of aortic dissection and/or thoracic aortic aneurysm repair in an affected family member
  - ≥ 5.0 cm when there is no information on aortic diameters at the time of dissection or aneurysm repair in affected family members, and there are no high-risk features for adverse aortic events
  - ≥ 4.5 cm, no identifiable genetic cause, high risk aortic events, or who are undergoing cardiac surgery for other indications provided aortic repair
- Syndromic heritable thoracic aortic disease (HTAD)
  - Marfan Syndrome
    - ≥ 5.0 cm
    - ≥ 4.5 cm with increased risk of dissection *:
      - Family history of aortic dissection

- Rapid aortic growth (≥ 0.3 cm/year)
- Diffuse aortic root and ascending aortic dilation
- Marked vertebral arterial tortuosity

- In patients with an aortic root area (cm^2) to patient height (m) ratio of ≥ 10 *
- < 5 cm but who are candidates for valve sparing root replacement and have a very low surgical risk *

- Loeys-Dietz, Ehlers-Danlos, Turner Syndromes and Other Genetic Variants
  - The surgical threshold for prophylactic replacement should be informed by the specific genetic variant, aortic diameter, aortic growth rate, extra aortic features, family history, patient age and sex, patient and physician's preference and experience, and must be discussed fully in the notes provided.

Indications listed with an "" may be appropriate if the procedure is performed by an experienced surgeon in a multidisciplinary aortic team.

Aortic Arch

Any of the following:

- ≥ 5.5 cm asymptomatic with low operative risk
- Symptoms attributable to the aneurysm and the member is at low or intermediate operative risk
- Concurrent with an ascending aortic aneurysm repair
- Concurrent with an elephant trunk procedure or replacement of the descending thoracic aorta

Acute Aortic Syndromes

Type A Aortic Dissection, Intramural Hematoma (IMH) and Penetrating Aortic Ulcer (PAU)

- Open surgical repair, Endovascular, or Hybrid Aortic Repair should be approved for hyperacute or acute pathology unresponsive to supportive medical therapy
- Procedures will be approved if a member is readmitted with new symptoms or evolving limb, organ or life-saving complications.
- If surgery is not performed and aneurysm results, treatment of the aneurysm will follow the guidelines for Aneurysms listed above

Blunt Traumatic Thoracic Aortic Injury (BTTAI)

- Open surgical repair, Endovascular, or Hybrid Aortic Repair should be approved for Grade 3 to 4 BTTAI and is not dependent on any variable.
- Grade 2 BTTAI with **any** high-risk imaging features:

- Posterior mediastinal hematoma more > 10 mm
- Lesion to normal aortic diameter ratio more > 1.4
- Mediastinal hematoma causing mass-effect
- Pseudocoarctation of the aorta
- Large left hemothorax
- Ascending aortic, aortic arch, or great vessel involvement
- Aortic arch hematoma

Other Conditions

- Takayasu and Giant cell arteritis
  - Patients in remission with aortic and branch vessel complications e.g. transient ischemic attack (TIA), stroke, limb ischemia
- Surgery to remove and/or replace infected aorta or aortic grafts
- Surgery to treat aortic tumors
- Bicuspid Aortic Valve

CODING AND STANDARDS

Codes

Code	Description
33858	Ascending aorta graft, with cardiopulmonary bypass, includes valve suspension, when performed; for aortic dissection
33859	Ascending aorta graft, with cardiopulmonary bypass, includes valve suspension, when performed; for aortic disease other than dissection (eg, aneurysm)
33863	Ascending aorta graft, with cardiopulmonary bypass, with aortic root replacement using valved conduit and coronary reconstruction (eg, Bentall)
33864	Ascending aorta graft, with cardiopulmonary bypass with valve suspension, with coronary reconstruction and valve-sparing aortic root remodeling (eg, David Procedure, Yacoub Procedure)
+33530	Reoperation, coronary artery bypass procedure or valve procedure, more than 1 month after original operation (List separately in addition to code for primary procedure)

Code	Description
+33866	Aortic hemiarch graft including isolation and control of the arch vessels, beveled open distal aortic anastomosis extending under one or more of the arch vessels, and total circulatory arrest or isolated cerebral perfusion (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Dilation of the ascending aorta (Thoracic Aortic Aneurysms (TAA)) is often detected during other cardiovascular imaging. Ascending aortic graft surgery is an excision and surgical replacement of the most proximal portion of the diseased thoracic aorta with a graft.

Definitions

- **Acute**: 1-14 days since onset of symptoms
- **Aneurysm**: a ballooning of all the walls of the artery resulting in a 1.5x increase its original size.
- **Endograft**: a preconstructed graft that is inserted via a remote access site. There are multiple commercial variants where the manufacturers' Instructions For Use (IFU) should be followed. Surgeon-modified grafts should only be used at institutions where the graft has been approved by an Institutional Review Board (IRB) or in a government-approved clinical trial.
- **Endoleak:** implies continuous filling of the aneurysm sac despite prior endograft. It is classified as Type I-IV depending on from where the endoleak arises.
- **Endovascular Aortic Aneurysm repair (EVAR):** involves the placement of a stent graft within the affected blood vessel through an artery (usually the femoral artery), and which seals the aneurysm sac from within.
- **Favorable anatomy for EVAR**: anatomy that is consistent with the Instructions For Use (IFU) of the endograft that will be inserted.

- **Heritable Thoracic Aortic Disease (HTAD)**: an aortic condition related to a genetic or heritable condition, some of which are associated with multisystem features (considered syndromic HTAD) or others with abnormalities limited to the aorta with or without its branches (known as nonsyndromic HTAD). Examples include Marfan, Loeys-Dietz, Turner and Ehlers-Danlos syndromes, Familial Thoracic aortic aneurysms, and possibly bicuspid aortic valve.
- **High-risk**: a patient who has significant comorbidities increasing the risk of death, renal failure, stroke, or spinal ischemia and paraplegia.
- **Hyperacute**: < 24 hours since onset of symptoms.
- **Intramural hematoma (IMH):** a hematoma in the wall of the artery without an identifiable communication between the true and false lumens. It is characterized by hyperdense, crescent-shaped hemorrhage within the wall and is best seen on non-contrast enhanced computed tomography.
- **Low-risk:** a patient who does not have significant comorbidities.
- **Open Surgery:** a direct procedure on the aorta or its branches via a midline or retroperitoneal approach.
- **Penetrating aortic ulcer (PAU)**: an atherosclerotic lesion that penetrates the internal elastic lamina of the aortic wall. It was also referred to as ulcer-like projections. It is often associated with IMH.
- **Pregnancy**: can significantly impact the disease process and must be taken into consideration when considering surgical intervention.
- **Pseudoaneurysm**: blood outside the wall of the aneurysm but contained by surrounding structures.
- **Saccular aneurysm**: a ballooning of part of the wall of an artery. It accrues a greater risk of rupture.
- **TEVAR:** EVAR involving the Thoracic Aorta
- **Unfavorable anatomy for TEVAR**: anatomy that would not be suitable for the IFU of any commercially available endograft.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AUC: Appropriate Use Criteria

BTTAI: Blunt Traumatic Thoracic Aortic Injury

CPT: Current Procedural Terminology

CTA: Computed Tomographic Angiography

HTAD: Heritable Thoracic Aortic Disease

IFU: Instructions For Use

IMH: Intramural Hematoma

IRB: Institutional Review Board

MRA: Magnetic Resonance Angiography

PAU: Penetrating Aortic Ulcer

TAA: Thoracic Aortic Aneurysm

TEVAR: Thoracic Endovascular Aortic Repair

TIA: Transient Ischemic Attack

SUMMARY OF EVIDENCE

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease [6]

Study Design: The guidelines were developed by the American Heart Association (AHA) and the American College of Cardiology (ACC) Joint Committee on Clinical Practice Guidelines. The recommendations are based on a comprehensive literature search conducted from January 2021 to April 2021, encompassing studies, reviews, and other evidence conducted on human subjects published in English from PubMed, EMBASE, the Cochrane Library, CINHL Complete, and other selected databases relevant to this guideline. Additional relevant studies published through June 2022 were also considered by the writing committee.

Target Population: The guidelines are intended for clinicians involved in the diagnosis, genetic evaluation, family screening, medical therapy, endovascular and surgical treatment, and long-term surveillance of patients with aortic disease across its multiple clinical presentation subsets (i.e., asymptomatic, stable symptomatic, and acute aortic syndromes). The recommendations apply to patients with or at risk of developing cardiovascular disease, with a focus on medical practice in the United States but relevant to patients worldwide.

Key Factors

- **Recommendations**: The guidelines update previously published AHA/ACC guidelines on thoracic aortic disease, peripheral artery disease, and bicuspid aortic valve disease with new evidence. New recommendations addressing comprehensive care for patients with aortic disease have been developed, emphasizing shared decision-making and the importance of institutional interventional volume and multidisciplinary aortic team expertise.
- **Imaging Techniques**: The guidelines provide detailed recommendations on aortic imaging techniques, including computed tomography (CT), magnetic resonance imaging (MRI), echocardiography, and ultrasound, to determine the presence and progression of

aortic disease.

- **Surgical and Endovascular Management**: The guidelines discuss the timing and types of surgical and endovascular interventions for aortic aneurysms, acute aortic syndromes, and other aortic conditions. They emphasize the importance of multidisciplinary aortic teams and high-volume centers for optimizing treatment outcomes.
- **Medical Management**: The guidelines include recommendations for medical therapy, including antihypertensive medications, statins, smoking cessation, and antiplatelet therapy, to manage aortic disease and reduce the risk of adverse aortic events.
- **Surveillance**: The guidelines provide recommendations for surveillance imaging after aortic repair to monitor for complications and progression of residual aortic pathology

ANALYSIS OF EVIDENCE [6]

Aortic Root Surgery

Findings:

- **Aortic Valve Resuspension**: In patients with acute type A aortic dissection and a partially dissected aortic root but no significant aortic valve leaflet pathology, aortic valve resuspension is recommended over valve replacement.
- **Aortic Root Replacement**: In patients with extensive destruction of the aortic root, a root aneurysm, or a known genetic aortic disorder, aortic root replacement is recommended with a mechanical or biological valved conduit. Valve-sparing root repair may be reasonable in selected patients who are stable and when performed by experienced surgeons in a Multidisciplinary Aortic Team.

Ascending Aorta Surgery

Findings:

- **Open Distal Anastomosis**: In patients with acute type A aortic dissection undergoing aortic repair, an open distal anastomosis is recommended to improve survival and increase false-lumen thrombosis rates.
- **Hemiarch Repair**: In patients with acute type A aortic dissection without an intimal tear in the arch or a significant arch aneurysm, hemiarch repair is recommended over more extensive arch replacement.
- **Extended Aortic Repair**: In patients with acute type A aortic dissection and a dissection flap extending through the arch into the descending thoracic aorta, an extended aortic repair with antegrade stenting of the proximal descending thoracic aorta may be considered to treat malperfusion and reduce late distal aortic complications.

Aortic Arch Surgery

Findings:

- **Symptoms and Surgical Intervention**: In patients with an aortic arch aneurysm who have symptoms attributable to the aneurysm and are at low or intermediate operative risk, open surgical replacement is recommended.

- **Diameter Thresholds**: In patients with an isolated aortic arch aneurysm who are asymptomatic and have a low operative risk, open surgical replacement at an arch diameter of ≥ 5.5 cm is reasonable.
- **Hemiarch Replacement**: In patients undergoing open surgical repair of an ascending aortic aneurysm, if the aneurysmal disease extends into the proximal aortic arch, it is reasonable to extend the repair with a hemiarch replacement.
- **Elephant Trunk Procedure**: In patients undergoing open surgical repair of an aortic arch aneurysm, if the aneurysmal disease extends into the proximal descending thoracic aorta, an elephant trunk procedure may be considered

POLICY HISTORY

Date	Summary
April 2026	● Update Background ● Edited text and terminology for improved readability ● Added code descriptions ● No clinically relevant changes
June 2025	● Added a Summary of Evidence and Analysis of Evidence
May 2025	● Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices ● Reduced General Consideration section and edited text for clarity throughout ● Added risks of aortic dissection for Marfan syndrome in Indication section
January 2025	● This guideline replaces UM CARDIO_1097 for Ascending Aortic Graft Surgery o Guideline name was changed to **Aortic Root, Ascending Aorta and Aortic Arch Surgery** ● Clinical indications were updated per societal guidance

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7260 for Automated Ambulatory Blood Pressure Monitoring

Guideline Number:	Applicable Codes	
Evolent_CG_7260		
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Original Date:	**Last Revised Date:**	**Implementation Date:**
November 2014	April 2026	January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Automated Ambulatory Blood Pressure Monitoring (ABPM).

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR AUTOMATED AMBULATORY BLOOD PRESSURE MONITORING [6]

- Suspected white-coat hypertension:
  - Grade I hypertension (systolic blood pressure (SBP) is 140-159 mmHg and/or diastolic blood pressure (DBP) is 90-99 mmHg) on office BP (blood pressure) measurement
  - Marked office BP elevation without hypertension-mediated organ damage (HMOD)

- 130 mmHg ≤ untreated SBP < 160 mmHg or 80 mmHg ≤ untreated DBP < 100 mmHg [7]

- Suspected masked hypertension:
  - High-normal office BP
  - Normal office BP in individuals with HMOD or at high total cardiovascular risk
  - Untreated office SBP < 130 mm Hg and DBP < 80 mmHg [7]
- In treated individuals:
  - Confirmation of uncontrolled and true resistant hypertension (defined as SBP ≥ 140 mmHg or DBP ≥ 90 mmHg despite being on maximally guideline-directed medical therapy (GDMT) with various causes of pseudo-resistant hypertension and secondary hypertension excluded)
  - Evaluation of 24-hour BP control (especially in high-risk patients)
  - Evaluating symptoms indicating hypotension (especially in older patients)
  - Suspected postural or postprandial hypotension
- Exaggerated BP response to exercise
- Considerable variability in office BP measurements
- Assessment of nocturnal BP and dipping status (e.g. sleep apnea, chronic kidney disease (CKD), diabetes, endocrine hypertension, or autonomic dysfunction). Repeating ABPM is necessary for reproducibility
- Patients incapable or unwilling to perform reliable home BP monitoring (HBPM), or anxious with self-measurement
- Pregnancy
- As periodic monitoring for confirmation of white-coat hypertension or masked hypertension in untreated or treated individuals to timely identify sustained hypertension or new HMOD
- As periodical follow-up for HMOD assessment in patients with true resistant hypertension to monitor kidney function and serum potassium levels

NOTE: The recommended time interval between measurements should be 20 minutes during day and night to minimize the risk of missing day or night periods. [6]

CODING AND STANDARDS

Codes

Code	Description
93784	Ambulatory blood pressure monitoring, utilizing report-generating software, automated, worn continuously for 24 hours or longer; including recording, scanning analysis, interpretation and report
93786	Ambulatory blood pressure monitoring, utilizing report-generating software, automated, worn continuously for 24 hours or longer; recording only
93788	Ambulatory blood pressure monitoring, utilizing report-generating software, automated, worn continuously for 24 hours or longer; scanning analysis with report
93790	Ambulatory blood pressure monitoring, utilizing report-generating software, automated, worn continuously for 24 hours or longer; review with interpretation and report

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Ambulatory blood pressure monitoring (ABPM) involves the use of a non-invasive device which is used to measure blood pressure in 24-hour cycles, with out-of-office BP readings obtained at relatively frequent intervals during the daytime (i.e., 15-30 minutes) and less frequent intervals at nighttime (i.e., 30-60 minutes). [7] These 24-hour measurements are stored in the device and are later interpreted by the physician.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ABPM: Ambulatory blood pressure monitoring

BP: Blood pressure

CKD: Chronic kidney disease

DBP: Diastolic blood pressure

GDMT: Guideline-directed medical therapy

HBPM: Home blood pressure monitoring

HMOD: Hypertension-mediated organ damage

SBP: Systolic blood pressure

SUMMARY OF EVIDENCE

2023 ESH Guidelines for the management of arterial hypertension The Task Force for the management of arterial hypertension of the European Society of Hypertension [6]

Study Design: This document presents the 2023 European Society of Hypertension (ESH) Guidelines for the management of arterial hypertension. It is a comprehensive guideline developed by a Task Force of 59 experts from various European countries, representing multiple medical specialties. The guidelines were developed after a thorough review of new studies in hypertension and related areas, with a focus on real-world studies and randomized controlled trials (RCTs).

Target Population: The guidelines are intended for adults with hypertension, including specific recommendations for different demographic groups such as children, adolescents, young adults, older persons, and women. It also addresses hypertension in various clinical conditions and comorbidities.

Key Factors:

- **Pathophysiology**: The guidelines discuss the genetic and environmental factors contributing to hypertension, including the role of the renin-angiotensin-aldosterone system (RAAS), autonomic regulation, and inflammation.
- **Diagnosis**: Recommendations for the classification of hypertension, BP measurement techniques, and the use of out-of-office BP monitoring (ABPM and HBPM) are provided.

- **Management**: The guidelines emphasize lifestyle interventions, pharmacological treatment, and the importance of achieving BP targets. Specific recommendations are made for different patient populations and clinical scenarios.
- **Follow-Up**: The importance of regular follow-up and monitoring of BP control, adherence to treatment, and the management of resistant hypertension are highlighted.

2025 AHA/ACC/AANP/AAPA/ABC/ACCP/ACPM/AGS/AMA/ASPC/NMA/PCNA/SGIM Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines [7]

Study Design

- ABPM is a form of out-of-office blood pressure (BP) monitoring, typically using a fully automated device worn for 24 hours, with readings every 15–30 minutes during the day and 30–60 minutes at night.
- Home BP Monitoring (HBPM) is also discussed as a complementary method, with patient-initiated measurements over days to weeks.
- Studies referenced include randomized controlled trials (RCTs), systematic reviews, meta-analyses, and large cohort studies.

Target Population

- Adults with suspected hypertension (to confirm diagnosis).
- Patients on antihypertensive medication (for monitoring and titration).
- Individuals with resistant hypertension or suspected secondary hypertension (e.g., primary aldosteronism, obstructive sleep apnea, chronic kidney disease, renovascular disease).
- High-risk groups: those with white-coat or masked hypertension, post-kidney transplant, pregnancy, and comorbidities (CKD, diabetes, CVD, stroke).

Key Factors & Evidence Summary

- ABPM is the reference standard for out-of-office BP monitoring and is superior to office BP for predicting cardiovascular outcomes.
- HBPM is preferred for ongoing management and medication titration due to practicality and reproducibility.
- Validated devices and standardized protocols are required for both ABPM and HBPM.
- Diagnostic thresholds: Office BP ≥130/80 mm Hg; ABPM daytime ≥130/80 mm Hg; HBPM ≥130/80 mm Hg.
- ABPM provides:
    - 24-hour BP profile (daytime, nighttime, and overall averages).
    - Detection of nocturnal hypertension, BP variability, and early-morning surges.

- Identification of white-coat and masked hypertension.

- HBPM is effective for longitudinal management, especially when combined with education, telehealth, and clinical interventions.
- Meta-analyses show modest BP reductions with HBPM alone, greater reductions when combined with cointerventions.
- Clinical recommendations:
  - Out-of-office BP (ABPM/HBPM) is recommended to confirm hypertension diagnosis (Class 1, Level A evidence).
  - HBPM is recommended for medication titration.
  - ABPM is preferred for excluding white-coat/masked hypertension; HBPM is preferred for excluding white-coat effect/masked uncontrolled hypertension.
- Diagnostic categories: sustained normotension, sustained hypertension, masked hypertension, white-coat hypertension (untreated); controlled, uncontrolled, masked uncontrolled hypertension, white-coat effect (treated).
- Implementation: Use validated devices (see validatebp.org), average ≥2 readings on ≥2 occasions, ongoing staff training, and avoid cuffless devices (not recommended).
- Prevalence: Hypertension in U.S. adults (2017–2020) was 46.7%; white-coat hypertension risk is higher in older/high-risk adults; masked hypertension is associated with increased CVD risk.
- Screening: Out-of-office BP monitoring is reasonable for excluding white-coat/masked hypertension, white-coat effect, and masked uncontrolled hypertension; the optimal frequency of follow-up is unclear.
- Limitations: Most ABPM/HBPM thresholds are derived from non-U.S. populations; more data are needed for U.S.-specific thresholds and optimal integration of health technology.

ANALYSIS OF EVIDENCE

Shared Findings [6,7]**:**

Diagnostic Superiority

- Both guidelines agree that ABPM is superior to office blood pressure (BP) measurement for diagnosing hypertension, especially for detecting:
  - White-coat hypertension (WCH): Elevated office BP, normal ambulatory BP
  - Masked hypertension (MH): Normal office BP, elevated ambulatory BP
  - Nocturnal hypertension: Elevated nighttime BP
  - Resistant hypertension: Uncontrolled BP despite optimal therapy

Prognostic Value

- ABPM provides incremental prognostic information over office BP, correlating more strongly with:
  - Target organ damage (e.g., left ventricular hypertrophy, albuminuria)
  - Cardiovascular (CV) events and mortality
  - BP variability and morning surge

Recommendations for Use

- Both guidelines recommend ABPM for:
  - Confirming hypertension diagnosis
  - Risk stratification
  - Guiding therapy adjustments
  - Monitoring treatment efficacy
  - Evaluating special populations (CKD, diabetes, pregnancy, elderly, children)

Clinical Implementation

- Validated devices and standardized protocols are emphasized.
- Minimum readings: Both recommend at least 20 valid awake and 7 valid asleep readings for a 24-hour recording; BP measured every 20 minutes is ideal
- Complementary role: ABPM and Home BP Monitoring (HBPM) are non-redundant; ABPM is best for nocturnal BP/dipping status, HBPM for long-term follow-up and adherence

Thresholds

- BP thresholds for diagnosis:
  - Office BP: ≥140/90 mmHg
  - ABPM (24h mean): ≥130/80 mmHg
  - Daytime ABPM: ≥135/85 mmHg
  - Nighttime ABPM: ≥120/70 mmHg
  - HBPM: ≥135/85 mmHg

Differing Findings [6,7]:

Evidence Gaps & Limitations

- Both guidelines acknowledge gaps:
  - No outcome-based randomized controlled trials (RCTs) directly comparing ABPM-guided vs. office BP-guided treatment
  - Current ABPM targets are inferred from office BP correspondence, not direct outcome data
- Mancia et al 2023 more explicitly discusses the need for future RCTs and the limitations of current evidence for treatment thresholds and targets [6]

Practical Barriers

- Mancia et al 2023 highlights ABPM's limitations [6]:
  - Not suitable for frequent use
  - Expense and limited availability in primary care
  - Patient discomfort during sleep
- Jones et al 2025 (ACC/AHA) emphasizes the practicality and reproducibility of HBPM for ongoing management and medication titration, especially when ABPM is not feasible [7]

Device Recommendations

- Both guidelines recommend validated upper arm-cuff automated devices.
- Both explicitly advise against cuffless BP devices for diagnosis or management due to insufficient precision and reliability

Special Populations

- Mancia et al 2023 provides detailed recommendations for ABPM in children, pregnancy, CKD, diabetes, and cancer patients [6]
- Jones et al 2025 also recommends ABPM for high-risk groups but places greater emphasis on HBPM for medication titration and longitudinal management [7]

Conclusion [6,7]

- ABPM is central to evidence-based hypertension management—diagnosis, risk stratification, treatment decisions, and monitoring.
- ABPM improves diagnostic accuracy, risk prediction, and management decisions; routine use is recommended in clinical practice for optimal hypertension care.
- ABPM and HBPM are complementary tools; both improve risk stratification and phenotype identification.
- Validated devices and standardized measurement protocols are essential for accurate BP assessment.

POLICY HISTORY

Date	Summary
April 2026	• Updated suspected white-coat hypertension and masked hypertension indications for Automated Ambulatory Blood Pressure Monitoring • Added code description • Adjusted Summary of Evidence and Analysis of Evidence sections

Date	Summary
June 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • No clinical changes • Removed codes description • Adjusted applicable lines of business – Medicare Advantage checked

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7262 for Diagnostic Electrophysiologic Testing

Guideline Number: Evolent_CG_7262	**Applicable Codes**	
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Original Date: January 2025	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

For the performance of diagnostic electrophysiologic testing in patients with symptoms suspected to be caused by disturbances in the conduction or maintenance of cardiac rhythm.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR DIAGNOSTIC ELECTROPHYSIOLOGIC TESTING (EPS) [6]

Sustained Narrow Complex Tachycardia [7]

- To establish the mechanism of the rhythm when ablation is planned, including patients with preexcitation syndromes or Wolff-Parkinson-White (WPW), suspected AV nodal reentry, intraatrial reentry, atrioventricular reentry (over concealed accessory pathway), paroxysmal atrial flutter, and for mapping ectopic atrial tachycardia

Nonsustained Ventricular Tachycardia (NSVT), Frequent Ventricular Extrasystoles and Couplets [8,9]

- Patients with other risk factors for future arrhythmic events, such as a low left ventricular ejection fraction (LVEF), positive signal-averaged electrocardiogram (ECG), and non-sustained ventricular tachycardia (VT) on ambulatory ECG recordings in whom EPS will be used for further risk assessment and for guiding therapy in patients with inducible sustained VT
- Patients with highly symptomatic, monomorphic premature ventricular complexes (PVCs), couplets, and NSVT who are considered as potential candidates for catheter ablation
- In patients with a prior myocardial infarction (MI), LVEF < 40%, and nonsustained VT, performance of an EPS with programmed ventricular stimulation is indicated for selecting suitable candidates for implantable cardioverter-defibrillator (ICD) implantation

Sustained Ventricular Tachycardia [8]

Structurally Normal Hearts

- Sustained monomorphic ventricular tachycardia in patients with structurally normal hearts:
  - Before catheter ablation, an EPS should be offered to symptomatic patients with documented sustained monomorphic ventricular tachycardia

Structurally Abnormal Hearts

- Sustained monomorphic ventricular tachycardia in patients with structurally abnormal hearts:
  - EPS should be performed preceding catheter ablation in patients with monomorphic sustained VT in candidates suitable for catheter ablation, typically in the same procedure
  - EPS is indicated in patients with wide QRS complex tachycardia in whom correct diagnosis is unclear after analysis of available ECG tracings, when knowledge of the correct diagnosis is required for patient care
  - EPS with standby catheter ablation should be considered in patients who develop VT following valvular surgery to identify and cure potential bundle branch re-entry VT
  - After catheter or surgical ablation of ventricular tachycardia, in patients with implantable defibrillators (ICD), programmed extra stimulation to assess the inducibility of clinically significant VT may be performed using the ICD when clinically indicated

After Surgical VT Ablation [9]

- EPS may be performed in patients who have undergone surgical ablation of ventricular tachycardia, to determine inducibility of ventricular tachycardia and risk stratification for

ICD implantation

Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) [8]

- In patients with ARVC and documented sustained and hemodynamically well-tolerated ventricular tachycardia, EPS may be performed if ablation of the arrhythmia is planned. (Hemodynamically poorly tolerated VT in this entity is an indication for ICD, and EPS should **not** be done)
- EPS may be performed in patients with ARVC and symptoms suggestive of malignant arrhythmia (palpitations and syncope) or NSVT when no documentation of sustained monomorphic VT exists.

NOTE: EPS is not indicated in **asymptomatic** patients with AVRC without documented sustained VT, due to the poor predictive value of programmed extrastimulation in these patients.

NOTE: Diagnostic EPS has no place in the evaluation of patients with documented **polymorphic ventricular tachycardia (PMVT).** Similarly, EPS is not indicated in the evaluation of patients with Catecholaminergic Polymorphic Ventricular Tachycardia, although it may be considered for the ablation of the PVCs that initiate PMVT

Syncope

- EPS is indicated for the evaluation of syncope when noninvasive testing has been unrevealing; relevant clinical scenarios include [10]:
  - Syncope with suspected sinus node dysfunction
  - Patients with syncope and left bundle branch block or bifascicular block (right bundle branch block and left anterior fascicular or left posterior fascicular block)
  - Patients with syncope and ischemic or other structural heart disease in which ventricular tachycardia is a potential cause for symptoms
  - Syncope in patients employed in high-risk occupations (airline pilots, bus drivers, police, firefighters, etc.)
  - Syncope immediately preceded by palpitations
  - Syncope or resuscitated sudden death in patients with preexcitation pattern on the ECG (WPW)
  - Unexplained syncope

Conduction Disturbances

EPS is indicated for [11,12]:

- Symptomatic Type 2 AV block, to determine the site of block. (since permanent pacemaker implantation is indicated for block in or below the bundle of His)
- Adult patients with myotonic muscular dystrophy, even in the absence of surface ECG abnormalities, to identify patients with a prolonged HV interval (>70 msec) in whom permanent pacemaker implantation should be considered

- Risk stratification of asymptomatic preexcitation (WPW pattern on ECG) to determine the refractory period of the accessory pathway and/or the shortest pre-excited R-R interval in atrial fibrillation
- Ventricular programmed extrastimulation may be performed in patients with cardiac sarcoidosis with a LVEF >35%, for risk stratification and consideration of ICD therapy

Coronary Artery Disease [8]

- EPS is indicated in patients with CAD with remote MI with symptoms suggestive of ventricular tachyarrhythmias, including palpitations, presyncope, and syncope
- EPS may be performed in patients with ischemic cardiomyopathy with LVEF 35-40% and non-sustained ventricular tachycardia (since inducible VT/VF is Class 1 indication for ICD)

Wide Complex Tachycardia [8]

- EPS is indicated in evaluation of wide complex tachycardias, including left bundle branch block, to establish the mechanism of the rhythm disturbance and to aid in determining correct management (i.e., to exclude pre-excited tachycardia in WPW or Mahaim-related tachycardia mimicking ventricular tachycardia), and to determine eligibility for catheter ablation or ICD implantation

Congenital Heart Disease [11]

- EPS is indicated in adults with congenital heart disease and life-threatening arrhythmias or resuscitated sudden cardiac death, when the cause for the event is unknown or there is potential for therapeutic intervention (ablation) at the time of the electrophysiological procedure
- EPS may be performed in patients with congenital heart disease with unexplained syncope with impaired ventricular function (LVEF <50%). In these patients, in the absence of a defined and reversible cause, ICD implantation is considered reasonable.
- EPS may be used for risk stratification in adults with Tetralogy of Fallot (TOF) **who have additional risk factors** for sudden cardiac death, defined as left ventricular systolic or diastolic dysfunction, nonsustained VT, QRS duration of ≥180 msec, and extensive right ventricular scarring.
- EPS is indicated for diagnostic evaluation of adults with Ebstein anomaly and asymptomatic ventricular preexcitation or symptomatic arrhythmia [13]
- EPS (and catheter ablation, if needed) is reasonable for adults with Ebstein anomaly before surgical intervention on the tricuspid valve [13]

NOTE: EPS/programmed extrastimulation is **not indicated** in the evaluation of Long QT Syndromes, Short QT Syndromes, or Early Repolarization. Studies of EPS in Brugada Syndrome have demonstrated poor correlation between inducibility and prognosis, and EPS is not recommended

NOTE: In survivors of cardiac arrest not due to a reversible cause, ICD implantation without prior performance of an EPS is appropriate, with rare exceptions.

CODING AND STANDARDS

Codes

Code	Description
93619	Comprehensive electrophysiologic evaluation with right atrial pacing and recording, right ventricular pacing and recording, His bundle recording, including insertion and repositioning of multiple electrode catheters, without induction or attempted induction of arrhythmia
93620	Comprehensive electrophysiologic evaluation including insertion and repositioning of multiple electrode catheters with induction or attempted induction of arrhythmia; with right atrial pacing and recording, right ventricular pacing and recording, His bundle recording
93642	Electrophysiologic evaluation of single or dual chamber transvenous pacing cardioverter-defibrillator (includes defibrillation threshold evaluation, induction of arrhythmia, evaluation of sensing and pacing for arrhythmia termination, and programming or reprogramming of sensing or therapeutic parameters)
+93609	Intraventricular and/or intra-atrial mapping of tachycardia site(s) with catheter manipulation to record from multiple sites to identify origin of tachycardia (List separately in addition to code for primary procedure)
+93613	Intracardiac electrophysiologic 3-dimensional mapping (List separately in addition to code for primary procedure)
+93621	Comprehensive electrophysiologic evaluation including insertion and repositioning of multiple electrode catheters with induction or attempted induction of arrhythmia; with left atrial pacing and recording from coronary sinus or left atrium (List separately in addition to code for primary procedure)
+93622	Comprehensive electrophysiologic evaluation including insertion and repositioning of multiple electrode catheters with induction or attempted induction of arrhythmia; with left ventricular pacing and recording (List separately in addition to code for primary procedure)
+93655	Intracardiac catheter ablation of a discrete mechanism of arrhythmia which is distinct from the primary ablated mechanism, including repeat

Code	Description
	diagnostic maneuvers, to treat a spontaneous or induced arrhythmia (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Invasive Cardiac Electrophysiology Studies (EPS) involve the use of multielectrode catheters introduced into the cardiac chambers, and typically positioned in the right atrium, right ventricle, region of the A-V Node and the Bundle of His, and frequently the coronary sinus.

Several vascular access sites are typically needed, and may include the femoral vein(s), jugular vein(s), subclavian vein(s) and the brachial vein(s). Under certain circumstances, access to the left heart may require either transseptal puncture or a retrograde approach via the femoral artery across the aortic valve. In these cases, systemic anticoagulation is mandated.

After initial recordings of baseline electrograms from the catheters, programmed extrastimulation of the various cardiac chambers may be undertaken to study conduction characteristics, physiology of the conduction system, and in an attempt inducibility of clinically relevant tachydysrhythmias. Provocation with drugs that affect electrical conduction, including atropine, isoproterenol, and adenosine, is commonly utilized to enhance the inducibility of abnormal heart rhythms.

EPS is typically performed in conjunction with catheter ablation of previously documented tachydysrhythmias, to confirm the mechanism of the rhythm disturbance and to facilitate its induction, which is required to identify the critical site(s) for ablation.

Definitions

Sustained Tachycardia: tachycardia lasting 20 seconds or longer, or requiring cardioversion because of hemodynamic collapse

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ARVC: Arrhythmogenic right ventricular cardiomyopathy

A-V Node: Atrioventricular node

AUC: Appropriate use criteria

CAD: Coronary Artery Disease

ECG: Electrocardiogram

EPS: Electrophysiology studies

ICD: Implantable Cardioverter-Defibrillator

LVEF: Left ventricular ejection fraction

MI: Myocardial Infarction

NSVT: Non-sustained ventricular tachycardia

PMVT: Polymorphic ventricular tachycardia

PVC: Premature ventricular complexes

QRSd: Duration of the QRS complex

TOF: Tetralogy of Fallot

VT: Ventricular tachycardia

VF: Ventricular fibrillation

WPW: Wolff-Parkinson-White

SUMMARY OF EVIDENCE

2017 AHA/ACC/HRS Guideline for Management of Patients with Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death [8]

Study Design: This document is a clinical practice guideline developed by the American College of Cardiology, American Heart Association, and Heart Rhythm Society. It is based on systematic methods to evaluate and classify evidence, including literature searches, randomized controlled trials, registries, nonrandomized comparative and descriptive studies, case series, cohort studies, systematic reviews, and expert opinion.

Target Population: The guideline is intended for adults who have ventricular arrhythmias (VA) or are at risk for sudden cardiac death (SCD), including those with diseases and syndromes associated with a risk of SCD from VA.

Key Factors: The guideline covers various aspects such as epidemiology, mechanisms of VA, general evaluation of patients, therapies for treatment or prevention of VA, acute management of specific VA, ongoing management of VA and SCD risk related to specific disease states, and special considerations for catheter ablation.

PACES/HRS Expert Consensus Statement on the Recognition and Management of Arrhythmias in Adult Congenital Heart Disease [11]

Study Design: This document is an expert consensus statement developed by the Pediatric and Congenital Electrophysiology Society (PACES) and the Heart Rhythm Society (HRS), endorsed by several other organizations. It is based on formal literature reviews, expert opinion, and evidence-based recommendations.

Target Population: The statement focuses on adults with congenital heart disease (CHD) and arrhythmias, including those with various types of CHD such as atrial septal defects, Ebstein anomaly, tetralogy of Fallot, and Fontan procedure.

Key Factors: The document addresses the recognition and management of arrhythmias in adults with CHD, including epidemiology, delivery of care, evaluation and diagnosis, medical therapy, catheter ablation, bradyarrhythmias and pacemakers, sudden cardiac death and ICDs, cardiac resynchronization therapy, surgical options, and recommendations for electrophysiologic study prior to adult CHD surgery.

Recommendations for the use of electrophysiological study: Update 2018 [6]

Study Design: This document is a review article that provides updated recommendations for the use of electrophysiological studies (EPS) in clinical practice. It is based on a comprehensive review of relevant articles, clinical practice guidelines, and position statements from various organizations.

Target Population: The recommendations are intended for patients with different types of cardiac pathologies, including sinus node dysfunction, atrioventricular block, bundle branch block, narrow and wide QRS complex tachycardias, inherited primary arrhythmia syndromes, progressive cardiac conduction disease, early repolarization syndrome, hypertrophic cardiomyopathy, dilated cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, left ventricular noncompaction, muscular dystrophies, ischemic heart disease, infiltrative diseases, congenital heart disease, unexplained syncope, survivors of cardiac arrest, undocumented palpitations, and candidates for or carriers of cardiac implantable electronic devices.

Key Factors: The document discusses the role of EPS in diagnosing and managing various cardiac conditions, guiding catheter ablation procedures, and establishing indications for cardiac device implantation. It provides detailed recommendations for each cardiac disease/group of diseases, including the rationale, evidence, and specific indications for EPS.

ANALYSIS OF EVIDENCE

Shared Findings [6,8,11]**:**

- Importance of EPS: All three documents emphasize the importance of EPS in diagnosing and managing cardiac arrhythmias and conduction disorders. EPS is considered a valuable tool for evaluating patients with various cardiac conditions and guiding therapeutic interventions.
- Role in Risk Stratification: EPS is highlighted as a key method for risk stratification in patients with ventricular arrhythmias and sudden cardiac death risk. It helps identify patients who may benefit from implantable cardioverter-defibrillators (ICDs) and other preventive measures.
- Guidance for Catheter Ablation: EPS is recognized as essential for guiding catheter ablation procedures, particularly in patients with complex arrhythmias and structural heart disease.

Conclusion [6,8,11]**:**

In summary, while all three documents highlight the importance of EPS in diagnosing and managing cardiac arrhythmias, they differ in their target populations, specific recommendations, and focus areas. Al-Khatib et al 2018 and Khairy et al 2014 provide general guidelines and consensus statements, whereas Muresan et al 2019 offers detailed recommendations for a wide range of cardiac conditions.

POLICY HISTORY

Date	Summary
April 2026	• Adjusted sustained narrow complex tachycardia and congenital heart disease indications for Diagnostic Electrophysiologic Testing • Added code description • Removed code 93644
December 2025	• Added “for adults with Ebstein anomaly” to bullet under Congenital Defects, for purposes of clarification • Added the following CPT Codes to reflect Evolent prior authorization scope: 93609, 93613, 93621, 93622, 93655
July 2025	• Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Added new indications in congenital heart disease section

Date	Summary
	● Adjusted applicable lines of business – Medicare Advantage checked ● Updated references ● Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7263 for Cardiac Resynchronization Therapy

Guideline Number: Evolent_CG_7263	**Applicable Codes**	
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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

This guideline describes the medical necessity for cardiac resynchronization therapy (CRT). Indications for CRT for patients are based upon left ventricular (LV) ejection fraction (LVEF), QRS duration, New York Heart Association (NYHA) functional class (presence or absence of symptoms) and need for ventricular pacing regardless of etiology (ischemic or non-ischemic cardiomyopathy). [1]

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [2–6]

INDICATIONS FOR CARDIAC RESYNCHRONIZATION THERAPY (CRT)

Cardiomyopathy

NOTE: The following indications only apply to patients:

- Who have been on guideline-directed medical therapy (GDMT) for 3 months or
- Who have been on GDMT and are 40 days after myocardial infarction (MI), or
- With implantation of pacing or defibrillation device for special indications (class indicates NYHA functional class)

Class I Through Class IV [1,7]

- Ischemic cardiomyopathy, LVEF ≤ 35%, QRS ≥ 150 ms, left bundle branch block (LBBB), Sinus Rhythm (**AUC Score 7-9**)
- Nonischemic cardiomyopathy, LVEF ≤ 35%, QRS ≥ 150 ms, LBBB, Sinus Rhythm (**AUC Score 7-9**)

Class II Through Class IV [1,7]

- Ischemic and non-ischemic cardiomyopathy, LVEF ≤ 35%, QRS 120-149 ms, LBBB, Sinus Rhythm (**AUC Score 7**)
- Ischemic and non-ischemic cardiomyopathy, LVEF ≤ 35%, QRS ≥ 150 ms, non-LBBB **(AUC score 6)**
- Nonobstructive hypertrophic cardiomyopathy (HCM), LVEF < 50%, LBBB, CRT therapy for symptom reduction

Class III Through Class IV [1,8]

- Ischemic and non-ischemic cardiomyopathy, LVEF ≤ 35%, QRS ≥ 150 ms, non-LBBB, Sinus Rhythm (**AUC Score 7**)

Special Circumstances when CRT ICD may be implanted after < 3 months GDMT

- Criteria are met, based on a pacing indication, for a non-elective implantable cardioverter defibrillator (ICD) or pacemaker and in the face of the low likelihood of improvement in symptoms and adequate recovery of LVEF, despite less than 3 months GDMT for heart failure or < 40 days post myocardial infarction or 3 months post revascularization, criteria for CRT are otherwise met. This avoids a second implantation procedure within less than 3 months [1,9]

Special Situations: Independent/Regardless of NYHA Heart Failure Class

- Patients with an indication for ventricular pacing, a LVEF ≤ 50%, and high degree atrioventricular (AV) block or are expected to be paced more than 40% of the time; this includes patients with atrial fibrillation [1,8]
- Patients with atrial fibrillation and LVEF ≤ 35% who require ventricular pacing or otherwise meet CRT criteria; **AND** AV nodal ablation or pharmacologic rate control will result in nearly 100% ventricular pacing with CRT [7]

- For patients with atrial fibrillation and LVEF≤ 50%, if a rhythm control strategy fails and ventricular rates remain rapid despite medical therapy, atrioventricular nodal ablation with implantation of a CRT device is reasonable [7]
- As CRT has not been studied in transthyretin amyloid cardiomyopathy (ATTR-CM), those with heart failure with reduced ejection fraction (HFrEF) should follow guidelines for Class II-Class IV indications

Not Indicated

- NYHA class I or II and non-LBBB pattern with QRS duration < 150 ms, [1] except as in Special Situations section above
- NYHA class I through IV with QRS duration < 120 ms [1]
- Comorbidities and/or frailty expected to limit survival with good functional capacity to <1 year [1,7]
- Active bloodstream infection
- Reversible causes are present such as toxic-, metabolic- or tachycardia-mediated cardiomyopathy, require reassessment once the situation is corrected
- Cardiogenic shock or symptomatic hypotension while in stable baseline rhythm

Adult Congenital Heart Disease (CHD)

Class I Through Class IV

- Systemic ventricle with EF ≤ 35%, intrinsic narrow QRS complex, and undergoing new device placement or replacement with anticipated requirement for significant (> 40%) ventricular pacing (**AUC Score 7-8**) [10]
- Systemic ventricle with EF > 35%, intrinsic narrow QRS complex, and undergoing new device placement or replacement with anticipated requirement for significant (> 40%) ventricular pacing (**AUC Score 6**) [10]
- Any CHD, regardless of specific ejection fraction, with progression of systolic systemic ventricular dysfunction and/or ventricular dilation, *and who are undergoing other cardiac surgery*, (particularly if thoracotomy is anticipated to be needed for LV pacing), with a QRS complex ≥ 150 ms **(AUC Score 6)** [10]

Class II Through Class IV

- Systemic LVEF ≤ 35%, sinus rhythm and wide QRS complex ≥ 150 ms [10]
- Any CHD, wide QRS complex ≥ 150 ms due to a complete RBBB, with a severe sub-pulmonary right ventricle (RV) dysfunction and dilatation despite interventions to decrease RV volume overload [10]
- Patients with single ventricle or systemic right ventricle with an LVEF ≤ 35% with QRS complexes ≥ 120 ms with either RBBB or LBBB morphology [10]

Class IV

- Severe ventricular dysfunction, and would otherwise be candidates for heart transplantation or mechanical circulatory support [10]

Not Indicated

- Patients whose co-morbidities and/or frailty limit survival with good functional capacity to < 1 year [10]
- Patients with a narrow QRS complex (< 120 ms) without major electrical activation delay within the failing ventricle [10]

CODING AND STANDARDS

Codes

Code	Description
33224	Insertion of pacing electrode, cardiac venous system, for left ventricular pacing, with attachment to previously placed pacemaker or implantable defibrillator pulse generator (including revision of pocket, removal, insertion, and/or replacement of existing generator)
33231	Insertion of implantable defibrillator pulse generator only; with existing multiple leads
33241	Removal of implantable defibrillator pulse generator only
33249	Insertion or replacement of permanent implantable defibrillator system, with transvenous lead(s), single or dual chamber
+33225	Insertion of pacing electrode, cardiac venous system, for left ventricular pacing, at time of insertion of implantable defibrillator or pacemaker pulse generator (eg, for upgrade to dual chamber system) (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

CRT, which paces the left and right ventricle in rapid sequence, also known as biventricular pacing, improves coordination of left ventricular contraction in the presence of a wide QRS complex in systolic heart failure, by simultaneously pacing the interventricular septum and the left lateral wall.

CRT improves cardiac function and quality of life, and it decreases cardiac events and mortality among appropriately chosen patients. In the proper patient population, improved survival in patients with CRT can be greater than that provided by implantable cardioverter-defibrillator (ICD) insertion alone.

Guiding principles in the consideration of CRT:

- NYHA class is an important qualifying factor, with candidacy based on functional class, EF, and QRS duration
- Bundle branch block or intraventricular conduction delay should be persistent, not rate related [(1)]
- GDMT should have been in place continuously for at least 3 months after initiation of therapy for cardiomyopathy or 40 days post myocardial infarction to allow recovery of LVEF. This 3-month time period is "reset" if a revascularization is performed in the interim. Reversible causes (e.g., ischemia) should be excluded [(7)]
- The patient should have expected survival with a reasonably good functional status for more than 1 year [(1)]

Definitions

NYHA Functional Classification for Heart Failure

The New York Heart Association (NYHA) classes of heart failure is the most commonly used system to classify stages of heart failure. **[(11)]** Classes are based on physical activity limitations.

- Class I: No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, heart palpitations, or shortness of breath

- Class II: Slight limitation on physical activity. Comfortable at rest but ordinary physical activity results in fatigue, heart palpitations, shortness of breath or chest pain
- Class III: Marked limitation on physical activity. Comfortable at rest but less than ordinary activity causes fatigue, heart palpitations, shortness of breath or chest pain
- Class IV: Symptoms of heart failure at rest. Any physical activity increases discomfort

Heart Block [12]

- First-degree atrioventricular (AV) block:
  - P waves associated with 1:1 AV conduction and a PR interval > 200 ms
- Second-degree AV block:
  - P waves with a constant rate (< 100 bpm) where AV conduction is present but not 1:1
    - Mobitz type I
      - P waves with a constant rate (< 100 bpm) with a periodic single nonconducted P wave associated with P waves before and after the nonconducted P wave with inconstant PR intervals
    - Mobitz type II
      - P waves with a constant rate (< 100 bpm) with a periodic single nonconducted P wave associated with other P waves before and after the nonconducted P wave with constant PR intervals (excluding 2:1 AV block)
    - 2:1 AV block
      - P waves with a constant rate (or near constant rate because of ventriculophasic sinus arrhythmia) rate (< 100 bpm) where every other P wave conducts to the ventricles
    - Advanced, high-grade or high-degree AV block
      - ≥ 2 consecutive P waves at a constant physiologic rate that do not conduct to the ventricles with evidence for some AV conduction
- Third-degree AV block:
  - Complete heart block – no evidence of AV conduction

Guideline-Directed (or Optimal) Medical Therapy in Heart Failure [7]

Documentation of GDMT must include the doses and the date of initiation of each medication and must reflect 90 days of therapy since the initiation of the maximal dose administered. If a drug or class of drug is omitted, an explanation for its omission must be provided (intolerance, hypotension, bradycardia, or barriers to access are acceptable explanations). Notes must reflect adequate control of vital signs (BP < 140/90, HR < 100):

- Angiotensin converting enzyme inhibitor (ACE-I), angiotensin receptor blocker (ARB), or combined angiotensin receptor inhibitor and neprilysin inhibitor (ARNI)

- Beta blocker
- Addition of an aldosterone antagonist, provided eGFR is ≥ 30 ml/min/1.73 m^2 and K+ < 5.0, NYHA class II-IV
- SGLT2 Inhibitor (e.g., dapagliflozin, empagliflozin)

NOTE: GDMT requirement does not apply when CRT is indicated for secondary prevention of VT/VF, or in conditions in which the indication is not dependent on the left ventricular ejection fraction.

Other options/considerations for GDMT [7]

- Addition of loop diuretic for all NYHA class II – IV patients
- Addition of hydralazine and nitrate for persistently symptomatic African Americans, NYHA class III-IV
- Not required, but may be considered: Ivabradine for NYHA class II – III, when a beta blocker has failed to reduce a sinus rate to < 70 bpm. Ivabradine listed as a class IIa recommendation, while others are class I recommendations. CRT trials antedated routine use of Ivabradine.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [5]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ACE-I: Angiotensin converting enzyme inhibitor

ARB: Angiotensin receptor blocker

ARNI: Combined angiotensin receptor inhibitor and neprilysin inhibitor

ATTR-CM: Transthyretin Amyloid Cardiomyopathy

AV: Atrioventricular

CAD: Coronary artery disease, same as ischemic heart disease

CHD: Congenital heart disease

CRT: Cardiac resynchronization therapy (also known as biventricular pacing)

EF: Ejection Fraction

eGFR: Estimated glomerular filtration rate

GDMT: Guideline-Directed Medical Therapy

HCM: Hypertrophic Cardiomyopathy

HF: Heart failure

HFrEF: Heart failure with reduced ejection fraction

ICD: Implantable cardioverter-defibrillator

LBBB: Left bundle branch block

LV: Left ventricular/left ventricle

LVEF: Left ventricular ejection fraction

MI: Myocardial infarction

ms: Milliseconds

NYHA: New York Heart Association

RBBB: Right bundle branch block

RV: Right ventricle

SUMMARY OF EVIDENCE

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure [7]

Study Design: This document is a clinical practice guideline for the management of heart failure, developed by the American College of Cardiology/American Heart Association/Heart Failure Society of America Joint Committee on Clinical Practice Guidelines. It is based on a comprehensive literature search conducted from May 2020 to December 2020, including studies, reviews, and other evidence from human subjects published in English.

Target Population: The guideline is intended for clinicians to prevent, diagnose, and manage patients with heart failure. It provides patient-centric recommendations for the treatment of heart failure, aiming to improve quality of care and align with patients' interests.

Key Factors: The guideline includes recommendations for the prevention, diagnosis, and management of heart failure, based on contemporary evidence. It covers various aspects such as stages of heart failure, classification by left ventricular ejection fraction, diagnostic algorithms, epidemiology, causes, initial and serial evaluation, use of biomarkers, genetic evaluation, cardiac imaging, invasive evaluation, remote monitoring, exercise and functional capacity testing, risk scoring, and management strategies for different stages of heart failure.

Arrhythmias in congenital heart disease [10]

Study Design: This document is a position paper on arrhythmias in congenital heart disease, developed by the European Heart Rhythm Association, Association for European Pediatric and Congenital Cardiology, and the European Society of Cardiology Working Group on Grown-up Congenital Heart Disease, endorsed by HRS, PACES, APHRS, and SOLAECE. It is based on a detailed literature review and expert consensus.

Target Population: The position paper addresses arrhythmias in patients with congenital heart disease, focusing on young adults with congenital heart defects who suffer from arrhythmias due to the underlying defect or as a sequela of interventional or surgical treatment.

Key Factors: The paper discusses the management of arrhythmias in congenital heart disease, including pharmacological treatment, catheter ablation, and device therapy. It highlights the importance of understanding the individual pathological anatomy and physiology, as well as the natural history and long-term prognosis of patients. The document covers various types of arrhythmias, their substrates, work-up, acute assessment, collaboration between specialists, general assessment, imaging requirements, specific arrhythmia types, and management strategies.

ACC/AHA/ASE/HFSA/HRS/SCAI/SCCT/SCMR 2025 Appropriate Use Criteria for Implantable Cardioverter-Defibrillators, Cardiac Resynchronization Therapy, and Pacing [1]

Study Design: This document is an appropriate use criteria (AUC) for implantable cardioverter-defibrillators (ICD), cardiac resynchronization therapy (CRT), and pacing, developed by the American College of Cardiology Solution Set Oversight Committee, American Heart Association, American Society of Echocardiography, Heart Failure Society of America, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and Society for Cardiovascular Magnetic Resonance. It is based on a comprehensive review of common clinical scenarios and expert consensus.

Target Population: The AUC document addresses patients who are candidates for ICD, CRT, and pacing therapies, including those with heart failure, genetic conditions, structural heart disease, and other related conditions.

Key Factors: The document provides a detailed review of 335 clinical scenarios related to ICD, CRT, and pacing, including secondary prevention, primary prevention, comorbidities, generator replacement, dual-chamber ICD, totally subcutaneous ICD, CRT, LVAD, heart transplantation, cardiac contractility modulation, leadless pacing, and conduction system pacing. It categorizes the scenarios as "Appropriate," "May Be Appropriate," or "Rarely Appropriate" based on the potential benefits and risks of device implantation

ANALYSIS OF EVIDENCE

Shared Findings [1,7,10]

- Effectiveness: All three documents recognize the effectiveness of CRT in managing heart failure and arrhythmias. They emphasize the importance of CRT in improving patient outcomes, particularly in those with reduced ejection fraction and heart failure symptoms.
- Patient Selection: The importance of selecting appropriate patients for CRT is highlighted across all documents. They stress the need for careful evaluation of patient characteristics, including ejection fraction, heart failure symptoms, and arrhythmia history.
- Guideline Recommendations: The documents provide guideline-based

recommendations for CRT, ensuring that clinicians have access to evidence-based practices for managing heart failure and arrhythmias

Conclusion [1,7,10]

In summary, these articles collectively provide a robust framework for managing various cardiovascular conditions, each contributing unique insights and recommendations tailored to specific patient populations and clinical scenarios.

POLICY HISTORY

Date	Summary
August 2026	• Removed CPT code 33221 and its description
April 2026	• Removed duplicate indication for CRT Class III Through Class IV • Added code description • Aligned and adjusted background section
December 2025	• Fixed symbol typo under “Class II Through Class IV” heading
July 2025	• Reviewed to reconcile dates, no substantive changes made
June 2025	• Added a Summary of Evidence and Analysis of Evidence
April 2025	• This guideline merges two Evolent guidelines with identical clinical criteria: ECG 7263-01 for Cardiac Resynchronization Therapy and ECG 320 for Cardiac Resynchronization Therapy into Evolent Clinical Guideline 7263 for Cardiac Resynchronization Therapy ○ This guideline also merges Procedure Codes from these two Evolent guidelines • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Updated CRT indication for cardiomyopathy per recent societal appropriate use criteria • Corrected and added other CRT indications for congenital heart disease • Adjusted applicable lines of business – Medicare Advantage checked

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Force on Clinical Practice Guidelines and the Heart Rhythm Society. *J Am Coll Cardiol*. 2019;74(7):e51-e156. doi:https://doi.org/10.1016/j.jacc.2018.10.044

Evolent Clinical Guideline 7264 for Renal and Mesenteric Angiography and Intervention

Guideline Number: Evolent_CG_7264	**Applicable Codes**	
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Original Date: January 2026	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for renal angiography and possible interventions after angiography including angioplasty, stents, embolization, thrombectomy and lytic therapies.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

Special Notes

- Intervention on renal and mesenteric arteries is only considered medically necessary when there is documentation of clinical pathology associated with a significant risk of morbidity or mortality if left untreated.
    - The type of intervention (ie, open surgical or endovascular) is provider-dependent and will not be the basis for authorization.
- There are alternatives to renal and mesenteric artery intervention for the indications described below. Accordingly, there must be documentation of a shared decision-making process for renal and mesenteric artery intervention that includes a discussion of all

alternatives to the procedure, benefits and risks of the procedure and alternatives, and the possibility of recurrent clinical issues and need for further treatment following the procedure.

INDICATIONS FOR RENAL ANGIOGRAPHY

Renal Artery Stenosis (RAS)

NOTE: 2013 ACCF/AHA [6] and 2024 ESC [7] guidelines recommend noninvasive duplex ultrasonography (DUS) for first-line imaging, followed by computed tomography angiography (CTA) (provided glomerular filtration rate (eGFR) is ≥ 60 mL/min) and/or magnetic resonance angiography (MRA) (provided eGFR is ≥ 30 mL/min) to establish the diagnosis of renal artery stenosis (RAS). When the clinical index of suspicion is high and the results of noninvasive studies are inconclusive, 2017 ESC guidelines recommend digital subtraction angiography (DSA). [8]

- Hypertension
  - Resistant arterial hypertension (> 140/90 mmHg) (see **Definitions**) [6,7,9]
  - Accelerated (defined as sudden and persistent worsening of controlled hypertension) and malignant hypertension (defined as hypertension with evidence of acute end-organ damage) [6]
  - Onset of hypertension at < 30 years old [6,7]
  - Onset of severe hypertension at > 55 years old, with evidence of chronic kidney disease (CKD) and cardiac failure [6,7]
- Renal dysfunction
  - New azotemia or worsening renal function after administration of an angiotensin-converting enzyme (ACE) inhibitor or angiotensin II receptor blocker (ARB) agent [6,7]
  - Unexplained atrophic kidney (7-8 cm) or size discrepancy > 1.5 cm between kidneys [6,7]
  - Unexplained renal dysfunction, including individuals starting renal replacement therapy (dialysis or renal transplantation) [6,7]
- Sudden and unexplained pulmonary edema, especially in azotemic patients [6,7]
- Multivessel coronary artery disease with no evidence of peripheral artery disease (PAD) at the time of arteriography [6]
- Unexplained congestive heart failure (CHF) or refractory angina [6] **(AUC Score 6)** [10]

Fibromuscular Dysplasia [11]

NOTE: CTA is the first-line imaging for suspected fibromuscular dysplasia (FMD) for accurate differentiation of FMD from atherosclerotic RAS. Contrast-enhanced MRA is the next option if CTA is contraindicated. When the results of CTA or MRA confirm the diagnosis of FMD, or when a clinical index of suspicion is high despite negative findings on CTA or MRA, DSA should

be considered. Translesional pressure gradient measurement is also recommended for assessment of hemodynamic significance of stenosis, particularly in multifocal FMD, as well as post-angioplasty in both focal and multifocal FMD. [11,12]

- Onset of hypertension < 30 years of age, especially women
- Accelerated, malignant, or grade 3 (> 180/110 mmHg) hypertension
- Resistant hypertension (see **Definitions**)
- Unilateral small kidney without a causative urological abnormality
- Abdominal bruit in the absence of atherosclerotic disease or risk factors for atherosclerosis
- Suspected renal artery dissection or infarction
- Presence of FMD in at least one other vascular territory

INDICATIONS FOR RENAL ARTERY INTERVENTION

- Cardiac disturbance syndromes
  - Hemodynamically significant RAS and recurrent, unexplained CHF **(AUC Score 6)** or sudden, unexplained pulmonary edema **(AUC Score 7)** [6,10]
  - Hemodynamically significant RAS and unstable angina **(AUC Score 6)** [6,10]
  - Recurrent CHF with unilateral moderate RAS with resting translesional mean gradient of ≥ 10 mmHg (**AUC Score 5**) [9]
- Hypertension
  - Any one of the criteria for hypertension under RAS or FMD met (see **Renal Artery Stenosis (RAS)** and **Fibromuscular Dysplasia**) [6]
  - Resistant hypertension (see **Definitions**) when any **ONE** of the following criteria are met:
    - Evidence of bilateral or solitary severe RAS **(AUC Score 7)** [9]
    - Evidence of unilateral severe RAS **(AUC Score 6)** [9]
    - Severe unilateral RAS and high-risk lesion or complex anatomy **(AUC Score 4)** [9]
  - Nonproteinuric hypertension with unilateral renal artery disease [12]
- Kidney Dysfunction
  - Progressive CKD with bilateral (> 70%) RAS or RAS in a solitary kidney [6,7]
  - Chronic renal insufficiency with unilateral RAS (> 70%) [6,7]
  - CKD Stage 4 with bilateral moderate RAS and resting mean translesion gradient of ≥ 10 mmHg with kidney size > 7 cm in pole-pole length **(AUC Score 8)** [9]
  - CKD Stage 4 and global renal ischemia (unilateral severe RAS with solitary kidney or

bilateral severe RAS) without other explanation **(AUC Score 7)** [9]

- CKD Stage 2 with bilateral severe RAS **(AUC Score 5)** [9]
- CKD Stage 3, stable for one year, with bilateral severe RAS **(AUC Score 5)** [9]

- Evidence of progressive renal artery occlusion [12]
- Identifiable activation of renin-angiotensin system with hyperreninemia or with unilateral RAS, lateralization of renal vein renin [12]
- Angiotensin-dependent eGFR [12]
- Renal artery dissection; renal artery aneurysm and renal artery atherosclerosis > 50% in a transplanted kidney
- Special populations [12]:
  - Transplant RAS with or without calcineurin inhibitors
  - Episodic, circulatory congestion with bilateral atherosclerotic renovascular disease
  - Progressive loss of eGFR with occlusive atherosclerotic renovascular disease and no other kidney disease (ischemic nephropathy)
  - Aortic disease with renovascular protection as part of endovascular repair
  - Left-ventricular assist device
  - Radiation-induced renovascular disease with clinical syndromes
  - Other diseases (eg, Takayasu arteritis, extrinsic vascular compression)
  - Pediatric patients with mid aortic syndrome or fibromuscular variants

NOTE: Atherosclerotic renovascular disease with **hemodynamically insignificant stenosis** does **not** benefit from vascular intervention when treated with optimal GDMT. Symptomatic FMD-related renovascular disease is warranted for consideration for renal ballon angioplasty procedure, followed by stenting in dissection management or balloon angioplasty failure. [8,12]

LIMITATIONS FOR RENAL ARTERY INTERVENTION [9]

- Resistant hypertension (see **Definitions**) and unilateral moderate RAS with a mean translesional gradient of < 10 mmHg
- Progressive CKD stage 3 to stage 4 over six months with solitary or unilateral, severe RAS, with kidney size < 7 cm in pole-to-pole length
- Resistant hypertension (see **Definitions**) with unilateral chronic total occlusion of the renal artery
- Solitary or bilateral severe RAS with controlled blood pressure and normal renal function
- CKD stage 2 with unilateral severe RAS
- Bilateral or unilateral severe RAS with controlled BC and normal renal function

- Bilateral severe RAS with chronic end stage renal disease on hemodialysis > 3 months

INDICATIONS FOR MESENTERIC ARTERY INTERVENTION

NOTE: The superior mesenteric artery (SMA) should be the primary target vessel for intervention unless the individual's SMA is not suitable for intervention or a technical result was unacceptable. [13] Stenting the inferior mesenteric artery (IMA) can only be considered medically necessary if stenting the SMA and celiac artery (CA) cannot be accomplished and IMA intervention is the only alternative to open surgery.

Chronic Mesenteric Ischemia (CMI) [14,15]

When alternative nonvascular gastrointestinal etiologies have been reasonably excluded, and any **ONE** of the following symptoms are present:

- Postprandial abdominal pain
- Unintentional weight loss
- Food fear or avoidance
- Diarrhea

AND any **ONE** of the following duplex ultrasound stenosis screening criteria are met, **ONLY** if confirmed by CTA, MRA, or catheter angiography [16]:

- ≥ 70% stenosis (fasting peak systolic velocity (PSV) ≥ 400 cm/s) or occlusion of the SMA in the presence of atherosclerotic involvement
- ≥ 70% stenosis of the CA (fasting PSV ≥ 320 cm/s) due to Median Arcuate Ligament Syndrome (MALS)
- ≥ 50% stenosis of both the SMA (fasting PSV ≥ 295 cm/s) and CA (fasting PSV ≥ 240 cm/s)

NOTE: Critical stenosis in all three mesenteric arteries may constitute an indication for intervention in select asymptomatic patients after intensive counseling about the risks of invasive treatment compared to continued observation.

Visceral Artery Aneurysm or Pseudoaneurysm [17]

- CA aneurysm > 2 cm in diameter
- Hepatic artery aneurysm > 2 cm in diameter or growth > 0.5 cm/year
- Jejunal and ileal artery aneurysm > 2 cm in diameter
- Splenic artery aneurysm ≥ 3 cm in diameter (all sizes in women of childbearing age)
- Superior mesenteric, gastric, gastroepiploic, colic, pancreaticoduodenal, or gastroduodenal artery aneurysm
- Symptomatic aneurysm

- Pseudoaneurysm

Hemorrhage or High-risk Bleeding (18)

- Active bleeding or high-risk vascular lesions involving splanchnic arteries (eg, pseudoaneurysm-related gastrointestinal bleeding, post-pancreatitis hemorrhage, post-operative or traumatic arterial injury)

Median Arcuate Ligament Syndrome (MALS) (19)

When **ALL** the following criteria are met:

- Duplex imaging with velocity profiles as per chronic mesenteric ischemia (CMI) and decrease in velocities with inspiration
- Classic symptoms consistent with CMI (eg, postprandial abdominal pain, unintentional weight loss, food fear or avoidance, diarrhea)
- CTA demonstrating CA compression with respiratory variation
- Failure of conservative management
- Multidisciplinary evaluation documented

NOTE: Endovascular stenting alone will only be authorized if the patient remains symptomatic after surgical decompression of the median arcuate ligament

INDICATIONS FOR REPEAT MESENTERIC ARTERY INTERVENTION (15)

When **ALL** the following criteria are met:

- Recurrent ischemic symptoms
- Imaging demonstrating ≥ 70% restenosis or occlusion
- Documented symptomatic improvement following prior intervention

LIMITATIONS FOR MESENTERIC ARTERY INTERVENTION (14,15)

Intervention is not considered medically necessary for:

- Prophylactic or preventive stenting
- Incidental imaging findings without ischemic symptoms
- Asymptomatic or surveillance-only mesenteric artery stenosis
- Single-vessel stenosis without ischemic symptoms

CODING AND STANDARDS

Codes

Code	Description
36251	Selective catheter placement (first-order), main renal artery and any accessory renal artery(s) for renal angiography, including arterial puncture and catheter placement(s), fluoroscopy, contrast injection(s), image postprocessing, permanent recording of images, and radiological supervision and interpretation, including pressure gradient measurements when performed, and flush aortogram when performed; unilateral
36252	Selective catheter placement (first-order), main renal artery and any accessory renal artery(s) for renal angiography, including arterial puncture and catheter placement(s), fluoroscopy, contrast injection(s), image postprocessing, permanent recording of images, and radiological supervision and interpretation, including pressure gradient measurements when performed, and flush aortogram when performed; bilateral
37236	Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; initial artery
37246	Transluminal balloon angioplasty (except lower extremity artery(ies) for occlusive disease, intracranial, coronary, pulmonary, or dialysis circuit), open or percutaneous, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty within the same artery; initial artery
75726	Angiography, visceral, selective or supraselective (with or without flush aortogram), radiological supervision and interpretation
+37237	Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; each additional artery (List separately in addition to code for primary procedure)
+37247	Transluminal balloon angioplasty (except lower extremity artery(ies) for occlusive disease, intracranial, coronary, pulmonary, or dialysis circuit),

Code	Description
	open or percutaneous, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty within the same artery; each additional artery (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Renal angiography is X-ray study of blood vessels to the kidney. X-rays are taken while contrast dye is injected into a catheter (a tiny tube) that has been placed into the blood vessels of the kidneys to detect any signs of blockage, narrowing, or other abnormalities affecting the blood supply to the kidneys.

Renal Artery Angioplasty is an endovascular procedure to widen narrowed or obstructed renal arteries typically to treat arterial atherosclerosis. An empty, collapsed balloon, known as a balloon catheter, is passed over a wire into the narrowed locations and then inflated to a fixed size. The balloon forces expansion of the stenosis (narrowing) within the vessel and the surrounding muscular wall, opening up the blood vessel for improved flow, and the balloon is then deflated and withdrawn. A stent may or may not be inserted at the time of ballooning to ensure the vessel remains open.

Renovascular hypertension is one of many clinical syndromes of renovascular disease, derived most often from atherosclerosis, followed by FMD. Other less common causes include renal artery aneurysm, dissection, extravascular compression, infarction, mid aortic coarctation, partial or complete renal artery coverage by stent grafts, allograft inflow obstruction, and anatomic variants. [12]

Definitions

- Hemodynamically significant RAS is defined as either [9]:
  - Angiographic stenosis severity between 50-70% stenosis with resting or hyperemic mean pressure gradient ≥ 10 mmHg

- Angiographic stenosis severity between 50-70% stenosis with resting or hyperemic systolic pressure gradient ≥ 20 mmHg
- Angiographic stenosis severity between 50-70% stenosis with Renal Pd/Pa ≤ 0.8
- Angiographic stenosis severity with ≥ 70% stenosis

- Resistant hypertension: blood pressure target not achieved despite being on maximally tolerated GDMT (3 drug-therapy at optimal doses, including a diuretic) [10]

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

ACE: Angiotensin-converting enzyme

ARB: Angiotensin II receptor blockers

CA: Celiac artery

CHF: Congestive heart failure

CKD: Chronic kidney disease

CTA: Computed tomography angiography

CMI: Chronic mesenteric ischemia

DUS: Duplex ultrasonography

DSA: Digital subtraction angiography

eGFR: Estimated glomerular filtration rate

FMD: Fibromuscular dysplasia

GDMT: Guideline-directed medical therapy

IMA: Inferior mesenteric artery

MALS: Median Arcuate Ligament Syndrome

MRA: Magnetic resonance angiography

PAD: Peripheral artery disease

PSV: Peak systolic velocity

RAS: Renal Artery Stenosis

SMA: Superior mesenteric artery

SUMMARY OF EVIDENCE

Management of Patients With Peripheral Artery Disease (Compilation of 2005 and 2011 ACCF/AHA Guideline Recommendations) [6]

Study Design: The guidelines are based on a compilation of recommendations from the 2005 and 2011 ACCF/AHA guidelines. The document does not present new evidence but repackages existing recommendations to provide a complete set of guidelines in a single resource.

Target Population: The guidelines target individuals at risk for or diagnosed with renal artery stenosis (RAS), including those with hypertension, chronic kidney disease, and other related conditions.

Key Factors: Diagnostic studies are recommended for patients with early-onset hypertension, severe hypertension, accelerated or malignant hypertension, new or worsening renal function after ACE inhibitor or ARB therapy, unexplained atrophic kidney, or sudden unexplained pulmonary edema. Revascularization may be considered for asymptomatic bilateral or solitary viable kidney with significant RAS and is reasonable for patients with significant RAS and hypertension, progressive chronic kidney disease, recurrent unexplained congestive heart failure, or unstable angina. Renal stent placement is indicated for ostial atherosclerotic RAS lesions, and balloon angioplasty with bailout stent placement is recommended for fibromuscular dysplasia lesions. Vascular surgical reconstruction is indicated for patients with fibromuscular dysplastic RAS with clinical indications for intervention, atherosclerotic RAS with clinical indications for intervention, and atherosclerotic RAS in combination with pararenal aortic reconstructions.

These guidelines provide a comprehensive approach to the diagnosis and treatment of renal artery stenosis, aiming to improve patient outcomes through evidence-based recommendations.

2024 ESC Guidelines for the management of peripheral arterial and aortic diseases [7]

Study Design: The guidelines are developed by the task force on the management of peripheral arterial and aortic diseases of the European Society of Cardiology (ESC). The document is endorsed by several reputable organizations, including the European Association for Cardio-Thoracic Surgery (EACTS), the European Reference Network on Rare Multisystemic Vascular Diseases (VASCERN), and the European Society of Vascular Medicine (ESVM). The guidelines are based on a critical review and evaluation of published literature, including clinical trials and meta-analyses.

Target Population: The target population for these guidelines includes patients with peripheral arterial and aortic diseases, specifically those with renal artery disease. The guidelines address both atherosclerotic and non-atherosclerotic causes of renal artery stenosis (RAS), as well as special populations such as patients with fibromuscular dysplasia.

Key Factors: Duplex Ultrasound (DUS) is recommended as the first-line imaging modality for patients with suspicion of RAS. It provides high sensitivity and specificity for detecting significant stenosis. Catheter Angiography is considered the gold standard for diagnosing RAS, allowing for additional hemodynamic measurements.

Treatment Strategy: Revascularization should be considered in patients with atherosclerotic unilateral RAS (> 70%) with high-risk features and signs of kidney viability, bilateral RAS, or

RAS in a solitary kidney. It is also recommended for patients with hypertension and/or signs of renal dysfunction due to RAS caused by fibromuscular dysplasia.

SCAI appropriate use criteria for peripheral arterial interventions: An update [9]

Study Design: The document discusses various studies, including prospective multicenter registries and randomized controlled trials (RCTs). One notable RCT mentioned is the CORAL (Cardiovascular Outcomes in Renal Atherosclerotic Lesions) trial, which compared medical therapy alone to medical therapy combined with renal stenting.

Target Population: The studies primarily focus on patients with renal artery stenosis (RAS) and hypertension. The CORAL trial, for example, included patients with newly diagnosed renal artery stenosis and hypertension.

Key Factors: The document highlights improvements in systolic and diastolic blood pressure, renal function stabilization, and cardiac destabilization syndromes (heart failure and angina exacerbations) as benefits of renal artery stenting. The CORAL trial had limitations such as enrolling patients with moderate hypertension receiving only two antihypertensive medications and not requiring maximally tolerated doses. Hemodynamically severe renal artery stenosis is defined by specific pressure gradients and fractional flow reserve measurements. Meta-analyses show that fewer antihypertensive medications are required to achieve desired blood pressure reduction following renal artery revascularization.

ANALYSIS OF EVIDENCE

Analysis [6,7,9]**:**

In summary, while all three articles agree on the importance of accurate diagnosis and medical management for RAS, they differ in their conclusions regarding the impact of revascularization on cardiovascular events and the preferred methods for revascularization. This analysis highlights the evolving understanding and approaches to managing renal artery disease.

Shared Conclusions:

- Importance of Accurate Diagnosis: All three articles emphasize the need for accurate diagnosis of RAS using non-invasive methods like DUS, CTA, and MRA, with catheter angiography reserved for inconclusive cases.
- Medical Management: They all highlight the role of medical management, particularly antihypertensive therapy, as a first-line treatment for RAS.
- Criteria for Revascularization: The articles agree on the criteria for revascularization, focusing on patients with bilateral RAS, RAS in a solitary kidney, and those with high-risk features.

Differing Conclusions

- Impact of Revascularization on Cardiovascular Events: Anderson 2013 and Mazzolai 2024 discuss the benefits of revascularization in improving blood pressure and renal function, while Klein 2017 notes that revascularization has not shown a significant impact on major adverse cardiovascular events.

- Preferred Revascularization Methods: Anderson 2013 and Mazzolai 2024 recommend renal stent placement and balloon angioplasty, with Mazzolai 2024 also suggesting open surgical revascularization for complex cases. Klein 2017 emphasizes the importance of GDMT before considering revascularization.

POLICY HISTORY

Date	Summary
May 2026	• Moved definition of resistant hypertension from indications sections to background section • Removed duplicative language in indications for renal artery intervention • Removed redundant limitations for renal artery intervention already precluded by listed indications
March 2026	• Guideline renamed from Renal Angiography and Intervention to Renal and Mesenteric Angiography and Intervention • Added Special Notes section on documentation of clinical pathology and shared decision-making process • Added sections on indications for mesenteric intervention, repeat mesenteric intervention, and associated limitations
July 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• This guideline replaces Evolent Clinical Guideline 7324 for Renal Angiography • This guideline replaces Evolent Clinical Guideline 7325 for Renal Artery Intervention

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7265 for Cardiovascular Stress Test

Guideline Number: Evolent_CG_7265	**Applicable Codes**	
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Original Date: July 2011	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Cardiovascular Stress Test (ST) (walking exercise treadmill electrocardiogram (ECG) test).

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR CARDIOVASCULAR STRESS TEST

Known or Suspected Coronary Artery Disease (CAD)

- Symptoms suggesting myocardial ischemia
    - When a non-cardiac explanation is provided for symptoms, no testing is required **(AUC Score 8)** [6]
- Asymptomatic patient

- Prior to initiation of an unsupervised exercise program, with or without known CAD **(AUC Score 7)** [6]
- Prior to cardiac rehabilitation **(AUC Score 7)** [6]

- Syncope/presyncope
  - When initial evaluation suggests cardiovascular abnormalities **(AUC Score 7)** [6]
- Arrhythmias
  - In patients with frequent premature ventricular contraction (PVCs) or non-sustained ventricular tachycardia **(AUC Score 7)** [6]
  - Evaluation of patients with known or suspected exercise-induced arrhythmias [7]
  - Evaluation of patients with suspected chronotropic incompetence [8]
  - In patients with suspected long QT syndrome for diagnosis and therapy response [9]
  - In selected first-degree relatives of patients with arrhythmogenic right ventricular cardiomyopathy [9]
  - In first-degree relatives of subjects ≤ 40 years old who died suddenly and whose death could reasonably be attributed to unexplained sudden cardiac death (SCD), for comprehensive cardiac evaluation (including exercise stress testing) [9]
  - Identification of appropriate settings in patients with rate-adaptive pacemakers [7]
  - Evaluation of congenital complete heart block in patients considering increased physical activity or participation in competitive sports [7]
- Hypertrophic Cardiomyopathy (HCM) [10]
  - To determine functional capacity and to provide prognostic information as part of initial evaluation
- Valvular Disease
  - Aortic stenosis in **asymptomatic** patients with severe aortic stenosis (Stage C1) to assess physiological changes with exercise and to confirm the absence of symptoms [11]
  - Chronic aortic regurgitation [7,11]:
    - with equivocal symptoms, to assess functional capacity and symptoms
    - to assess symptoms and functional capacity prior to participation in athletic activity
    - prognostic assessment before aortic valve replacement in asymptomatic or minimally symptomatic patients with left ventricular dysfunction
  - In asymptomatic women with severe valve disease (Stage C1) considering pregnancy [11]
- Coarctation of the Aorta [12]
  - In adults, for exercise-induced hypertension

- Prior to elective non-cardiac surgery in asymptomatic patient [13–15]
    - An intermediate or high-risk surgery with one or more patient risk factors (see below), **AND** there has not been an ischemia evaluation within 1 year
        - Patient risk factors: history of ischemic heart disease, history of congestive heart failure, history of cerebrovascular disease, preoperative treatment with insulin, and preoperative serum creatinine > 2.0 mg/dL
        - **Surgical Risk:**
            - **High risk surgery:** Aortic and other major vascular surgery, peripheral vascular surgery, anticipated prolonged surgical procedures associated with large fluid shifts and/or blood loss
            - **Intermediate risk surgery:** Carotid endarterectomy, head and neck surgery, intraperitoneal and intrathoracic surgery, orthopedic surgery, prostate surgery
            - **Low risk surgery:** Endoscopic procedures, superficial procedure, cataract surgery, breast surgery

LIMITATIONS FOR CARDIOVASCULAR STRESS TEST

- Abnormal ST changes on resting ECG, digoxin, left bundle branch block, Wolff-Parkinson-White (WPW) pattern, ventricular paced rhythm (unless test is performed to establish exercise capacity and not for diagnosis of ischemia) [16]
- Unable to achieve ≥ 5 METs or unsafe to exercise [16]
- High-risk unstable angina or acute myocardial infarction, active acute coronary syndrome [16]
- Uncontrolled heart failure [16]
- Significant cardiac arrhythmias such as ventricular tachycardia, complete atrioventricular block or high risk for arrhythmias caused by QT prolongation [16]
- Severe symptomatic aortic stenosis [16]
- Severe systemic arterial hypertension (e.g., ≥ 200/110 mmHg) [16]
- Acute illness such as acute pulmonary embolism, acute myocarditis/pericarditis, and acute aortic dissection [16]
- Routine periodic stress testing is not recommended in patients with chronic coronary artery disease (CCD) without clinical or functional status changes [17]

CODING AND STANDARDS

Codes

Code	Description
93015	Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; with supervision, interpretation and report
93016	Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; supervision only, without interpretation and report
93017	Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; tracing only, without interpretation and report
93018	Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; interpretation and report only

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

General Overview

Cardiovascular stress test is a test used to measure cardiovascular response to external stress through treadmill/bicycle exercise in a controlled clinical environment.

Cardiovascular stress tests compare the coronary circulation while the patient is at rest with the same patient's circulation observed during maximum physical exertion, showing any abnormal blood flow to the myocardium as depicted by the continuously monitored EKG/ECG. The results

can also be interpreted as a reflection on the general physical condition of the test patient (blood pressure response and exercise tolerance).

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Definitions

Duke Exercise ECG Treadmill Score (DTS) [18]

- Calculate risk from ECG Treadmill alone:
  - DTS = exercise time in minutes - (5 x ST deviation in mm or 0.1 mV increments) - (4 x exercise angina score)
    - Angina score being 0 = none, 1 = non-limiting, and 2 = exercise-limiting
  - The score typically ranges from - 25 to + 15
    - Low-risk ≥ + 5
    - Intermediate risk from - 10 to + 4
    - High-risk ≤ -11

Global Risk of Cardiovascular Disease

- Global risk of CAD is defined as the probability of manifesting cardiovascular disease over the next 10 years and refers to **asymptomatic** patients without known cardiovascular disease. It should be determined using one of the risk calculators below.
  - **CAD Risk—Low**
    - 10-year absolute coronary or cardiovascular risk < 10%.
  - **CAD Risk—Moderate**
    - 10-year absolute coronary or cardiovascular risk between 10% and 20%.
  - **CAD Risk—High**
    - 10-year absolute coronary or cardiovascular risk > 20%.

Global CAD Risk Calculators

- Framingham Cardiovascular Risk
- Reynolds Risk Score

- Can use if there is no history of diabetes. Unique for use of family history
- Pooled Cohort Equation
- ACC/AHA Risk Calculator
- MESA Risk Calculator
  - With addition of coronary artery calcium score, for CAD-only risk

Guideline-Directed Medical Therapy (GDMT)

GDMT includes recommendations for antiplatelet therapy, cilostazol (unless contraindicated or not tolerated), statins, glycemic and hypertension control, structured exercise program (see definition), smoking cessation including planning, counseling, or behavior modification and pharmacotherapy if needed. Duration should be for at least 12 weeks.

Acronyms/Abbreviations

CAD: Coronary artery disease

DTS: Duke treadmill score

EKG/ECG: Electrocardiogram

GDMT: Guideline directed medical therapy

HCM: Hypertrophic cardiomyopathy

MET: Metabolic equivalent

PVC: Premature ventricular contraction

SCD: Sudden cardiac death

ST: Stress Test

WPW: Wolff-Parkinson-White

SUMMARY OF EVIDENCE

ACC/AHA/ASE/ASNC/ASPC/HFSA/HRS/SCAI/SCCT/SCMR/STS 2023 Multimodality Appropriate Use Criteria for the Detection and Risk Assessment of Chronic Coronary Disease [6]

Study Design: The study is a report by the American College of Cardiology (ACC) Solution Set Oversight Committee, in collaboration with several other cardiovascular societies. It updates the prior AUC for various cardiovascular imaging modalities, including radionuclide imaging, stress echocardiography, calcium scoring, coronary computed tomography angiography (CCTA), stress cardiac magnetic resonance (CMR), and invasive coronary angiography.

Target Population: The target population includes patients with known or suspected CCD, which encompasses stable ischemic heart disease (SIHD). The clinical scenarios cover both symptomatic and asymptomatic patients, with and without prior testing or revascularization.

Key Factors: The document outlines 64 clinical scenarios for the detection and risk assessment of CCD, drawn from common applications and current clinical practice guidelines. The clinical scenarios were rated by an independent panel using a modified Delphi process. Ratings were categorized as Appropriate (7-9), May Be Appropriate (4-6), or Rarely Appropriate (1-3).

2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death [9]

Study Design: The guideline is based on a systematic review of evidence from various sources, including randomized controlled trials (RCTs), registries, nonrandomized comparative and descriptive studies, case series, cohort studies, systematic reviews, and expert opinion. The writing committee used evidence-based methodologies to formulate recommendations, focusing on the quality of scientific evidence and the magnitude and certainty of benefit in proportion to risk.

Target Population: The guideline is intended for adults who have ventricular arrhythmias (VA) or are at risk for sudden cardiac death (SCD), including those with diseases and syndromes associated with a risk of SCD from VA. It covers a wide range of conditions, including ischemic heart disease, nonischemic cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, hypertrophic cardiomyopathy, myocarditis, cardiac sarcoidosis, neuromuscular disorders, and cardiac channelopathies.

Key Factors: Indications for ICD Implantation, secondary prevention for patients who survive sudden cardiac arrest (SCA) due to VA or experience hemodynamically unstable VT. Primary prevention for patients with reduced left ventricular ejection fraction (LVEF) due to ischemic or nonischemic cardiomyopathy. Management of VA in specific populations such as athletes, pregnant women, older patients with comorbidities, and patients with chronic kidney disease.

2024 AHA/ACC/AMSSM/HRS/PACES/SCMR Guideline for the Management of Hypertrophic Cardiomyopathy [10]

Study Design: This document is a guideline developed by the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines, in collaboration with several other medical societies. It includes recommendations based on a comprehensive literature search and evidence review.

Target Population: The guidelines focus on patients with hypertrophic cardiomyopathy, including adults, children, and adolescents. It addresses the diagnosis, risk assessment, and management of HCM, including the use of ICDs for SCD prevention.

Key Factors: The document highlights the importance of SCD risk assessment in HCM patients, including factors such as family history of SCD, maximal LV wall thickness, unexplained syncope, LV apical aneurysm, extensive LGE, and NSVT episodes. Recommendations for ICD placement in high-risk HCM patients consider individual clinical judgment, shared decision-making, and the presence of major risk factors. The guidelines discuss the selection of ICD devices, including single-chamber, dual-chamber, and subcutaneous ICDs, based on patient preferences and clinical needs. The document provides recommendations for the pharmacological and invasive treatment of symptomatic HCM patients, including the use of beta blockers, calcium channel blockers, myosin inhibitors, and septal reduction therapies.

ANALYSIS OF EVIDENCE

Analysis [6,9,10]

While all three articles emphasize the importance of cardiovascular stress testing in diagnosing and managing cardiac conditions, they differ in their specific guidelines, patient populations, and clinical scenarios. The articles highlight the diverse applications of stress testing in cardiology and the need for tailored guidelines based on specific clinical contexts.

Shared Conclusions:

- All three articles emphasize the significance of cardiovascular stress testing in diagnosing and managing various cardiac conditions. Stress testing is highlighted as a crucial tool for assessing myocardial ischemia, ventricular arrhythmias, and hypertrophic cardiomyopathy (HCM).
- The articles discuss various types of stress tests, including exercise treadmill testing, stress echocardiography, and stress cardiac magnetic resonance (CMR). These tests are used to evaluate different aspects of cardiac function and identify potential issues.
- Cardiovascular stress testing is commonly used for risk stratification in patients with known or suspected cardiac conditions. The tests help determine the severity of the condition and guide treatment decisions.

POLICY HISTORY

Date	Summary
April 2026	• Abbreviations were updated • Global CAD Risk Calculators table replaced with bulleted list • CPT code table inserted for guideline adherence • Updated the Background section • Updated references
July 2025	• No substantial clinical criteria changes • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Added a Summary of Evidence and Analysis of Evidence • Updated references

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7266 for Carotid Artery Stenting

Guideline Number: Evolent_CG_7266	Applicable Codes	
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Original Date: September 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines, and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Carotid stenting is a procedure that opens clogged arteries to prevent or treat stroke. The carotid arteries are located on each side of the neck and are the main arteries supplying blood to the brain. The procedure involves temporarily inserting and inflating a tiny balloon where the carotid artery is clogged to widen the artery and placement of a small metal coil called a stent in the clogged artery. The stent helps prop the artery open and decreases the chance of it narrowing again.

A transfemoral stent (TFS) is a stent inserted via a remote puncture of the femoral artery, which involves traversing the aortic arch and is usually supplemented by distal filter placement to prevent embolization. Carotid stents can also be placed via a radial or brachial artery puncture.,

Transcarotid revascularization (TCAR) is a process involving a small cutdown on the cervical common carotid artery and placing the stent during reversal of flow out of the brain to prevent distal embolization

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

Special Note

Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used, including their potential outcomes. These should include endarterectomy as well as non-interventional medical management. Selection of asymptomatic patients for carotid revascularization should be guided by an assessment of comorbid conditions, life expectancy, and other individual factors and should include a thorough discussion of the risks and benefits of the procedure with an understanding of the patient's preferences. This process must be reflected in notes provided.

INDICATIONS FOR CAROTID ARTERY STENTING BY TRANSFEMORAL (TFS), TRANSRADIAL, TRANSBRACHIAL, OR TRANSCAROTID REVASCULARIZATION (TCAR)

Symptomatic Patients

- For neurologically stable patients with recent stable stroke or transient ischemic attack (TIA) and > 50% stenosis between 48 hours and 14 days after symptom onset **OR** patients with 50-99% stenosis and nondisabling TIA, amaurosis fugax, or stroke within the last 6 months [6,7], when **ALL** of the following criteria are met:
    - Duplex ultrasound demonstrating systolic velocity ≥ 125 cm/sec and internal carotid artery/common carotid artery (ICA/CCA) ratio ≥ 2 [6,7]
    - Computed tomography angiography (CTA) or magnetic resonance angiography (MRA) confirming ≥ 50% stenosis and providing additional information about the aortic arch, and extra- and intra-cranial circulation [6,7]
        - If CTA and MRA contraindicated, diagnostic cerebrovascular arteriogram confirming ≥ 50% stenosis
    - Neurological assessment by a neurologist or National Institutes of Health stroke scale (NIHSS)-certified health professional.

Asymptomatic Patients

- Asymptomatic carotid stenosis ≥ 70% when **ALL** of the following criteria are met [8]:
    - Low-risk patient [8]
    - In conjunction with best medical therapy including statins (or equivalent), antiplatelet medications, blood pressure and hyperglycemic control [8]
    - Duplex ultrasound demonstrating systolic velocity ≥ 230 cm/sec, ICA/CCA ratio ≥ 4, and end diastolic velocity of ≥ 100 cm/sec [6,7]
    - CTA or MRA confirming ≥ 70% stenosis and providing additional information about

the aortic arch, and extra- and intra-cranial circulation [6,7]

- If CTA and MRA contraindicated, diagnostic cerebrovascular arteriogram confirming ≥ 70% stenosis

LIMITATIONS

- Stent(s) within 48 hours of a stroke [6]
- Chronic total occlusion of the targeted carotid artery, or near occlusion and distal vessel collapse [9,10]
- Severe disability caused by cerebral infarction that precludes preservation of useful function [9]
- ≥ 50% stenosis with a disabling stroke (modified Rankin score ≥ 3), or area of infarction exceeding one-third (> 30%) of the ipsilateral middle cerebral artery territory, or altered consciousness/drowsiness [6,10]
- Asymptomatic FMD of a carotid artery, regardless of the severity of stenosis [9]
- To prevent cognitive decline in patients with ≥ 70% asymptomatic carotid stenosis [10]
- Prophylactic stent in patients with asymptomatic 50-70% carotid stenosis undergoing major non-cardiac surgical procedure(s) [8]
- Transfemoral stent in the presence of severe aortic calcification, atherosclerosis, or tortuosity [10]
- TCAR in the presence of a tracheal stoma, or any **ONE** of the following [11]:
  - Local tissues are scarred and fibrotic from prior ipsilateral surgery or external beam radiotherapy
  - Lesion < 5 cm from the clavicle
  - Severe calcification
  - Local infection

CODING AND STANDARDS

Codes

Code	Description
37215	Transcatheter placement of intravascular stent(s), cervical carotid artery, open or percutaneous, including angioplasty, when performed, and radiological supervision and interpretation; with distal embolic protection

Code	Description
37216	Transcatheter placement of intravascular stent(s), cervical carotid artery, open or percutaneous, including angioplasty, when performed, and radiological supervision and interpretation; without distal embolic protection

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

- **Rankin Score**: The degree measurement of disability or dependence in the daily activities of people who have suffered a stroke or other causes of neurological disability.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

ACCF: American College of Cardiology Foundation

ACR: American College of Radiology

AHA: American Heart Association

AANN: American Association of Neuroscience Nurses

AANS: American Association of Neurological Surgeons

ASA: American Stroke Association

ASNR: American Society of Neuroradiology

AUC: Appropriate use criteria

CABG: Coronary artery bypass graft

CAS: Carotid artery stenting

CEA: Carotid endarterectomy

CNS: Congress of Neurological Surgeons

CTA: Computed tomography angiography

FMD: Fibromuscular dysplasia

GDMT: Guideline-directed medical therapy

GRADE: Grades of Recommendation Assessment, Development, and Evaluation

ICA/CCA: Internal carotid artery/common carotid artery

MRA: Magnetic resonance angiography

NCD: National Carrier Determination

NIHSS: National Institutes of Health stroke scale

PTA: Percutaneous Transluminal Angioplasty

RPVI: Registered Physician in Vascular Interpretation

RVT: Registered Vascular Technologist

SAIP: Society of Atherosclerosis Imaging and Prevention

SCAI: Society for Cardiovascular Angiography and Interventions

SIR: Society of Interventional Radiology

SNIS: Society of Neurointerventional Surgery

SVM: Society for Vascular Medicine

SVS: Society for Vascular Surgery

TCAR: Transcarotid Revascularization

TF-CAS: Transfemoral carotid artery stenting

TFS: Transfemoral stent

TIA: Transient ischemic attack

SUMMARY OF EVIDENCE

2011 ASA/ACCF/AHA/AANN/AANS/ACR/ASNR/CNS/SAIP/SCAI/SIR/SNIS/SVM/SVS Guideline on the Management of Patients With Extracranial Carotid and Vertebral Artery Disease [9]

Study Design: The guideline is based on a thorough review of the literature relevant to carotid and vertebral artery interventions up to May 2010. The recommendations are evidence-based, derived from studies, reviews, and other evidence conducted in human subjects and published in English. The writing committee performed a formal literature review, weighed the strength of evidence for or against particular tests, treatments, or procedures, and included estimates of expected health outcomes where data exist.

Target Population: The target population includes patients with extracranial carotid and vertebral artery disease, both symptomatic and asymptomatic. The guideline addresses patient populations residing in North America and includes recommendations for primary care clinicians, medical and surgical cardiovascular specialists, trainees in primary care and vascular specialties, nurses, and other healthcare personnel.

Key Factors:

Anatomy and Definitions: The guideline provides detailed descriptions of the normal anatomy of the aortic arch and cervical arteries, variations in anatomy, and definitions related to extracranial cerebrovascular disease.

Epidemiology: It discusses the prevalence of stroke and extracranial cerebrovascular disease, including data from population studies and the impact of geographic variations.

Clinical Presentation: The guideline covers the natural history of atherosclerotic carotid artery disease, characterization of atherosclerotic lesions, symptoms and signs of transient ischemic attack (TIA) and ischemic stroke, and public awareness of stroke risk factors and warning indicators.

Diagnosis and Testing: Recommendations for diagnostic testing in patients with symptoms or signs of extracranial carotid artery disease, including the use of duplex ultrasonography, magnetic resonance angiography (MRA), computed tomographic angiography (CTA), and catheter-based contrast angiography.

Medical Therapy: Recommendations for the treatment of hypertension, cessation of tobacco smoking, control of hyperlipidemia, management of diabetes mellitus, and antithrombotic therapy in patients with extracranial carotid atherosclerotic disease.

Revascularization: Detailed recommendations for carotid endarterectomy (CEA) and carotid artery stenting (CAS), including factors affecting the outcome, risks associated with the procedures, and comparative assessments.

Special Populations: Recommendations for neurological risk reduction in patients with carotid artery disease undergoing cardiac or noncardiac surgery.

Nonatherosclerotic Carotid and Vertebral Artery Diseases: Management of fibromuscular dysplasia (FMD) and cervical artery dissection.

2021 Guideline for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack: A Guideline From the American Heart Association/American Stroke Association [7]

Study Design: The study is a guideline from the American Heart Association/American Stroke Association, reviewed for evidence-based integrity and endorsed by several neurological and vascular societies. It is based on systematic methods to evaluate and classify evidence, aiming to provide recommendations for the prevention of stroke in patients with stroke and transient ischemic attack (TIA).

Target Population: The guidelines are applicable to patients with or at risk of developing cerebrovascular disease, focusing primarily on medical practice in the United States but relevant globally. The target population includes individuals who have experienced ischemic stroke or TIA, with specific recommendations tailored to various subtypes of stroke and risk factors.

Key Factors

Diagnostic Workup: Recommendations for diagnostic evaluation after ischemic stroke to define etiology and identify treatment targets to reduce recurrent stroke risk.

Vascular Risk Factor Management: Emphasis on managing vascular risk factors such as diabetes, smoking cessation, lipids, and hypertension through intensive medical management by multidisciplinary teams.

Lifestyle Factors: Importance of healthy diet and physical activity, with recommendations for low-salt and Mediterranean diets and supervised physical activity.

Antithrombotic Therapy: Recommendations for antithrombotic therapy, including antiplatelet or anticoagulant agents, with specific guidelines for dual antiplatelet therapy in certain high-risk patients.

Atrial Fibrillation: Management of atrial fibrillation with anticoagulation and heart rhythm monitoring.

Carotid and Intracranial Stenosis: Recommendations for intervention in patients with severe stenosis, including carotid endarterectomy and stenting.

Patent Foramen Ovale: Guidelines for percutaneous closure in patients with specific criteria.

Health Systems-Based Interventions: Importance of quality monitoring and improvement programs, multidisciplinary team-based approaches, and decision support tools for secondary stroke prevention.

Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease [6]

Study Design: The guidelines are based on extensive investigations, including multiple randomized controlled trials and systematic reviews. The recommendations are made using the GRADE (grades of recommendation assessment, development, and evaluation) approach.

Target Population: The target population includes patients with carotid bifurcation stenosis, both symptomatic and asymptomatic. Specific emphasis is placed on low-risk surgical patients,

patients presenting with acute stroke, and patients with combined carotid and coronary artery disease.

Key Factors

Carotid Endarterectomy (CEA) vs. Maximal Medical Therapy: CEA is recommended over maximal medical therapy for low-risk patients with asymptomatic carotid bifurcation atherosclerosis and stenosis of > 70%. CEA is also recommended over transfemoral carotid artery stenting (TF-CAS) for low surgical risk patients with symptomatic carotid artery stenosis of > 50%.

Timing of Carotid Intervention: Carotid revascularization is recommended for symptomatic patients with > 50% stenosis to be performed as soon as the patient is neurologically stable after 48 hours but definitely before 14 days after symptom onset.

Screening for Carotid Artery Stenosis: Routine screening for clinically asymptomatic carotid artery stenosis in individuals without cerebrovascular symptoms or significant risk factors is not recommended. Screening is suggested for selected asymptomatic patients at increased risk of carotid stenosis, especially if they are willing to consider carotid intervention if significant stenosis is discovered.

Optimal Sequence of Intervention for Combined Carotid and Coronary Artery Disease: For patients with symptomatic carotid stenosis of 50% to 99% who require both CEA and coronary artery bypass grafting (CABG), CEA is suggested before or concomitant with CABG to potentially reduce the risk of stroke and stroke/death.

Medical Management and Revascularization for Asymptomatic Carotid Stenosis [8]

Study Design: A large, multicenter, randomized, observer-blinded clinical trial conducted as part of the CREST-2 program, specifically the carotid artery stenting trial, which compared intensive medical management alone with transfemoral carotid artery stenting plus intensive medical management. The trial enrolled patients across 155 certified centers in 5 countries and followed patients for up to 4 years.

Target Population: Adult patients aged ≥ 35 years with high-grade (≥ 70%) asymptomatic carotid artery stenosis and no recent history of stroke, TIA, or amaurosis fugax in the target carotid territory. Patients with disabling prior stroke, unstable cardiac conditions, or atrial fibrillation requiring anticoagulation were excluded.

Key Factors

Stenting vs. Intensive Medical Therapy: Carotid artery stenting combined with intensive medical management significantly reduced the risk of the compositive outcome of periprocedural stroke or death or postprocedural ipsilateral ischemic stroke at 4 years compared with intensive medical management alone,

Periprocedural Risk and Long-Term Benefit: Stenting was associated with a higher periprocedural stroke or death risk within the first 44 days after randomization compared with medical therapy alone, while postprocedural ipsilateral stroke rates were substantially lower during the 4-year follow-up, resulting in a net long-term benefit. Overall event rates were low in both groups, reflecting the effectiveness of modern intensive medical therapy and narrowing the absolute benefit margin of surgical intervention.

Operator Expertise and Procedural Quality: Stenting procedures were performed only by certified, high-volume surgeons, with mandatory use of embolic protection devices, suggesting that results may not be generalizable to lower-volume or less experienced practice settings.

Clinical Decision-Making and Shared Responsibility: Supports carotid artery stenting as a potentially beneficial adjunct to intensive medical therapy in carefully selected patients with asymptomatic high-grade carotid stenosis. Emphasizes a shared decision-making approach, incorporating patient preferences, life expectancy, comorbidities, and procedural risk.

ANALYSIS OF EVIDENCE

Shared Conclusions

1. **Carotid Endarterectomy (CEA) vs. Carotid Artery Stenting (CAS)**
    - All articles emphasize the importance of CEA over CAS for patients with symptomatic carotid artery stenosis. AbuRahma et al. recommend CEA for low- and standard-risk patients with > 50% symptomatic carotid artery stenosis. [6] Brott et al. 2011 also highlight the preference for CEA over CAS in symptomatic patients due to lower periprocedural stroke and death rates. [9] Kleindorfer et al. reiterate the importance of fixing severe stenosis in patients with symptomatic carotid artery disease. [7]
2. **Medical Management and Risk Factor Control**
    - The importance of aggressive medical management, including blood pressure control, lipid-lowering therapy, and lifestyle modifications, is a common theme. AbuRahma et al. discuss the role of medical management in stroke prevention. [6] Brott et al. 2011 emphasize the need for comprehensive risk factor management, including hypertension and hyperlipidemia. [9] Kleindorfer et al. also stress the importance of managing vascular risk factors, including hypertension, diabetes, and lifestyle changes. [7]
3. **Screening and Diagnosis**
    - The articles agree on the importance of screening for carotid artery stenosis in high-risk patients, with symptom status guiding management. AbuRahma et al. recommend selective screening for asymptomatic carotid artery stenosis in high-risk patients. [6] Brott et al. 2011 and Kleindorfer et al. recommend noninvasive carotid imaging in patients with symptomatic ischemic stroke or or TIA. [7,9] Brott et al. 2026 further clarify that detection of high-grade asymptomatic carotid stenosis should prompt optimized medical therapy and individualized decision-making rather than automatic progression to revascularization. [8]

POLICY HISTORY

Date	Summary
May 2026	• Added Special Notes section on shared decision-making process requirement • Removed duplicative language in indications • Updated indications and limitations related to percentage stenosis and medical therapy to align with new literature • Removed redundant limitations already precluded by listed indications • Updated Summary of Evidence and Analysis of Evidence to reflect updated literature
June 2025	• Added new bullet-point to the General Statement section • Checked the Medicare Advantage box in the Applicable Lines of Business table • Added a Summary of Evidence and Analysis of Evidence • Updated references
March 2025	• Modified the second, Level-1 bullet-point in the Indications from: “Stenting will be performed more than 14 days after the onset of symptoms and **ANY** of the following”, to: “Stenting should be performed **no** more than 14 days after the onset of symptoms for **ANY** of the following”
January 2025	• This guideline replaces UM CARDIO_1171 Carotid Artery Stenting • Added general statement for share-decision making • Updated clinical indications, limitation, and background sections • Removed Special Note section

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7267 for Cerebrovascular Duplex Ultrasound

Guideline Number: Evolent_CG_7267	**Applicable Codes**	
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Original Date: April 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Carotid Duplex.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR CAROTID DUPLEX

- Asymptomatic patients
  - With known carotid stenosis, 15–50% stenosis followed on an annual basis, and > 50% stenosis followed every six months [6,7]
  - With carotid bruit to detect hemodynamically significant carotid stenosis [8]
  - Annual surveillance following therapeutic intervention when ≥ 50% carotid stenosis has been identified [6] (**AUC Score 7**) [7]
  - With symptomatic peripheral artery disease (PAD), coronary artery disease (CAD),

or atherosclerotic aortic aneurysm, to detect hemodynamically significant carotid stenosis [6,8]

- ≥ 55 years old with two or more of the following risk factors [6,8]:
  - Hypertension
  - Hyperlipidemia
  - Tobacco smoking
  - Diabetes
  - Renal failure
  - A family history in a first-degree relative of atherosclerosis manifested before 60 years old
  - A family history of ischemic stroke
- With clinically occult cerebral infarction noted on brain imaging studies to detect significant carotid artery stenosis [8]
- With Fibromuscular Dysplasia (FMD) of carotid artery as annual surveillance to detect changes in the extent or severity of disease [6]

- Symptomatic patients
  - With focal neurological symptoms corresponding to the territory supplied by the left or right internal carotid artery [6,9]
  - Amaurosis fugax
  - With nonspecific neurological symptoms when cerebral ischemia is a plausible cause [6,9]
  - In symptomatic patients with atherosclerotic subclavian artery disease (transient ischemic attack (TIA)/stroke, coronary subclavian steal syndrome, ipsilateral hemodialysis access dysfunction, severe ischemia) [6,10]
  - With vasculitis involving the extra cranial carotid arteries [7,11]
  - With pulsatile neck mass (**AUC Score 8**) [7] and no prior carotid duplex performed within the last 6 months [9]
- Cardiac surgery
  - Before elective coronary artery bypass graft (CABG) surgery [8] in patients ≥ 65 years old and in those with left main coronary stenosis, known PAD, a history of cigarette smoking, a history of stroke or TIA, or carotid bruit [6,12] (**AUC Score 6**) [7]
  - In patients undergoing or are candidates for carotid endarterectomy (CEA) or carotid artery stenting (CAS) for completion imaging to reduce the risk of peri-operative stroke [12]
  - After revascularization at 1-month baseline, and every 6 months for 2 years, then annually to assess patency and exclude the development of new or contralateral lesion [6]

Note: Duplex ultrasonography may overestimate the severity of stenosis contralateral to internal carotid occlusion, suggesting the need for further confirmation with another imaging modality, especially in asymptomatic patients who are candidates for carotid revascularization [6]

CODING AND STANDARDS

Codes

Code	Description
93880	Duplex scan of extracranial arteries; complete bilateral study
93882	Duplex scan of extracranial arteries; unilateral or limited study

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Non-invasive extra cranial arterial studies involve the use of direct methods of ultrasound. Duplex ultrasound is the first-line imaging modality for carotid artery imaging, screening, and examination the anatomy and physiology of the carotid artery. [8]

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

CABG: Coronary artery bypass graft

CAD: Coronary artery disease

CAS: Carotid artery stenting

FMD: Fibromuscular dysplasia

PAD: Peripheral artery disease

TIA: Transient ischemic attack

SUMMARY OF EVIDENCE

2011 ASA/ACCF/AHA/AANN/AANS/ACR/ASNR/CNS/SAIP/SCAI/SIR/SNIS/SVM/SVS Guideline on the Management of Patients With Extracranial Carotid and Vertebral Artery Disease [6]

Study Design: The guideline is based on a thorough review of the literature relevant to carotid and vertebral artery interventions up to May 2010. The recommendations are evidence-based, derived from studies, reviews, and other evidence conducted in human subjects and published in English. The writing committee performed a formal literature review, weighed the strength of evidence for or against particular tests, treatments, or procedures, and included estimates of expected health outcomes where data exist.

Target Population: The target population includes patients with extracranial carotid and vertebral artery disease, both symptomatic and asymptomatic. The guideline addresses patient populations residing in North America and includes recommendations for primary care clinicians, medical and surgical cardiovascular specialists, trainees in primary care and vascular specialties, nurses, and other healthcare personnel.

Key Factors:

Anatomy and Definitions: The guideline provides detailed descriptions of the normal anatomy of the aortic arch and cervical arteries, variations in anatomy, and definitions related to extracranial cerebrovascular disease.

Epidemiology: It discusses the prevalence of stroke and extracranial cerebrovascular disease, including data from population studies and the impact of geographic variations.

Clinical Presentation: The guideline covers the natural history of atherosclerotic carotid artery disease, characterization of atherosclerotic lesions, symptoms and signs of transient ischemic attack (TIA) and ischemic stroke, and public awareness of stroke risk factors and warning indicators.

Diagnosis and Testing: Recommendations for diagnostic testing in patients with symptoms or signs of extracranial carotid artery disease, including the use of duplex ultrasonography, magnetic resonance angiography (MRA), computed tomographic angiography (CTA), and catheter-based contrast angiography.

Medical Therapy: Recommendations for the treatment of hypertension, cessation of tobacco smoking, control of hyperlipidemia, management of diabetes mellitus, and antithrombotic therapy in patients with extracranial carotid atherosclerotic disease.

Revascularization: Detailed recommendations for carotid endarterectomy (CEA) and carotid artery stenting (CAS), including factors affecting the outcome, risks associated with the procedures, and comparative assessments.

Special Populations: Recommendations for neurological risk reduction in patients with carotid artery disease undergoing cardiac or noncardiac surgery.

Nonatherosclerotic Carotid and Vertebral Artery Diseases: Management of fibromuscular dysplasia (FMD) and cervical artery dissection.

ACCF/ACR/AIUM/ASE/ASN/ICAVL/SCAI/SCCT/SIR/SVM/SVS 2012 Appropriate Use Criteria for Peripheral Vascular Ultrasound and Physiological Testing Part I: Arterial Ultrasound and Physiological Testing [7]

Study Design: This document is the 2012 Appropriate Use Criteria for Peripheral Vascular Ultrasound and Physiological Testing, Part I: Arterial Ultrasound and Physiological Testing. It was developed by the American College of Cardiology Foundation Appropriate Use Criteria Task Force in partnership with several other societies.

Target Population: The criteria are intended for patients undergoing peripheral vascular ultrasound and physiological testing for various arterial disorders, including cerebrovascular disease, renal artery stenosis, mesenteric artery stenosis, abdominal aortic disease, and lower and upper extremity arterial disease.

Key Factors: The document provides detailed criteria for the appropriate use of peripheral vascular ultrasound and physiological testing based on various clinical scenarios. It includes indications for testing, surveillance after revascularization, and follow-up care. The criteria are intended to guide clinicians in maximizing the appropriate use of noninvasive vascular laboratory testing for the care of patients with peripheral vascular disorders.

Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease [8]

Study Design: The guidelines are based on extensive investigations, including multiple randomized controlled trials (RCTs) and systematic reviews. The recommendations are made using the GRADE (grades of recommendation assessment, development, and evaluation) approach.

Target Population: The target population includes patients with carotid bifurcation stenosis, both symptomatic and asymptomatic. Specific emphasis is placed on low-risk surgical patients, patients presenting with acute stroke, and patients with combined carotid and coronary artery disease.

Key Factors

Carotid Endarterectomy (CEA) vs. Maximal Medical Therapy: CEA is recommended over maximal medical therapy for low-risk patients with asymptomatic carotid bifurcation atherosclerosis and stenosis of >70%. CEA is also recommended over transfemoral

carotid artery stenting (TF-CAS) for low surgical risk patients with symptomatic carotid artery stenosis of >50%.

Timing of Carotid Intervention: Carotid revascularization is recommended for symptomatic patients with >50% stenosis to be performed as soon as the patient is neurologically stable after 48 hours but definitely before 14 days after symptom onset.

Screening for Carotid Artery Stenosis: Routine screening for clinically asymptomatic carotid artery stenosis in individuals without cerebrovascular symptoms or significant risk factors is not recommended. Screening is suggested for selected asymptomatic patients at increased risk of carotid stenosis, especially if they are willing to consider carotid intervention if significant stenosis is discovered.

Optimal Sequence of Intervention for Combined Carotid and Coronary Artery Disease: For patients with symptomatic carotid stenosis of 50% to 99% who require both CEA and coronary artery bypass grafting (CABG), CEA is suggested before or concomitant with CABG to potentially reduce the risk of stroke and stroke/death.

ANALYSIS OF EVIDENCE

Shared Findings [6–8]

- **Importance of Carotid Endarterectomy (CEA) and Carotid Artery Stenting (CAS)**: All three articles emphasize the significance of CEA and CAS in managing carotid artery disease. They agree that these procedures are crucial for preventing stroke in patients with significant carotid stenosis.
- **Role of Medical Therapy**: The articles highlight the role of medical therapy in managing carotid artery disease. They agree that medical therapy, including antiplatelet agents, statins, and antihypertensive medications, is essential for all patients, regardless of whether they undergo CEA or CAS.
- **Screening and Surveillance**: The importance of screening and surveillance for carotid artery disease is a common theme. The articles agree that regular follow-up and imaging are necessary to monitor disease progression and the effectiveness of interventions.

POLICY HISTORY

Date	Summary
May 2026	• Guideline name changed from Carotid Duplex to Cerebrovascular Duplex Ultrasound • Added indications for evaluating the subclavian and vertebral arteries • Added amaurosis fugax as a standalone indication in symptomatic patients

Date	Summary
	• Added technical description to codes
July 2025	• Updated indication for asymptomatic patients with known carotid stenosis from 30-50% followed on an annual basis to 15-50% followed on an annual basis
June 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• Added new bullet-point to the General Statement section • Checked the Medicare Advantage box in the Applicable Lines of Business table • No clinical changes

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7268 for Carotid Endarterectomy

Guideline Number:	Applicable Codes	
Evolent_CG_7268		
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Original Date:	**Last Revised Date:**	**Implementation Date:**
September 2011	May 2026	January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines, and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Carotid endarterectomy (CEA) is a surgical procedure used to prevent stroke, by correcting stenosis (narrowing) in the common or internal carotid artery. Endarterectomy is the removal of material on the inside of an artery.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

Special Note

Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used, including their potential outcomes. These should include endarterectomy, carotid stenting, as well as non-interventional medical management. Selection of asymptomatic patients for carotid revascularization should be guided by an assessment of comorbid conditions, life expectancy, and other individual factors, and should include a thorough discussion of the risks and benefits of the procedure with an understanding of the patient's preferences. Factors that may preclude endarterectomy are listed below (see **Background**). This process must be reflected in notes provided.

INDICATIONS

Symptomatic Patients

- Neurologically stable patients with recent stable stroke or transient ischemic attack (TIA) and > 50% stenosis (confirmed by computed tomography angiography [CTA], magnetic resonance angiography [MRA], catheter angiography, or duplex scan systolic velocity ≥ 125 cm/sec and internal carotid artery/common carotid artery (ICA/CCA) ratio ≥ 2), between 48 hours and 14 days after symptom onset [6,7]
- Patients with 50-99% stenosis (confirmed by CTA, MRA, catheter angiography, or duplex scan systolic velocity ≥ 125 cm/sec and internal carotid artery/common carotid artery (ICA/CCA) ratio ≥ 2) and nondisabling TIA, amaurosis fugax, or stroke within the past 6 months [6,7]

Asymptomatic Patients

- Asymptomatic ≥ 70% carotid stenosis when **ALL** of the following criteria are met [8]:
  - Low-risk patient [8]
  - In conjunction with best medical therapy including statins (or equivalent), antiplatelet medications, blood pressure, and hyperglycemic control [8]
  - Duplex ultrasound demonstrating systolic velocity ≥ 230 cm/sec, ICA/CCA ratio ≥ 4, and end diastolic velocity of ≥ 100 cm/sec [6,7]
  - CTA or MRA confirming ≥ 70% carotid stenosis and providing additional information about the aortic arch, and extra- and intra-cranial circulation [6,7]
    - If CTA and MRA contraindicated, diagnostic cerebrovascular arteriogram confirming ≥ 70% stenosis

CODING AND STANDARDS

Codes

Code	Description
35301	Thromboendarterectomy, including patch graft, if performed; carotid, vertebral, subclavian, by neck incision

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Risk Criteria for Carotid Endarterectomy

The following may be considered high-risk factors for carotid revascularization via endarterectomy based on clinical judgment [(9)]:

- Neck irradiation
- Previous carotid endarterectomy
- Previous neck surgery
- Tracheal stoma
- Lesion above C2
- Contralateral vocal cord injury
- Hostile neck owing to obesity, immobility, or kyphosis
- Medical high risk

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

AUC: Appropriate use criteria

CABG: Coronary artery bypass graft

CAS: Carotid artery stenting

CEA: Carotid endarterectomy

CTA: Computed tomography angiography

GRADE: Grades of Recommendation Assessment, Development, and Evaluation

MRA: Magnetic resonance angiography

TIA: Transient ischemic attack

TF-CAS: Transfemoral carotid artery stenting

SUMMARY OF EVIDENCE

Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease [6]

Study Design: The guidelines are based on extensive investigations, including multiple randomized controlled trials and systematic reviews. The recommendations are made using the GRADE (grades of recommendation assessment, development, and evaluation) approach.

Target Population: The target population includes patients with carotid bifurcation stenosis, both symptomatic and asymptomatic. Specific emphasis is placed on low-risk surgical patients, patients presenting with acute stroke, and patients with combined carotid and coronary artery disease.

Key Factors

Carotid Endarterectomy (CEA) vs. Maximal Medical Therapy: CEA is recommended over maximal medical therapy for low-risk patients with asymptomatic carotid bifurcation atherosclerosis and stenosis of > 70%. CEA is also recommended over transfemoral carotid artery stenting (TF-CAS) for low surgical risk patients with symptomatic carotid artery stenosis of > 50%.

Timing of Carotid Intervention: Carotid revascularization is recommended for symptomatic patients with > 50% stenosis to be performed as soon as the patient is neurologically stable after 48 hours but definitely before 14 days after symptom onset.

Screening for Carotid Artery Stenosis: Routine screening for clinically asymptomatic carotid artery stenosis in individuals without cerebrovascular symptoms or significant risk factors is not recommended. Screening is suggested for selected asymptomatic patients at increased risk of carotid stenosis, especially if they are willing to consider carotid intervention if significant stenosis is discovered.

Optimal Sequence of Intervention for Combined Carotid and Coronary Artery Disease: For patients with symptomatic carotid stenosis of 50% to 99% who require

both CEA and coronary artery bypass grafting (CABG), CEA is suggested before or concomitant with CABG to potentially reduce the risk of stroke and stroke/death.

Medical Management and Revascularization for Asymptomatic Carotid Stenosis [8]

Study Design: A large, multicenter, randomized, observer-blinded clinical trial conducted as part of the CREST-2 program, consisting of two parallel trials comparing intensive medical management alone with revascularization plus intensive medical management. The carotid endarterectomy trial randomized patients with asymptomatic carotid stenosis to carotid endarterectomy plus intensive medical management versus intensive medical management alone, with follow-up of up to 4 years.

Target Population: Adult patients aged ≥ 35 years with high-grade (≥ 70%) asymptomatic carotid artery stenosis and no recent history of stroke, TIA, or amaurosis fugax in the target carotid territory. Patients were representative of contemporary clinical practice and were enrolled across 155 centers in multiple countries. Exclusion criteria included recent cerebrovascular symptoms, disabling prior stroke, unstable angina, or atrial fibrillation requiring anticoagulative therapy.

Key Factors

Patient Selection and Risk Stratification: Emphasizes careful selection of patients with asymptomatic high-grade stenosis and no recent cerebrovascular symptoms, highlighting the importance of individualized risk–benefit assessment before considering CEA.

Carotid Endarterectomy vs. Intensive Medical Therapy: CEA combined with intensive medical management and lifestyle modification did not demonstrate a statistically significant reduction in the composite outcome of perioperative stroke or death or long-term ipsilateral ischemic stroke compared with intensive medical management and lifestyle modification alone.

Periprocedural and Long-Term Stroke Risk: CEA was associated with a higher periprocedural stroke risk compared with medical therapy alone, while postprocedural ipsilateral stroke rates were lower. Overall event rates were low in both groups, reflecting the effectiveness of modern intensive medical therapy and narrowing the absolute benefit margin of surgical intervention.

Operator Expertise and Procedural Quality: CEA procedures were performed only by certified, high-volume surgeons with documented low complication rates, suggesting that results may not be generalizable to lower-volume or less experienced practice settings.

Clinical Decision-Making and Shared Responsibility: Supports a shared decision-making approach, incorporating patient preferences, life expectancy, comorbidities, procedural risk, and the absence of demonstrated superiority of CEA over intensive medical therapy.

2021 Guideline for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack: A Guideline From the American Heart Association/American Stroke Association [7]

Study Design: The study is a guideline from the American Heart Association/American Stroke Association, reviewed for evidence-based integrity and endorsed by several neurological and vascular societies. It is based on systematic methods to evaluate and classify evidence, aiming to provide recommendations for the prevention of stroke in patients with stroke and transient ischemic attack (TIA).

Target Population: The guidelines are applicable to patients with or at risk of developing cerebrovascular disease, focusing primarily on medical practice in the United States but relevant globally. The target population includes individuals who have experienced ischemic stroke or TIA, with specific recommendations tailored to various subtypes of stroke and risk factors.

Key Factors

Diagnostic Workup: Recommendations for diagnostic evaluation after ischemic stroke to define etiology and identify treatment targets to reduce recurrent stroke risk.

Vascular Risk Factor Management: Emphasis on managing vascular risk factors such as diabetes, smoking cessation, lipids, and hypertension through intensive medical management by multidisciplinary teams.

Lifestyle Factors: Importance of healthy diet and physical activity, with recommendations for low-salt and Mediterranean diets and supervised physical activity.

Antithrombotic Therapy: Recommendations for antithrombotic therapy, including antiplatelet or anticoagulant agents, with specific guidelines for dual antiplatelet therapy in certain high-risk patients.

Atrial Fibrillation: Management of atrial fibrillation with anticoagulation and heart rhythm monitoring.

Carotid and Intracranial Stenosis: Recommendations for intervention in patients with severe stenosis, including carotid endarterectomy and stenting.

Patent Foramen Ovale: Guidelines for percutaneous closure in patients with specific criteria.

Health Systems-Based Interventions: Importance of quality monitoring and improvement programs, multidisciplinary team-based approaches, and decision support tools for secondary stroke prevention.

ANALYSIS OF EVIDENCE

Shared Conclusions [6–8]

1. **Importance of Early Detection and Treatment**: All three articles emphasize the significance of early detection and timely initiation of therapy to reduce stroke risk. However, contemporary evidence emphasizes that in asymptomatic patients, early treatment primarily consists of intensive medical management, with revascularization reserved for carefully selected individuals rather than applied routinely.
2. **Surgical and Medical Management**: The articles discuss both surgical and medical management options for carotid artery stenosis. Medical management, including

antiplatelet therapy, statins, and lifestyle modifications, is emphasized as crucial for preventing recurrent strokes. While carotid endarterectomy (CEA) and carotid artery stenting (CAS) remain effective surgical interventions in selected patients, recent evidence demonstrates that intensive medical therapy alone can achieve very low stroke rates in asymptomatic carotid stenosis, limiting the incremental benefit of routine surgical intervention in this population.

3. **Risk Factors and Patient Selection**: The articles agree on the importance of considering patient-specific risk factors and characteristics when deciding on the treatment approach. Factors such as age, comorbidities, and the severity of stenosis are critical in determining whether revascularization is likely to provide net benefit beyond optimized medical therapy.

POLICY HISTORY

Date	Summary
May 2026	• Added Special Note section on shared decision-making process requirement • Clarified imaging standards and updated indications in symptomatic patients • Updated patient factors and imaging standards for indications in asymptomatic patients per updated references • Updated Summary of Evidence and Analysis of Evidence to reflect updated references
June 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• Added new bullet-point to the General Statement section • Checked the Medicare Advantage box in the Applicable Lines of Business table • No clinical changes
January 2025	• This guideline replaces UM CARDIO_1163 for Carotid Endarterectomy • Updated references • Reorganized and clarified indications

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7269 for Catheter Based Carotid and Brachiocephalic Arteriography, Venography, and Intervention

Guideline Number: Evolent_CG_7269	**Applicable Codes**	
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Original Date: September 2011	**Last Revised Date:** June 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Catheter Based Carotid and Brachiocephalic Arteriography, Venography, and Intervention.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

Special Note

Patients must be involved in a shared decision-making process, which must include options for less invasive tests as well as possible complications from the planned procedure, and should include a thorough discussion of the risks and benefits of the procedure with an understanding of the patient's preferences. This process must be reflected in the notes provided.

INDICATIONS FOR CATHETER BASED CAROTID OR BRACHIOCEPHALIC ARTERY DIGITAL ANGIOGRAPHY [6]

Any of the following:

- When there are conflicting or inconclusive results from a prior duplex scan, computed tomography angiography (CTA) and/or magnetic resonance angiography (MRA) and carotid revascularization is being contemplated
- When there is/are contraindications to CTA/MRA and revascularization is being contemplated
- In patients with renal dysfunction to limit exposure to contrast material during evaluation of a single vascular territory
- For the diagnosis of cervical artery dissection
- For the evaluation of carotid fibromuscular dysplasia
- For the evaluation of vertebral artery dissection and obstructive lesions
- For the evaluation or management of cervical or intracranial aneurysms, mass, malignancies, bleeding, fistula, or malformations

INDICATIONS FOR HEMODIALYSIS-RELATED ISSUES

Hemodialysis-related complications can occur outside the dialysis circuit, necessitating further visualization and treatment.

- Catheter directed arteriography and/or angioplasty/stent may be performed when **all** the following conditions are met [7,8]:
    - The catheter is inserted in one of the following manners:
        - Through a puncture at a different site than the dialysis circuit
        - Via the dialysis circuit and positioned in the aorta or subclavian artery
    - Arteriography is employed to examine/treat possible pathologies when at least one of the following applies:
        - Steal syndrome or distal limb ischemia is suspected
        - A fistulogram has been performed for hemodialysis issues, and no pathology or reason for decreased flow was visualized
- Venography may be performed when the catheter is inserted from a vein outside the dialysis circuit for a tunneled catheter replacement

- Venous angioplasty/stents can be performed on veins that are not part of the dialysis circuit but have caused complications due to stenosis or occlusion when at least ONE of the following applies:
    - The stenosis involves a vein distal to, and not involving, the cephalic arch (which is the junction of the cephalic vein and axillary vein)
    - A fibrous sheath has caused occlusion or loss of function of a tunneled dialysis catheter, and the endovascular device is inserted from a site distant from the dialysis catheter insertion site.

INDICATIONS FOR SUBCLAVIAN ARTERY PROCEDURES

Revascularization of the subclavian artery by endovascular or open surgical techniques is medically necessary when all are present [9,10]:

- There is a hemodynamically significant stenosis as documented by any of the following:
    - Disparity between arm pressures
    - Abnormal waveforms by doppler or plethysmography
    - 70% stenosis on duplex imaging (systolic >230cm/s)
    - Bidirectional or retrograde flow in the vertebral artery,
- Confirmation of > 70% stenosis by CTA, MRA or catheter angiography
- Any one of the following:
    - Symptomatic upper extremity ischemia
        - Arm discomfort with exercise
        - Distal hand or finger pain attributable to ischemia, embolization, non-healing skin breakdown, or gangrene (documented preferably by finger pressures or waveforms)
    - Vertebrobasilar Insufficiency (Subclavian Steal Syndrome) as evidence by:
        - Recurrent dizziness, syncope. visual disturbance, or ataxia, especially if brought on by arm exercise
    - Prior ipsilateral left internal mammary artery (LIMA) - coronary bypass with angina or myocardial ischemia attributable to reduced LIMA flow irrespective of degree of stenosis
    - Planned LIMA - coronary bypass in the presence of high-grade subclavian stenosis.
    - Asymptomatic patients with a LIMA - Coronary Bypass
    - Recurrent symptoms and evidence of recurrent stenosis following prior subclavian treatment

- Prior to axillo-femoral bypass in the presence of > 50% stenosis
- To correct developing subclavian stenosis after axillo-femoral bypass

LIMITATIONS FOR CATHETER BASED CAROTID ARTERY DIGITAL ANGIOGRAPHY

- Catheter-based angiography is unnecessary for diagnostic evaluation of most patients with Extracranial Carotid and Vertebral Artery Disease (ECVD), especially preoperatively before carotid endarterectomy (CEA) [11] and is used increasingly as a therapeutic revascularization maneuver in conjunction with stent deployment [6]

CODING AND STANDARDS

Codes

Code	Descriptions
36215	Selective catheter placement, arterial system; each first order thoracic or brachiocephalic branch, within a vascular family
36216	Selective catheter placement, arterial system; initial second order thoracic or brachiocephalic branch, within a vascular family
36217	Selective catheter placement, arterial system; initial third order or more selective thoracic or brachiocephalic branch, within a vascular family
36221	Non-selective catheter placement, thoracic aorta, with angiography of the extracranial carotid, vertebral, and/or intracranial vessels, unilateral or bilateral, and all associated radiological supervision and interpretation, includes angiography of the cervicocerebral arch, when performed
36222	Selective catheter placement, common carotid or innominate artery, unilateral, any approach, with angiography of the ipsilateral extracranial carotid circulation and all associated radiological supervision and interpretation, includes angiography of the cervicocerebral arch, when performed
36223	Selective catheter placement, common carotid or innominate artery, unilateral, any approach, with angiography of the ipsilateral intracranial carotid circulation and all associated radiological supervision and interpretation, includes angiography of the extracranial carotid and cervicocerebral arch, when performed

Code	Descriptions
36224	Selective catheter placement, internal carotid artery, unilateral, with angiography of the ipsilateral intracranial carotid circulation and all associated radiological supervision and interpretation, includes angiography of the extracranial carotid and cervicocerebral arch, when performed
36225	Selective catheter placement, subclavian or innominate artery, unilateral, with angiography of the ipsilateral vertebral circulation and all associated radiological supervision and interpretation, includes angiography of the cervicocerebral arch, when performed
36226	Selective catheter placement, vertebral artery, unilateral, with angiography of the ipsilateral vertebral circulation and all associated radiological supervision and interpretation, includes angiography of the cervicocerebral arch, when performed
37236	Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; initial artery
37238	Transcatheter placement of an intravascular stent(s), open or percutaneous, including radiological supervision and interpretation and including angioplasty within the same vessel, when performed; initial vein
37246	Transluminal balloon angioplasty (except lower extremity artery(ies) for occlusive disease, intracranial, coronary, pulmonary, or dialysis circuit), open or percutaneous, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty within the same artery; initial artery
37248	Transluminal balloon angioplasty (except dialysis circuit), open or percutaneous, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty within the same vein; initial vein
75710	Angiography, extremity, unilateral, radiological supervision and interpretation
+36218	Selective catheter placement, arterial system; additional second order, third order, and beyond, thoracic or brachiocephalic branch, within a

Code	Descriptions
	vascular family (List in addition to code for initial second or third order vessel as appropriate)
+36227	Selective catheter placement, external carotid artery, unilateral, with angiography of the ipsilateral external carotid circulation and all associated radiological supervision and interpretation (List separately in addition to code for primary procedure)
+36228	Selective catheter placement, each intracranial branch of the internal carotid or vertebral arteries, unilateral, with angiography of the selected vessel circulation and all associated radiological supervision and interpretation (eg, middle cerebral artery, posterior inferior cerebellar artery) (List separately in addition to code for primary procedure)
+37237	Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; each additional artery (List separately in addition to code for primary procedure)
+37239	Transcatheter placement of an intravascular stent(s), open or percutaneous, including radiological supervision and interpretation and including angioplasty within the same vessel, when performed; each additional vein (List separately in addition to code for primary procedure)
+37247	Transluminal balloon angioplasty (except lower extremity artery(ies) for occlusive disease, intracranial, coronary, pulmonary, or dialysis circuit), open or percutaneous, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty within the same artery; each additional artery (List separately in addition to code for primary procedure)
+37249	Transluminal balloon angioplasty (except dialysis circuit), open or percutaneous, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty within the same vein; each additional vein (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Carotid angiography is a procedure performed to visualize the arterial supply to the brain and to ascertain presence of blockage in the extra-cranial carotid arteries.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

CEA: Carotid endarterectomy

CTA: Computed tomography angiography

ECVD: Extracranial Carotid and Vertebral Artery Disease

LIMA: Left internal mammary artery

MRA: Magnetic resonance angiography

SUMMARY OF EVIDENCE

2011 ASA/ACCF/AHA/AANN/AANS/ACR/ASNR/CNS/SAIP/SCAI/SIR/SNIS/SVM/SVS Guideline on the Management of Patients With Extracranial Carotid and Vertebral Artery Disease [6]

Study Design: The guideline is based on a thorough review of the literature relevant to carotid and vertebral artery interventions up to May 2010. The recommendations are evidence-based, derived from studies, reviews, and other evidence conducted in human subjects and published in English. The writing committee performed a formal literature review, weighed the strength of evidence for or against particular tests, treatments, or procedures, and included estimates of expected health outcomes where data exist.

Target Population: The target population includes patients with extracranial carotid and vertebral artery disease, both symptomatic and asymptomatic. The guideline addresses patient populations residing in North America and includes recommendations for primary care clinicians, medical and surgical cardiovascular specialists, trainees in primary care and vascular specialties, nurses, and other healthcare personnel.

Key Factors:

Anatomy and Definitions: The guideline provides detailed descriptions of the normal anatomy of the aortic arch and cervical arteries, variations in anatomy, and definitions related to extracranial cerebrovascular disease.

Epidemiology: It discusses the prevalence of stroke and extracranial cerebrovascular disease, including data from population studies and the impact of geographic variations.

Clinical Presentation: The guideline covers the natural history of atherosclerotic carotid artery disease, characterization of atherosclerotic lesions, symptoms and signs of transient ischemic attack (TIA) and ischemic stroke, and public awareness of stroke risk factors and warning indicators.

Diagnosis and Testing: Recommendations for diagnostic testing in patients with symptoms or signs of extracranial carotid artery disease, including the use of duplex ultrasonography, magnetic resonance angiography (MRA), computed tomographic angiography (CTA), and catheter-based contrast angiography.

Medical Therapy: Recommendations for the treatment of hypertension, cessation of tobacco smoking, control of hyperlipidemia, management of diabetes mellitus, and antithrombotic therapy in patients with extracranial carotid atherosclerotic disease.

Revascularization: Detailed recommendations for carotid endarterectomy (CEA) and carotid artery stenting (CAS), including factors affecting the outcome, risks associated with the procedures, and comparative assessments.

Special Populations: Recommendations for neurological risk reduction in patients with carotid artery disease undergoing cardiac or noncardiac surgery.

Nonatherosclerotic Carotid and Vertebral Artery Diseases: Management of fibromuscular dysplasia (FMD) and cervical artery dissection.

Upper Extremity Catheter Angiography: Indications, Techniques, Anatomy, and Classic Cases [7]

Study Design: The study design is a pictorial essay that discusses the indications, techniques, anatomy, and classic cases of upper extremity catheter angiography. The target population includes patients with various pathophysiologic conditions such as trauma, limb ischemia, hemodialysis access, vasculitis, and vascular anomalies. The study reviews modern indications of upper extremity catheter angiography, patient preparation, angiographic techniques, normal and variant anatomy, and classic angiographic diagnoses.

Key factors:

> **Indications**: Trauma, acute limb ischemia, bypass graft planning, dialysis access steal syndrome, vasculitis, and vascular anomalies.
>
> **Techniques**: Preparation and patient positioning, equipment and access, vasodilators.
>
> **Diagnosis**: Anatomy and variants, classic angiographic cases such as Takayasu's arteritis, arterial thoracic outlet syndrome, thromboangiitis obliterans (Buerger's disease), hypothenar hammer syndrome, and Raynaud's phenomenon.

The study emphasizes the importance of catheter angiography in specific clinical scenarios despite advancements in computed tomography/magnetic resonance angiography (CT/MRA).

Subclavian Artery Disease: Diagnosis and Therapy [9]

- **General Population**: Subclavian artery disease affects about 2% of the general population but is more common in those with peripheral artery disease (PAD), coronary artery disease, or risk factors such as smoking, hypertension, and low HDL cholesterol.
- **High-Risk Groups**:
  - Patients with known PAD (prevalence of subclavian stenosis up to 54%).
  - Patients undergoing coronary artery bypass grafting (CABG), especially those with left internal mammary artery (LIMA) grafts.
  - Patients with symptoms of arm claudication, vertebrobasilar insufficiency, or lower extremity ischemia (especially after axillofemoral bypass).
  - Patients with clinical suspicion based on physical findings (e.g., inter-arm systolic blood pressure difference >10 mm Hg).

Key Factors in Catheter Angiography

Indications

- Catheter angiography is considered the definitive diagnostic test for subclavian artery disease, especially when noninvasive tests (duplex ultrasound, CT angiography, MR angiography) are inconclusive or when intervention is planned.
- It is particularly indicated in:
  - Symptomatic patients (arm claudication, cerebral hypoperfusion, subclavian steal syndrome).
  - Preoperative evaluation before CABG or in patients with prior bypass grafts.
  - Cases where precise anatomical mapping is required for intervention planning.

Technical Aspects

- **Femoral access** is most common, but radial or brachial access may be used in cases of challenging anatomy.
- **Combined approaches** (e.g., "body floss technique") are used for complex or chronic occlusions.
- Angiography provides both anatomical and functional information, and digital subtraction techniques help characterize stenosis.

Outcomes and Complications

- Endovascular interventions (angioplasty and stenting) have high technical success rates (~95%) and are first-line therapy for most patients.
- Complication rates (stroke, death) are low (2.3–3.6%), with most failures occurring within the first two years.
- Patency rates after stenting are favorable, but long lesions and complete occlusions are associated with higher restenosis and stent fracture rates.
- The use of distal cerebral protection devices is controversial and not systematically studied; most embolic complications arise from aortic arch manipulation rather than stent placement itself.

ANALYSIS OF EVIDENCE

Catheter angiography remains the gold standard for anatomical and functional assessment of arterial disease, especially when noninvasive imaging is inconclusive or intervention is planned.

Catheter angiography is particularly indicated for:

- Symptomatic patients (e.g., arm claudication, vertebrobasilar insufficiency, subclavian steal syndrome, TIA, stroke) [7].
    - Despite advances in CT/MR, catheter angiography still has utility in trauma, acute limb ischemia, and vasculitis.
- Preoperative evaluation [9]
    - Catheter angiography is useful as both a diagnostic and interventional planning tool, particularly for CABG patients with LIMA grafts, and in those with prior bypass procedures.
- Cases requiring precise anatomical mapping for intervention [6]
    - Catheter angiography can provide definitive information when noninvasive modalities or inconclusive or technically limited, or anatomically complex cases.

Shared Conclusions [6,7,9]

- Catheter angiography and subsequent endovascular interventions (angioplasty, stenting) have high technical success rates (~95%) and are first-line therapy for most patients with symptomatic disease.

- Complication rates (stroke, death) are low, but most failures occur within the first two years.
- Patency rates after stenting are favorable, but long lesions and complete occlusions are Catheter angiography is essential for definitive diagnosis and procedural planning in complex or symptomatic cases.
- Noninvasive imaging (duplex, CTA, MRA) is preferred for initial evaluation, but catheter angiography is required when results are inconclusive or intervention is planned.
- Endovascular therapy (angioplasty, stenting) is effective and safe, with high technical success and favorable patency rates.
- Surgical revascularization remains an option for refractory or anatomically unsuitable cases.
- Associated with higher restenosis and stent fracture rates.

POLICY HISTORY

Date	Summary
June 2026	• Fixed placement of add on code in table
May 2026	• Updated citations • Updated Summary of Evidence and Analysis of Evidence to reflect new citations • Added code descriptions
March 2026	• Added indications for subclavian artery procedures
July 2025	• Guideline name was changed from ECG 7269 for Catheter Based Carotid and Brachiocephalic Artery Digital Angiography to ECG 7269 for Catheter Based Carotid and Brachiocephalic Arteriography, Venography, and Intervention • Added section on venous angioplasty • Added CPT codes 37236, 37237, 37238, 37239, 37246, 37247, 37248, 37249, and 75710
June 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• Added new bullet-point to the General Statement section • No clinical changes

Date	Summary
January 2025	• This guideline replaces UM CARDIO_1169 Catheter Based Carotid Artery Digital Angio • Updated according to societal guidelines • Added missing CPT code 36228 • Added hemodialysis-related indication section

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guideline 7270 for Central Venous Access Procedure

Guideline Number:	Applicable Codes	
Evolent_CG_7270		
"Evolent" refers to Evolent Health LLC and Evolent Specialty Services, Inc.		
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Original Date:	**Last Revised Date:**	**Implementation Date:**
September 2011	May 2026	January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Central Venous Access Device (CVAD) implantation and removal.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR CVAD IMPLANTATION [6]

Indications	Usually Appropriate	May Be Appropriate	Usually Not Appropriate
Administration of IV medication (> 2 weeks) (excluding chemotherapy)	PICC, Tunneled CVC	Chest port, Arm port	Non-tunneled CVC

Indications	Usually Appropriate	May Be Appropriate	Usually Not Appropriate
Administration of IV medication that may irritate peripheral endothelium	Non-tunneled CVC, PICC	Tunneled CVC, Midline catheter	Arm port, Chest port
Frequent blood sampling (< 2 weeks)	Non-tunneled CVC, PICC	Tunneled CVC, Midline catheter	Arm port, Chest port
Hemodialysis prior to AVF creation	Non-tunneled CVC (≤ 2 weeks), Tunneled CVC	Non-tunneled CVC (>2 weeks)	Arm port, Chest port, PICC
Hemodynamic monitoring	Non-tunneled CVC, PICC	Tunneled CVC, Midline catheter	Arm port, Chest port
Administration of chemotherapy (> 2 weeks)	Chest port, Arm port	PICC, Tunneled CVC	Non-tunneled CVC

INDICATIONS FOR CVAD REMOVAL

- If the central venous access is no longer clinically needed
- Catheter occlusion
- Central venous thrombosis
- Fibrin sheath formation
- Catheter-related infection
- Catheter kinking

LIMITATION

- Angioplasty of the fibrin sheath is considered part of the repair or replacement procedure unless accessed from a remote site

CODING AND STANDARDS

Codes

Code	Description
CVAD Insertion	
36556	Insertion of non-tunneled centrally inserted central venous catheter; age 5 years or older
36558	Insertion of tunneled centrally inserted central venous catheter, without subcutaneous port or pump; age 5 years or older
36561	Insertion of tunneled centrally inserted central venous access device, with subcutaneous port; age 5 years or older
36563	Insertion of tunneled centrally inserted central venous access device with subcutaneous pump
36565	Insertion of tunneled centrally inserted central venous access device, requiring 2 catheters via 2 separate venous access sites; without subcutaneous port or pump (eg, Tesio type catheter)
36566	Insertion of tunneled centrally inserted central venous access device, requiring 2 catheters via 2 separate venous access sites; with subcutaneous port(s)
CVAD Removal	
36589	Removal of tunneled central venous catheter, without subcutaneous port or pump
36590	Removal of tunneled central venous access device, with subcutaneous port or pump, central or peripheral insertion
CVAD Replacement	
36578	Replacement, catheter only, of central venous access device, with subcutaneous port or pump, central or peripheral insertion site
36580	Replacement, complete, of a non-tunneled centrally inserted central venous catheter, without subcutaneous port or pump, through same venous access
36581	Replacement, complete, of a tunneled centrally inserted central venous catheter, without subcutaneous port or pump, through same venous access

Code	Description
36582	Replacement, complete, of a tunneled centrally inserted central venous access device, with subcutaneous port, through same venous access
36583	Replacement, complete, of a tunneled centrally inserted central venous access device, with subcutaneous pump, through same venous access
CVAD Repair	
36575	Repair of tunneled or non-tunneled central venous access catheter, without subcutaneous port or pump, central or peripheral insertion site
36576	Repair of central venous access device, with subcutaneous port or pump, central or peripheral insertion site
Fluoroscopic Guidance/Contrast	
36597	Repositioning of previously placed central venous catheter under fluoroscopic guidance
36598	Contrast injection(s) for radiologic evaluation of existing central venous access device, including fluoroscopy, image documentation and report
76000	Fluoroscopy (separate procedure), up to 1 hour physician or other qualified health care professional time
+77001	Fluoroscopic guidance for central venous access device placement, replacement (catheter only or complete), or removal (includes fluoroscopic guidance for vascular access and catheter manipulation, any necessary contrast injections through access site or catheter with related venography radiologic supervision and interpretation, and radiographic documentation of final catheter position) (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Central Venous Access Device: a catheter that is placed in a vein that leads directly to the right side of the heart. There are a number of central veins and for each of these there are a variety of techniques. Catheters are available which differ in length, internal diameter, number of channels, method of insertion, material and means of fixation.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AVF: Arteriovenous fistula

CVAD: Central venous access device

CVC: Central venous catheter

IV: Intravenous

PICC: Peripherally inserted central catheter

SUMMARY OF EVIDENCE [6]

Study Design: The document is a systematic review and guideline developed by an expert panel on interventional radiology. It evaluates the literature supporting the selection of central venous access devices and the site of placement in various clinical settings. The review includes data from multiple studies, including randomized controlled trials, prospective cohort studies, and systematic reviews.

Target Population: The target population includes patients requiring central venous access for various medical conditions such as acute illness, renal failure, cancer, and the need for long-term intravenous medication or parenteral nutrition. Specific patient groups addressed include those with acute renal failure, chronic kidney disease, cancer, and those requiring frequent intravenous administration of medications.

Key Factors:

- **Device Selection:** The document provides recommendations for different types of central venous access devices, including nontunneled central venous catheters (CVCs), peripherally inserted central catheters (PICCs), tunneled dialysis catheters, and central venous ports (chest and arm ports). The appropriateness of each device is categorized based on the clinical scenario, such as the duration of therapy, the type of medication administered, and the patient's underlying condition.
- **Site Selection:** Recommendations are provided for the optimal site of catheter insertion, including the internal jugular vein, subclavian vein, external jugular vein, femoral vein, hepatic vein, and inferior vena cava. The appropriateness of each site is evaluated based on factors such as the risk of infection, mechanical complications, and the patient's clinical condition.
- **Clinical Scenarios:** The document outlines specific clinical scenarios and provides evidence-based recommendations for device and site selection. For example, it addresses scenarios such as acutely ill patients requiring short-term therapy, patients with renal failure needing long-term dialysis, and cancer patients requiring chemotherapy.
- **Literature Review:** The document includes a summary of the literature review, highlighting key studies and their findings. It discusses the benefits and risks associated with different types of central venous access devices and insertion sites.
- **Expert Panel:** The guidelines were developed by an expert panel consisting of radiologists, interventional radiologists, and other specialists. The panel reviewed the available evidence and provided consensus recommendations.

ANALYSIS OF EVIDENCE [6]

The guideline provides recommendations for selecting central venous access devices and sites based on various clinical scenarios. For acutely ill patients, nontunneled central venous catheters (CVC) and peripherally inserted central catheters (PICC) are usually appropriate for short-term use. For patients with acute renal failure, nontunneled and tunneled dialysis catheters are suitable for short-term renal replacement therapy, while tunneled dialysis

catheters are recommended for long-term therapy in patients with renal failure. Cancer patients requiring chemotherapy infusions are advised to use chest and arm ports, and for continuous IV medication administration, PICC and tunneled CVC are suitable for long-term use. For long-term total parenteral nutrition, double lumen tunneled CVC and double lumen PICC are recommended, and single or double lumen tunneled CVC are appropriate for chronic kidney disease patients requiring long-term IV infusions. Site selection for acutely ill patients generally includes internal jugular, subclavian, and upper extremity veins, while internal jugular veins are usually appropriate for chronic kidney disease patients.

The document also emphasizes the importance of selecting the appropriate device and site to minimize complications and improve patient outcomes. It highlights the benefits and risks associated with different types of central venous access devices and sites, stressing the need for careful consideration based on the patient's clinical condition. The guidelines aim to provide a comprehensive approach to central venous access device and site selection, ensuring optimal care and minimizing potential complications.

POLICY HISTORY

Date	Summary
May 2026	• Added limitation section to cover angioplasty of fibrin sheath • Removed misplaced code 32552 and Place of Services code
May 2025	• Added new bullet-point to the General Statement section • Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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3. Hendel RC, Patel MR, Allen JM, et al. Appropriate Use of Cardiovascular Technology: 2013 ACCF appropriate use criteria methodology update. *J Am Coll Cardiol*. 2013;61(12):1305-1317. doi:10.1016/j.jacc.2013.01.025
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Evolent Clinical Guideline 7271 for Coronary Fractional Flow Reserve

Guideline Number: Evolent_CG_7271	**Applicable Codes**	
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Original Date: May 2016	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Coronary Fractional Flow Reserve

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR CORONARY FRACTIONAL FLOW RESERVE [6]

- In patients with angina or an anginal equivalent, undocumented ischemia, and angiographically intermediate stenoses (defined as a diameter stenosis severity of 40% to 69%) to guide the decision to proceed with PCI (percutaneous coronary intervention)
- In patients undergoing valve surgery, aortic surgery, or other cardiac operations with intermediate coronary artery disease (CAD; defined as 40%–69% stenosis) to guide the decision to proceed with or without concomitant CABG (coronary artery bypass graft)

CODING AND STANDARDS

Codes

Code	Description
+93571	Intravascular Doppler velocity and/or pressure derived coronary flow reserve measurement (coronary vessel or graft) during coronary angiography including pharmacologically induced stress; initial vessel (List separately in addition to code for primary procedure)
+93572	Intravascular Doppler velocity and/or pressure derived coronary flow reserve measurement (coronary vessel or graft) during coronary angiography including pharmacologically induced stress; each additional vessel (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Fractional flow reserve (FFR) is used to determine the functional significance of a coronary stenosis in angiographically "intermediate" or "indeterminant" lesions which allows the operator to decide when PCI may be beneficial or safely deferred. During coronary catheterization, a catheter is inserted into the femoral (groin) or radial arteries (wrist) using a sheath and guidewire. FFR is calculated as the ratio of distal coronary pressure to aortic pressure measured during maximal hyperemia. A normal value for FFR is 1.0. FFR. FFR ≤ 0.80 in an angiographically intermediate lesion (50-70% stenosis) is considered to be a significant coronary lesion (>70% stenosis). [7]

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

CABG: Coronary artery bypass graft

CAD: Coronary artery disease

FFR: Fractional flow reserve

PCI: Percutaneous coronary intervention

SUMMARY OF EVIDENCE

2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization [6]

Study Design: The guidelines are based on a comprehensive literature search conducted from May 2019 to September 2019, which included studies, reviews, and other evidence conducted on human subjects and published in English. The search covered databases such as PubMed, EMBASE, the Cochrane Collaboration, and CINHL Complete. Additional relevant studies published through May 2021 were also considered.

Target Population: The target population includes patients with coronary artery disease (CAD) who are being considered for coronary revascularization. This includes patients with stable ischemic heart disease (SIHD), acute coronary syndromes (ACS), and those undergoing percutaneous coronary intervention (PCI).

Key Factors:

- **FFR and iFR Use:** FFR and instantaneous wave-free ratio (iFR) are physiological methods used to assess lesion significance in patients with angina or angina equivalent and angiographically intermediate stenoses. FFR is defined as the ratio of maximal blood flow in a region distal to a lesion compared with the normal maximal blood flow of an artery. iFR is an index of lesion severity measured during the wave-free period in diastole.
- **Clinical Trials and Outcomes:** The FAME (Fractional Flow Reserve Versus Angiography for Multivessel Evaluation) trial demonstrated that FFR-guided PCI reduced the risk of the composite endpoint of death, myocardial infarction (MI), or urgent revascularization compared with angiography-guided PCI. The DEFINE-FLAIR (Functional Lesion Assessment of Intermediate Stenosis to Guide Revascularization) and iFR-SWEDEHEART (Instantaneous Wave-Free Ratio versus Fractional Flow Reserve in Patients with Stable Angina Pectoris or Acute Coronary Syndrome) trials

showed that iFR-guided PCI was noninferior to FFR-guided PCI in terms of clinical outcomes.

- **Recommendations:** FFR or iFR is recommended to guide the decision to proceed with PCI in patients with angiographically intermediate stenoses and undocumented ischemia. PCI should not be performed in stable patients with angiographically intermediate stenoses and FFR >0.80 or iFR >0.89.
- **Safety and Efficacy:** Deferral of PCI when FFR is >0.80 or iFR is >0.89 is associated with low rates of long-term major adverse cardiovascular events (MACE). The use of FFR and iFR has been shown to improve clinical outcomes by reducing unnecessary revascularizations and focusing treatment on lesions that are physiologically significant.

Fractional Flow Reserve Assessment of Coronary Artery Stenosis [7]

Study Design: The document is a review article that discusses various aspects of CAD, including prevention, diagnosis, and treatment. It synthesizes findings from multiple studies and clinical trials to provide a thorough overview of the current state of knowledge in the field.

Target Population: The primary focus is on patients with coronary artery disease, particularly those with stable ischemic heart disease or acute coronary syndrome (ACS). The review addresses different patient subsets, including those with high-risk clinical conditions, moderate coronary lesions, and multivessel disease.

Key Factors:

- **Prevention**: Emphasizes the importance of a healthy lifestyle, including diet, exercise, maintaining optimal body weight, and avoiding smoking, as the best method for preventing CAD.
- **Diagnosis**: Discusses the use of coronary angiography and fractional flow reserve (FFR) to identify significant coronary lesions and assess their physiological impact. FFR is highlighted as the gold standard for detecting myocardial ischemia.
- **Treatment**: Reviews the indications for revascularization, including percutaneous coronary intervention (PCI) and coronary artery bypass graft (CABG). It also covers the use of FFR to guide revascularization decisions in patients with stable CAD and intermediate coronary lesions.
- **Recent Advances**: Mentions recent advances in non-invasive assessment techniques, such as computed tomographic angiography (CTA) and FFR-CT, which allow for the evaluation of coronary artery disease without invasive procedures.

ANALYSIS OF EVIDENCE

Shared Conclusions [6,7]

Both articles focus on coronary artery disease (CAD) and the importance of revascularization in managing this condition. They emphasize the significance of identifying and treating significant coronary stenoses to improve patient outcomes.

- **Revascularization Techniques**: Both articles discuss the use of percutaneous coronary intervention (PCI) and coronary artery bypass graft (CABG) as primary revascularization techniques. They highlight the benefits of these procedures in reducing mortality and improving symptoms in patients with CAD.
- **Fractional Flow Reserve (FFR)**: Both articles mention the use of FFR as a critical tool in assessing the physiological significance of coronary stenoses. FFR helps determine whether revascularization is necessary based on the severity of blood flow impairment.
- **Patient Selection**: Both articles stress the importance of patient selection for revascularization procedures. They recommend using clinical criteria, imaging, and physiological assessments to identify patients who would benefit the most from revascularization.

POLICY HISTORY

Date	Summary
April 2026	• No substantive clinical change • Added code description
June 2025	• Added new bullet-point to the General Statement section • Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7274 for Coronary Intra Vascular Arterial Ultrasound

Guideline Number: Evolent_CG_7274	**Applicable Codes**	
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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Coronary Intra Vascular Arterial Ultrasound (IVUS).

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Coronary IVUS is recommended for:

- Assessing angiographically intermediate stenoses (50% - 70% diameter) left main (LM) and non-LM coronary artery lesion severity prior to revascularization [6]
- Assessing indeterminate LM disease where coronary angiography was limited by foreshortening or overlapping vessels. [6]
- Post cardiac transplantation within 4 to 6 weeks and 1 year to exclude donor coronary

artery disease (CAD), detect rapidly progressive cardiac allograft vasculopathy, and provide prognostic information [7]

- Evaluating the mechanism of stent failure, stent restenosis and stent thrombosis [6,8]
- Coronary stent implantation guidance, particularly in cases of LM coronary artery stenting or complex coronary artery stenting including but not limited to [6,8,9]:
  - Adequate expansion and apposition in selected patients
- Assessing plaque extent (burden) and characteristics within the LM coronary artery, [9] particularly ostial stenosis in LM coronary artery and daughter branches [8,9]
- Assessing the severity and optimizing the treatment of unprotected LM coronary artery lesions [8]

Limitations

IVUS is **not** indicated for:

- Routine lesion assessment when revascularization with percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) is not being contemplated [7]
- Extreme vessel tortuosity and angulation [10]
- Patients not suitable for systemic anticoagulation or angiography or cardiac catheterization [10]

CODING AND STANDARDS

Codes

Code	Description
+92978	Endoluminal imaging of coronary vessel or graft using intravascular ultrasound (IVUS) or optical coherence tomography (OCT) during diagnostic evaluation and/or therapeutic intervention including imaging supervision, interpretation and report; initial vessel (List separately in addition to code for primary procedure)
+92979	Endoluminal imaging of coronary vessel or graft using intravascular ultrasound (IVUS) or optical coherence tomography (OCT) during diagnostic evaluation and/or therapeutic intervention including imaging supervision, interpretation and report; each additional vessel (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

IVUS is a specially designed catheter with a miniaturized ultrasound probe attached to the distal end of the catheter. IVUS when introduced in a coronary artery during cardiac catheterization, provides more precise information about the severity of stenosis and plaque morphology than does coronary angiography such as for the lumen of ostial lesions or where angiographic images do not visualize lumen segments adequately, such as regions with multiple overlapping arterial segments. It is also used to assess the effects of treatments of stenosis such as with hydraulic angioplasty expansion of the artery, with or without stents, and the results of medical therapy over time.

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

CAD: Coronary artery disease

CABG: Coronary artery bypass grafting

IVUS: Intra Vascular Arterial Ultrasound

LMCAD: Left main coronary artery disease

PCI: Percutaneous coronary intervention

SUMMARY OF EVIDENCE

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention [7]

Study Design: The guidelines are based on a comprehensive review of evidence related to PCI, including randomized controlled trials (RCTs), observational studies, meta-analyses, and expert consensus. The writing committee conducted an extensive evidence review through November 2010, with additional references through August 2011. The recommendations are categorized by the Class of Recommendation (COR) and Level of Evidence (LOE), which estimate the size and certainty of the treatment effect.

Target Population: The guidelines target patients undergoing PCI for various clinical scenarios, including stable ischemic heart disease (SIHD), acute coronary syndromes (ACS), and specific anatomical and clinical situations such as chronic total occlusions (CTOs), saphenous vein grafts (SVGs), bifurcation lesions, aorto-ostial stenoses, calcified lesions, and specific patient populations like the elderly, diabetics, women, and those with chronic kidney disease (CKD) or cardiac allografts.

Key Factors:

Methodology and Evidence Review: The recommendations are evidence-based, with a formal literature review and ranking of evidence supporting each recommendation. The writing committee used evidence-based methodologies developed by the ACCF/AHA Task Force.

PCI Outcomes: Definitions of PCI success include angiographic success, procedural success, and clinical success. Predictors of clinical outcome after PCI include advanced age, diabetes, CKD, ACS, congestive heart failure, and multivessel coronary artery disease (CAD).

PCI Complications: The document discusses various complications associated with PCI, including mortality, myocardial infarction (MI), emergency coronary artery bypass grafting (CABG), stroke, vascular complications, coronary perforation, bleeding, and contrast-induced acute kidney injury (AKI).

Preprocedural Considerations: Recommendations for preprocedural considerations include assessing the risk of contrast-induced AKI, anaphylactoid reactions, statin treatment, bleeding risk, and the use of PCI in hospitals without on-site surgical backup.

Procedural Considerations: Recommendations for procedural considerations include vascular access, PCI in specific clinical situations (UA/NSTEMI, STEMI, cardiogenic shock), revascularization before noncardiac surgery, coronary stents, adjunctive diagnostic devices (FFR, IVUS), adjunctive therapeutic devices (coronary atherectomy, thrombectomy, laser angioplasty, cutting balloon angioplasty, embolic protection devices), and percutaneous hemodynamic support devices.

Postprocedural Considerations: Recommendations for postprocedural considerations include postprocedural antiplatelet therapy, exercise testing, cardiac rehabilitation, secondary prevention, and quality and performance considerations.

2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization [6]

Study Design: The guidelines are based on a comprehensive literature search conducted from May 2019 to September 2019, which included studies, reviews, and other evidence conducted on human subjects and published in English. The search covered databases such as PubMed, EMBASE, the Cochrane Collaboration, and CINHL Complete. Additional relevant studies published through May 2021 were also considered.

Target Population: The target population includes patients with coronary artery disease (CAD) who are being considered for coronary revascularization. This includes patients with stable ischemic heart disease (SIHD), acute coronary syndromes (ACS), and those undergoing percutaneous coronary intervention (PCI).

Key Factors:

FFR and iFR Use: FFR and instantaneous wave-free ratio (iFR) are physiological methods used to assess lesion significance in patients with angina or angina equivalent and angiographically intermediate stenoses. FFR is defined as the ratio of maximal blood flow in a region distal to a lesion compared with the normal maximal blood flow of an artery. iFR is an index of lesion severity measured during the wave-free period in diastole.

Clinical Trials and Outcomes: The FAME (Fractional Flow Reserve Versus Angiography for Multivessel Evaluation) trial demonstrated that FFR-guided PCI reduced the risk of the composite endpoint of death, myocardial infarction (MI), or urgent revascularization compared with angiography-guided PCI. The DEFINE-FLAIR (Functional Lesion Assessment of Intermediate Stenosis to Guide Revascularization) and iFR-SWEDEHEART (Instantaneous Wave-Free Ratio versus Fractional Flow Reserve in Patients with Stable Angina Pectoris or Acute Coronary Syndrome) trials showed that iFR-guided PCI was noninferior to FFR-guided PCI in terms of clinical outcomes.

Recommendations: FFR or iFR is recommended to guide the decision to proceed with PCI in patients with angiographically intermediate stenoses and undocumented ischemia. PCI should not be performed in stable patients with angiographically intermediate stenoses and FFR >0.80 or iFR >0.89.

Safety and Efficacy: Deferral of PCI when FFR is >0.80 or iFR is >0.89 is associated with low rates of long-term major adverse cardiovascular events (MACE). The use of FFR and iFR has been shown to improve clinical outcomes by reducing unnecessary revascularizations and focusing treatment on lesions that are physiologically significant.

2018 ESC/EACTS Guidelines on myocardial revascularization [8]

Study Design: The guidelines were developed by the Task Force on myocardial revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). The guidelines were produced after careful consideration of scientific and medical knowledge and the evidence available at the time of their dating. The development process included a comprehensive review of published evidence for diagnosis, management, and prevention of myocardial revascularization, with a critical evaluation of diagnostic and therapeutic procedures, including assessment of the risk-benefit ratio.

Target Population: The guidelines target healthcare professionals involved in the medical care of patients with myocardial revascularization needs. This includes cardiologists, cardiac surgeons, interventional cardiologists, anesthetists, and other specialists. The guidelines aim to assist these professionals in selecting the best management strategies for individual patients with given conditions, taking into account the impact on outcomes as well as the risk-benefit ratio of particular diagnostic or therapeutic means.

Key Factors:

Associations and Councils: The guidelines were developed with contributions from various ESC associations and councils, including the Acute Cardiovascular Care Association (ACCA), European Association of Preventive Cardiology (EAPC), European Association of Cardiovascular Imaging (EACVI), European Association of Percutaneous Cardiovascular Interventions (EAPCI), European Heart Rhythm Association (EHRA), Heart Failure Association (HFA), Council on Cardiovascular Nursing and Allied Professions, Council for Cardiology Practice, Council on Cardiovascular Primary Care, Council on Stroke, and Council on Valvular Heart Disease.

Diagnostic Tools: The guidelines discuss the use of non-invasive and invasive diagnostic tools to guide myocardial revascularization, including assessment of myocardial ischemia, viability, fractional flow reserve (FFR), and intravascular imaging.

Decision-Making Process: Emphasis is placed on patient information and informed consent, multidisciplinary decision-making (Heart Team), and timing of revascularization.

Revascularization Strategies: The guidelines provide recommendations for revascularization in stable coronary artery disease (SCAD), non-ST-elevation acute coronary syndrome (NSTE-ACS), ST-segment elevation myocardial infarction (STEMI), heart failure, diabetes, chronic kidney disease, and patients requiring valve interventions.

Procedural Aspects: Detailed recommendations are provided for procedural aspects of coronary artery bypass grafting (CABG) and percutaneous coronary intervention (PCI), including choice of stent, access site, and antithrombotic treatments.

Volume-Outcome Relationship: The guidelines discuss the impact of operator and institutional volume on outcomes of revascularization procedures and recommend training programs for cardiac surgery and interventional cardiology.

ANALYSIS OF EVIDENCE

Shared Conclusions [6–8]

1. **Revascularization Strategies**: All three articles emphasize the importance of revascularization in managing coronary artery disease (CAD). They agree that both coronary artery bypass grafting (CABG) and percutaneous coronary intervention (PCI) are viable options, depending on the patient's specific condition and the complexity of the disease.
2. **Patient Selection**: The articles highlight the necessity of careful patient selection for revascularization procedures. They stress the importance of considering factors such as

the severity of CAD, the presence of comorbidities, and the patient's overall health and preferences.

Use of Guidelines: Each article underscores the importance of adhering to clinical guidelines and using a multidisciplinary approach (Heart Team) to make informed decisions about revascularization. This approach ensures that patients receive the most appropriate and effective treatment.

POLICY HISTORY

Date	Summary
April 2026	• Added code descriptions • Clarified indications on intermediate vs indeterminate stenoses
June 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• Added new bullet-point to the General Statement section • Checked the Medicare Advantage box in the Applicable Lines of Business table • No clinical changes
January 2025	• This guideline replaces UM 1292 Coronary Intra Vascular Arterial Ultrasound

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug.

Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7276 for Descending Thoracic Aortic Open or Endovascular Surgery

Guideline Number: Evolent_CG_7276	**Applicable Codes**	
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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for procedures on the descending thoracic aorta.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

General Considerations

Thoracic Endovascular Aortic Repair (TEVAR) is preferred over open surgery in all instances where the anatomy is favorable (see **Definitions**). Open surgery is usually reserved for unfavorable anatomy or patients with Connective Tissue Disorders (CTD) or Heritable Thoracic Aortic Diseases (HTAD). When open surgery is requested, the reason must be included in the notes provided. Hybrid procedures may be required especially for thoracoabdominal aneurysms.

Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used including their potential outcomes. This process should be reflected in notes provided.

INDICATIONS (6–8)

Descending Thoracic Aneurysm and Thoracoabdominal Aneurysm

NOTE: Requests for concomitant subclavian, carotid, or iliac artery bypass should be approved as well as access site, or adjunctive endovascular procedures

- Open surgical repair and TEVAR procedures should be approved for **ruptured** descending thoracic aortic aneurysm (DTA) and thoracoabdominal aneurysm and are not dependent on any variable
- Open surgical repair and TEVAR are indicated for **non-ruptured** DTA when fine-cut (< 0.2 mm) computed tomography angiography (CTA) or magnetic resonance angiography (MRA) of the entire aorta and iliac arteries demonstrate **ANY** of the following:
    - DTA ≥ 5.5 cm in low-risk patients
    - DTA ≥ 6.0 cm in high-risk patients
    - DTA ≥ 5.0 cm in women or anyone with Marfan syndrome
    - DTA < 5.0 cm may be appropriate in pregnant women, HTAD other than Marfan Syndrome, or CTD but the reason must be included in the notes provided
    - DTA < 5.5 cm with:
        - Aneurysm growth of > 0.5 cm in 12 months
        - Symptoms or findings consistent with impending rupture. Examples include but are not limited to:
            - Back or chest pain
            - Periaortic hematoma
            - Pleural effusion
        - Saccular configuration
        - Mycotic aneurysm
        - Family or personal history of any non-cerebral artery rupture
    - Persistent endoleak after prior endograft

Descending Aortic Dissection

With at least ONE of the following:

- Open surgical repair and TEVAR procedures for hyperacute or acute pathology unresponsive to supportive medical therapy, including concomitant subclavian, carotid, or iliac artery bypass, as well as referencing access sites and adjunctive endovascular procedures.
- New symptoms or signs of evolving limb, organ or life-saving complications attributable to the aortic pathology or its treatment

- ANY findings consistent with impending rupture:
  - Descending thoracic aortic dissection
  - New periaortic hematoma or pleural effusion
  - Continued aortic growth ≥ 5 mm in 6 months
  - False lumen expansion ≥ 2.2 cm
  - Aortic diameter ≥ 5.5 cm
  - Endoleak after prior stent
  - Intramural hematoma (IMH), or IMH with Penetrating Aortic Ulcer (PAU) with:
    - Progression on follow-up imaging (maximum aortic diameter ≥ 4.5 cm, IMH wall thickness ≥ 10 mm, presence of ulcer-like projections after a period of hypertension control **OR**
    - Concern for rupture as explained in the notes provided
  - Isolated Penetrating Aortic Ulcer with
    - Diameter between 13 mm to 20 mm or depth ≥ 10 mm **OR**
    - Concern for rupture as explained in the notes provided

Other Descending Thoracic Aortic Conditions

With at least ONE of the following:

- Aorto-enteric fistula
- Aorto-bronchial fistula
- Infected aorta or aortic grafts
- Aortic tumors
- Kommerell's Diverticulum when diameter exceeds 30 mm or the diameter of the descending aorta adjacent to the diverticulum exceeds 50 mm.
- Symptomatic Aberrant right or left subclavian artery
- Coarctation of the aorta

CODING AND STANDARDS

Codes

Code	Description
33875	Descending thoracic aorta graft, with or without bypass

Code	Description
33877	Repair of thoracoabdominal aortic aneurysm with graft, with or without cardiopulmonary bypass
33880	Endovascular repair of thoracic aorta, including pre-procedure sizing and device selection, nonselective catheterization(s), all associated radiological supervision and interpretation; by deployment of an aorto-aortic tube endograft covering the left subclavian artery and all aortic tube endograft extension(s) proximally in the aortic arch and ascending aorta and distally to the celiac artery, when performed
+33530	Reoperation, coronary artery bypass procedure or valve procedure, more than 1 month after original operation (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Dilation of the descending aorta (TAA) is often detected during other cardiovascular imaging. Descending aortic graft surgery is defined as excision and surgical replacement of the most distal portion of the diseased thoracic aorta with a graft.

Definitions

- **Acute**: 1-14 days since onset of symptoms
- **Endograft** is a preconstructed graft that is inserted via a remote access site. There are multiple commercial variants where the manufacturers' Instructions For Use (IFU) should be followed. Surgeon-modified grafts should only be used at institutions where the graft has been approved by an Institutional Review Board (IRB) or in a government-approved clinical trial.
- **Favorable anatomy for EVAR**: anatomy that is consistent with the Instructions For Use (IFU) of the endograft that will be inserted.

- **Heritable Thoracic Aortic Disease (HTAD)**: an aortic condition related to a genetic or heritable condition, some of which associated with multisystem features (considered syndromic HTAD) or others with abnormalities limited to the aorta with or without its branches (known as nonsyndromic HTAD). Examples include Marfan, Loeys-Dietz, Turner and Ehlers-Danlos syndromes, Familial Thoracic aortic aneurysms, and possibly bicuspid aortic valve.
- **High risk**: a patient who has significant comorbidities increasing the risk of death, renal failure, stroke, or spinal ischemia and paraplegia.
- **Hyperacute**: < 24 hours since onset of symptoms.
- **Intramural hematoma (IMH)**: a hematoma in the wall of the artery without an identifiable communication between the true and false lumens. It is characterized by hyperdense, crescent-shaped hemorrhage within the wall and is best seen on non-contrast enhanced computed tomography.
- **Low risk**: a patient who does not have significant comorbidities.
- **Penetrating aortic ulcer (PAU)**: an atherosclerotic lesion that penetrates the internal elastic lamina of the aortic wall. It was also referred to as ulcer-like projections. It is often associated with IMH.
- **Pregnancy**: can significantly impact the disease process and must be taken into consideration when considering surgical intervention.
- **Unfavorable anatomy for TEVAR**: anatomy that would not be suitable for the IFU of any commercially available endograft.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(4)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AUC: Appropriate Uce Criteria

CTA: Computed Tomography Angiography

CTD: Connective Tissue Disorders

DTA: Descending Thoracic Aneurysm

HTAD: Heritable Thoracic Aortic Disease

IFU: Instructions For Use

IMH: Intramural hematoma

MRA: Magnetic Resonance Angiography

PAU: Penetrating Aortic Ulcer

TEVAR: Thoracic Endovascular Aortic Repair

SUMMARY OF EVIDENCE

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease [6]

Study Design: This study is a clinical practice guideline developed by the American Heart Association (AHA) and the American College of Cardiology (ACC) Joint Committee on Clinical Practice Guidelines. It involved a comprehensive literature search from January 2021 to April 2021, including studies, reviews, and other evidence conducted on human subjects published in English from PubMed, EMBASE, the Cochrane Library, CINHL Complete, and other selected databases.

Target Population: The guidelines are intended for clinicians diagnosing and managing patients with aortic disease across multiple clinical presentation subsets, including asymptomatic, stable symptomatic, and acute aortic syndromes.

Key Factors: The guidelines emphasize shared decision-making, institutional interventional volume, and multidisciplinary aortic team expertise in the care of patients with aortic disease. They provide recommendations for medical therapy, endovascular and surgical treatment, and long-term surveillance.

Society for Vascular Surgery (SVS) and Society of Thoracic Surgeons (STS) reporting standards for type B aortic dissections [7]

Study Design: This study provides reporting standards for type B aortic dissections developed by the Society for Vascular Surgery (SVS) and the Society of Thoracic Surgeons (STS). It includes a new classification system for practical use and reporting that encompasses the aortic arch.

Target Population: The study focuses on patients with acute type B aortic dissection, which composed approximately 33% of all dissection patients enrolled in the International Registry of Acute Aortic Dissection (IRAD) over a 17-year period.

Key Factors: The document defines complicated vs uncomplicated dissections, high-risk grouping, follow-up criteria, false lumen status, measurement criteria, and definitions of aortic remodeling. It provides a framework for more granular discussions and reporting of aortic dissection.

Society for Vascular Surgery clinical practice guidelines of thoracic endovascular aortic repair for descending thoracic aortic aneurysms [8]

Study Design: This study is a clinical practice guideline developed by the Society for Vascular Surgery (SVS) for thoracic endovascular aortic repair (TEVAR) for descending thoracic aortic aneurysms (TAA). It involved a systematic review and meta-analysis of observational studies comparing TEVAR and open repair.

Target Population: The guidelines are applicable to patients with descending thoracic aortic aneurysms and other rarer pathologic processes of the descending thoracic aorta.

Key Factors: The guidelines recommend TEVAR over open repair for elective descending thoracic aorta aneurysms due to reduced morbidity, length of stay, and short-term mortality. They emphasize the importance of imaging before, during, and after TEVAR, and provide recommendations for perioperative management, spinal cord protection, and surveillance

ANALYSIS OF EVIDENCE

Shared Findings [6–8]

- Emphasis on Imaging: All three articles highlight the importance of accurate imaging techniques for diagnosis and treatment planning. Fine-cut CTA and three-dimensional reconstruction are recommended for precise measurements and planning.
- Multidisciplinary Approach: The importance of a multidisciplinary team in managing complex aortic diseases is emphasized across all articles. This approach ensures comprehensive care and optimal outcomes.
- Shared Decision-Making: Shared decision-making involving the patient and a multidisciplinary team is encouraged to determine the best treatment options, considering individual patient factors and preferences.

Conclusion [6–8]

The three articles provide comprehensive guidelines and recommendations for the management of descending thoracic aortic diseases, with a focus on imaging, multidisciplinary care, and shared decision-making. While there are shared conclusions regarding the importance of these factors, each article also offers unique insights and recommendations specific to their focus areas, such as classification systems and chronicity definitions for aortic dissections, and specific management strategies for TEVAR.

POLICY HISTORY

Date	Summary
May 2026	● Reorganized and edited indications for better clarity ● Added technical description to codes
June 2025	● Added a Summary of Evidence and Analysis of Evidence
May 2025	● Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices ● Edited text for clarity

Date	Summary
January 2025	● This guideline replaces UM CARDIO_1098 for Descending Thoracic Aortic Graft Surgery ○ Guideline name changed to **Descending Thoracic Aortic Open or Endovascular Surgery** ● Clinical indications were updated per societal guidance

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7280 for Duplex Scan of Hemodialysis Access

Guideline Number:	Applicable Codes	
Evolent_CG_7280		
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Original Date:	**Last Revised Date:**	**Implementation Date:**
April 2011	May 2026	January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines, and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Duplex scan of hemodialysis access (including arterial inflow, body of access and venous outflow) combines Doppler and conventional ultrasound to see the structure of blood vessels, how the blood is flowing through the vessels, and whether there is any obstruction in the vessels. Combining spectral Doppler analysis and color flow Doppler images provide anatomic and hemodynamic information.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

- For arteriovenous (AV) access insufficiency [6] in patients at high risk of AV access failure with any **ONE** of the following:
  - Access collapse suggesting poor arterial inflow
  - Poorly matured fistula

- Loss of thrill
- Palpable “water hammer” pulse
- Abnormal bruit over fistula
- Distal limb ischemia
- Clinical signs of infection
- Perigraft mass, aneurysm, or pseudoaneurysm
- Increased bleeding

- Evaluation of abnormal fistula function when any **ONE** of the following criteria are met [7,8]:
  - Elevated venous pressure of > 200 mmHg on a 300 cc/min pump
  - Elevated recirculation time of > 15%
  - Low urea reduction rate of < 60%

CODING AND STANDARDS

Codes

Code	Description
93990	Duplex scan of hemodialysis access (including arterial inflow, body of access and venous outflow)

Applicable Lines of Business

☒	CHIP (Children’s Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

AUC: Appropriate use criteria

AV: Arteriovenous

AVF: Arteriovenous fistula

AVG: Arteriovenous graft

CKD: Chronic kidney disease

CVC: Central venous catheter

eGFR: Estimated glomerular filtration rate

ESVS: European Society for Vascular Surgery

KDOQI: Kidney Disease Outcomes Quality Initiative

PSV: Peak systolic velocity

SUMMARY OF EVIDENCE

AIUM Practice Parameter for the Performance of Vascular Ultrasound for Postoperative Assessment of Hemodialysis Access, 2024 Revision [6]

Study Design: The AIUM Practice Parameter is based on a narrative synthesis of published evidence and expert consensus developed by a multidisciplinary panel. The reviewed evidence base includes observational studies, diagnostic accuracy studies comparing duplex ultrasound with angiography, randomized controlled trials evaluating surveillance strategies, and systematic reviews and meta-analyses. The document integrates reported diagnostic performance metrics, physiologic thresholds, and clinical outcomes to define best practices for duplex ultrasound performance and interpretation.

Target Population: The practice parameter applies to patients undergoing hemodialysis who require evaluation of vascular access. This includes patients with newly created AVFs undergoing maturation assessment, with established AVFs/AVGs with suspected dysfunction or access-related symptoms (eg, low blood flow, difficult cannulation, prolonged bleeding, edema,

or ischemia), and rarely, selected asymptomatic patients evaluated as part of structured surveillance.

Key Factors:

Hemodynamic and Morphologic Assessment: The evidence supports the use of integrated grayscale, color, and spectral Doppler assessment to evaluate luminal narrowing, velocity acceleration, flow turbulence, and volume flow rates. Standardized thresholds (eg, peak systolic velocity (PSV) ratios at the anastomosis or draining vein and minimum flow volume criteria) are supported by multiple studies.

Assessment of AVF Maturation: Multiple studies demonstrate that early postoperative duplex ultrasound parameters, including vein diameter, flow volume, and vein depth, are moderately predictive of successful AVF maturation, emphasizing the value of identification of correctable anatomic lesions by ultrasound and ultrasound-guided intervention.

Evaluation of Access Dysfunction and Complications: Duplex ultrasound reliably identifies common causes of access dysfunction, including stenosis, thrombosis (occlusive and nonocclusive), pseudoaneurysm, aneurysmal degeneration, and inflow or outflow disease. It is also useful for evaluating access-related ischemia and for postintervention follow-up.

Role in Surveillance: While selected data suggest a possible benefit in fistulas through reduced catheter use or hospitalization, the evidence regarding routine ultrasound surveillance of asymptomatic, functioning access is mixed. Higher-level evidence suggests no consistent improvement in long-term patency, particularly for grafts, leading to recommendations against routine preemptive intervention in the absence of clinical signs.

Arteriovenous Access for Hemodialysis [7]

Study Design: This publication is a narrative review based on an updated comprehensive literature search conducted for the Kidney Disease Outcomes Quality Initiative (KDOQI) 2019 vascular access guidelines, extending the search window from 2015 through early 2023 to gather more recent high-level data. Evidence on AV access for hemodialysis was selectively summarized to emphasize findings most relevant to generalist clinicians involved in the care of patients with chronic kidney disease (CKD).

Target Population: The review focuses on patients with CKD who require or are expected to require hemodialysis, specifically patients with advanced CKD approaching kidney failure or with inadequate existing hemodialysis access who would benefit from AV access evaluation.

Key Factors:

Patient Life-Plan and Access Strategy: The review emphasizes adoption of an individualized Patient Life-Plan, Access Needs (PLAN) framework, aligning dialysis modality choice and vascular access decisions with patient comorbidities, life expectancy, and preferences.

Referral Timing and Vessel Preservation: Patients should be referred for vascular access assessment when estimated glomerular filtration rate (eGFR) decreases to 15-20 mL/min and concurrent decline in kidney function (earlier in cases of rapid eGFR

decline), as well as patients who are failing peritoneal dialysis modality, have nonfunctional or poorly functioning AV access, or currently have a central venous catheter (CVC) but are eligible for AVF/AVG. Early planning is highlighted as critical to minimizing catheter dependence and preserving future access options.

Duplex Ultrasonography-Guided Vascular Access Assessment and Surveillance: The review emphasizes duplex ultrasonography as a central tool for optimizing hemodialysis vascular access across access types, supporting informed selection between AV fistulas and grafts, assessing maturation and nonmaturation, and enabling early detection and targeted management of access-related complications—thereby balancing short-term usability with long-term access durability and patient outcomes.

ANALYSIS OF EVIDENCE

Shared Conclusions [6,7]

Essential Role in Detecting Access Dysfunction

Both articles conclude that duplex ultrasound is a key diagnostic tool for identifying clinically significant hemodialysis access problems, particularly stenosis, thrombosis, and flow abnormalities, often before access failure becomes irreversible.

Added Value Beyond Physical Examination Alone

Duplex ultrasound provides higher sensitivity than clinical examination alone, especially for detecting occult or graft-related stenosis, and is therefore an important adjunct when clinical findings or dialysis performance suggest dysfunction.

Central Importance in AVF Maturation Assessment

Both sources support the use of duplex ultrasound to evaluate nonmaturing AVFs by assessing flow volume, vein diameter, depth, and anatomic abnormalities, helping identify potentially correctable causes and guide salvage efforts.

Targeted, Clinically Integrated Use

Both publications agree that duplex ultrasound should be used in a targeted, clinically driven manner, not as routine surveillance in asymptomatic, functioning access. Within this shared conclusion, the AIUM Parameters emphasize imaging standards, diagnostic criteria, and technical performance, whereas Lok et al. frame duplex ultrasound within a broader patient-centered clinical strategy (PLAN), highlighting when imaging is appropriate rather than how it is performed.

POLICY HISTORY

Date	Summary
May 2026	• Added purpose of duplex scan to Purpose section • Removed redundant indications and indications more appropriate for different imaging modalities • Updated Summary and Analysis of Evidence to reflect updated literature
June 2025	• Added new bullet-point to the General Statement section • Checked the Medicare Advantage box in the Applicable Lines of Business table • Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7281 for Guideline Directed Medical Therapy – Heart Failure and Coronary Artery Disease

Guideline Number: Evolent_CG_7281		
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Original Date: May 2024	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Heart failure with reduced ejection fraction (HFrEF) is a complex condition that can arise from multiple factors, including coronary artery disease, hypertension, myocardial infarction, valvular heart disease, and cardiomyopathies. These underlying conditions collectively impair the heart's ability to effectively pump blood, leading to a reduction in ejection fraction. Similarly, heart failure with preserved ejection fraction (HFpEF) presents with comparable symptoms but is distinguished by a left ventricular ejection fraction (LVEF) of 50% or higher.

Medical management is of utmost importance in addressing both HFrEF and HFpEF, aiming to alleviate symptoms, improve quality of life, and extend lifespan. Medications play a crucial role in reducing cardiac workload, enhancing cardiac function, and managing fluid overload. Before considering invasive procedures, the administration of medications is essential to stabilize the patient's condition, optimize cardiac function, and minimize the risks associated with such interventions.

Guideline-Directed Medical Therapy (GDMT) serves as the cornerstone of management for both heart failure and coronary artery disease (CAD). Evidence-based guidelines universally recommend GDMT for individuals diagnosed with CAD, particularly as a primary treatment for stable CAD and as a crucial component of secondary prevention following coronary revascularization procedures like percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG). GDMT has been associated with a significant reduction in death rates and the risk of myocardial infarction (MI), and in some cases, its impact on mortality reduction may even surpass that of selecting a specific revascularization method. Notably, GDMT for CAD intersects with recommendations for heart failure management, emphasizing the importance of comprehensive and integrated care for individuals with these conditions.

Purpose

GDMT must be administered before further consideration of additional imaging and/or initial or additional procedures. This document outlines the requirements based on the current ACC and AHA recommendations.

Clinical Reasoning

The current ACC/AHA clinical practice guidelines have established the requirements for pharmacologic therapy considered for patients with chronic CAD and/or NYHA Class II-IV. When applicable, optimal GDMT shall focus on therapies with Class I recommendations that have demonstrated reductions in morbidity, mortality, and improvements in patient quality of life, unless specified. The beneficial effects of medications can become apparent within weeks of initiation. These drugs have additive effects and in most cases the effects are dose related. As a result, GDMT stipulates that all medications be initiated and then titrated to the maximal tolerated dose (or a target dose) as quickly as possible. [1–5]

INDICATIONS

Guideline Directed Medical Therapy (GDMT) for HFrEF (non-ischemic) [6,7]

Documentation must be provided of **all** the following:

- NYHA functional class (see Definitions)
- The report of the last modality having measured the ejection fraction (EF)
  - MUGA
  - Echocardiography
  - Left Ventriculogram
  - Nuclear stress test (SPECT)
  - Cardiac MRI
  - Cardiac CT
  - Cardiac PET
- An up-to-date list of heart failure medications and their dosages (see **Definitions**). The following medications need to be addressed along with any intolerance or reason a medication cannot be titrated (when titration is indicated) to maximal dosing (i.e. renal dysfunction, side effects, blood pressure, heart rate limitations, etc.)
  - ACE inhibitor/ARB OR angiotensin receptor neprilysin inhibitor (ARNI)
  - Beta blocker (bisoprolol, carvedilol, and metoprolol succinate
  - MRA
  - SGLT2 Inhibitor
- Last vital signs measured while on medications
  - Vital signs must be reasonably controlled (i.e., BP <140/90mmHg, HR <100)
- Documentation of Time since GDMT has been optimized:

- Patients diagnosed with non-ischemic heart failure with reduced ejection fraction (HFrEF) should be maintained on maximal tolerated GDMT **for a period of 12 weeks** before moving forward with any additional testing or invasive/interventional procedures.

Guideline Directed Medical Therapy (GDMT) for HFrEF (Ischemic) [6,7]

ISCHEMIC CARDIOMYOPATHY: In addition to the recommendations for GDMT in heart failure for non-ischemic cardiomyopathy **(see above),** those with suspected or known CAD should additionally document all of the following:

- The report of the last modality having demonstrated coronary disease
  - Non-Invasive testing
  - Nuclear stress test (SPECT)
  - Stress Echocardiography
  - Coronary CTA
  - Cardiac PET scan
  - Cardiac MRI
- Within the up-to-date list of medications and their dosages, as stated for heart failure in non-ischemic cardiomyopathy, **additional medications should document:**
  - Antiplatelet Therapy
  - Statin Therapy
- Patients diagnosed with ischemic heart failure with reduced ejection fraction (HFrEF) should be maintained on maximal tolerated GDMT for a period time before moving forward with any additional testing or invasive/interventional procedures.
  - The following time periods have been established post MI:
    - **Non-revascularized: 40 days**
    - **Revascularized: 12 weeks**

Guideline Directed Medical Therapy (GDMT) for HFpEF [7,8]

Heart Failure with preserved Ejection Fraction (HFpEF) is diagnosed clinically when the Left Ventricular Ejection Fraction (LVEF) is equal to or greater than 50%. It should be noted that HFpEF is not interchangeable with diastolic dysfunction, as the presence of diastolic dysfunction on echocardiogram lacks the specificity required for clinical diagnosis or condition. A comprehensive diagnostic evaluation is warranted to ascertain underlying etiologies that may mimic HFpEF. Following confirmation of HFpEF, therapeutic interventions should prioritize addressing comorbidities and adhering to guideline-directed medical therapy (GDMT) to optimize patient outcomes, including enhancing quality of life, reducing hospitalizations, and improving survival rates. This guideline is specifically dedicated to delineating the medical management strategies post-confirmation of HFpEF diagnosis (GDMT).

Documentation must be provided of **all** of the following:

- NYHA functional class (see **Definitions**)
- The report of the last modality having measured the Ejection Fraction
  - MUGA
  - Echocardiography
  - Left Ventriculogram
  - Nuclear stress test (SPECT)
  - Cardiac MRI
  - Cardiac CT
  - Cardiac PET
- Documentation that other conditions that mimic HFpEF have been considered
- An up-to-date list of heart failure medications and their dosages (see **Definitions**). The following medication needs to be addressed along with any intolerance or reason it cannot be titrated (when titration is indicated) to maximal dosing (i.e. renal dysfunction, side effects, blood pressure, heart rate limitations, etc.)
  - SGLT2 Inhibitor
- Last Vital signs measured while on medications
  - Vital signs must be reasonably controlled (i.e., BP <140/90mmHg)
- Documentation of Time since GDMT has been optimized

Guideline Directed Medical Therapy (GDMT) for CAD with Preserved Ejection Fraction (9)

All of the following must be documented for GDMT:

- Canadian Class for angina (see **Definitions**) or description of ongoing symptoms despite medications
- The report of the last modality having demonstrated coronary disease
  - Non-Invasive testing
  - Nuclear stress test (SPECT)
  - Stress Echocardiography
  - Coronary CTA
  - Cardiac PET scan
  - Cardiac MRI
- An up-to-date list of anti-anginal and risk modifying medications and their dosages (see **Definitions**). At least two of the following medications need to be addressed along with

any intolerance or reason at least two medications cannot be titrated (when titration is indicated) to maximal dosing (i.e. renal dysfunction, side effects, blood pressure, heart rate limitations, etc.)

- ACE inhibitor/ARB OR angiotensin receptor neprilysin inhibitor (ARNI)
- Beta blocker if between 0- 3 years from MI (myocardial infarction)
- Nitrates
- Calcium channel blockers
- Ranolazine

- Last vital signs measured while on medications
  - Vital signs must be reasonably controlled (i.e., BP <140/90mmHg, HR <100)
- Documentation of Time since GDMT has been optimized
- Exceptions for GDMT documentation: The following **does not require** GDMT documentation:
  - Class I indications for revascularization inclusive of high-risk non-invasive testing, or prior invasive testing demonstrating high risk left main (LM) CAD and multivessel CAD associated with diabetes.

CODING AND STANDARDS

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

- **Heart failure with reduced ejection fraction (HFrEF)**, also known as systolic heart failure, occurs when the left ventricle of the heart is unable to pump blood efficiently. In this condition, the heart's pumping function is weakened, resulting in less blood being

ejected into the body. HFrEF is characterized by a left ventricular ejection fraction (LVEF) of ≤40%. Patients with HFrEF may experience symptoms such as fatigue, shortness of breath, and fluid retention.

- **Heart failure with preserved ejection fraction (HFpEF)** occurs when the heart's main pumping chamber (left ventricle) has a normal or near-normal ejection fraction (EF). In HFpEF, the EF is ≥50%. As opposed to HFrEF, the hallmark of HFpEF is stiffening of the heart muscle, particularly in the left ventricle. This stiffness impairs the heart's ability to relax and fill with blood properly causing similar symptoms as HFrEF.
- **Guideline-Directed Medical Therapy (GDMT):** Evidence-based treatment regimens recommended by clinical practice guidelines for managing specific medical conditions. These guidelines are developed by expert panels and professional organizations to provide standardized, effective, and safe approaches to patient care. GDMT typically includes medications, lifestyle modifications, and other interventions that have demonstrated efficacy in improving patient outcomes. Evidence based pharmacologic therapies used in treatment of HFrEF have demonstrated a reduction in morbidity, mortality, and rate of hospitalization. Efficacious therapies used in HFpEF are directed towards the treatment of the underlying condition (e.g., HTN, AF) rather than on HR. Unless otherwise indicated, class 1 level of evidence will be used as the basis of the recommendations outlined in this document
- **American College of Cardiology/American Heart Association (ACC/AHA) Stages of HF** [7]**:**
  - Stage A: At high risk for HF but without structural heart disease or symptoms of HF
  - Stage B: Structural heart disease but without signs or symptoms of HF
  - Stage C: Structural heart disease with prior or current symptoms of HF
  - Stage D: Refractory HF requiring specialized interventions

NYHA Functional Classification for Heart Failure

The New York Heart Association (NYHA) classes of heart failure is the most commonly used system to classify stages of heart failure [10]. Classes are based on physical activity limitations.

- Class I: No limitations on physical activity Ordinary physical activity does not cause undue fatigue, heart palpitations, or shortness of breath
- Class II: Slight limitations on physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, heart palpitations, shortness of breath or chest pain.
- Class III: Marked limitations on physical activity. Comfortable at rest, but less than ordinary activity causes fatigue, heart palpitations, shortness of breath or chest pain.
- Class IV: Symptoms of heart failure at rest. Any physical activity increases discomfort.

Medications HFrEF [7]

Drug Class	Starting dose	Target dose
Beta-Blockers		
Bisoprolol	1.25 mg once daily	10 mg once daily
Carvedilol	3.125 mg twice daily	25 mg twice daily for weight <85 kg and 50 mg twice daily for weight ≥85 kg
Metoprolol succinate	12.5–25 mg daily	200 mg daily
ARNIs		
Sacubitril/valsartan	24/26 mg–49/51 mg twice daily	97/103 mg twice daily
ACEIs		
Captopril	6.25 mg 3× daily	50 mg 3× daily
Enalapril	2.5 mg twice daily	10–20 mg twice daily
Lisinopril	2.5–5 mg daily	20–40 mg daily
Ramipril	1.25 mg daily	10 mg daily
ARBs		
Candesartan	4–8 mg daily	32 mg daily
Losartan	25–50 mg daily	150 mg daily
Valsartan	40 mg twice daily	160 mg twice daily
Aldosterone antagonists		
Eplerenone	25 mg daily	50 mg daily
Spironolactone	12.5–25 mg daily	25–50 mg daily
SGLT2 inhibitors		
Dapagliflozin	10 mg daily	10 mg daily
Empagliflozin	10 mg daily	10 mg daily
Vasodilators		
Hydralazine	25 mg 3× daily	75 mg 3× daily
Isosorbide Dinitrate	20 mg 3× daily	40 mg 3× daily
Fixed-dose combination	20 mg/37.5 mg (1 tab) 3× daily	2 tabs 3× daily

ACC = American College of Cardiology; ACEI = angiotensin-converting enzyme inhibitor; AHA = American Heart Association; ARB = angiotensin receptor blocker; ARNI = angiotensin receptor-neprilysin inhibitor; GDMT = guideline-directed medical therapy; HF = heart failure; HFrEF = heart failure with reduced ejection fraction; HFSA = Heart Failure Society of America; SGLT2 = sodium-glucose cotransporter-2.

Medications HFpEF [7]

Drug Class	Starting dose	Target dose
SGLT2is		
Dapagliflozin	10 mg daily	10 mg daily
Empagliflozin	10 mg daily	10 mg daily
Aldosterone antagonists		
Spironolactone	25 mg daily	50 mg daily
ARNIs		
Sacubitril/valsartan	24 mg/26 mg twice daily	97 mg/103 mg twice daily
ARBs		
Candesartan	4 mg to 8 mg daily	32 mg daily

ARB = angiotensin receptor blocker; ARNI = angiotensin receptor–neprilysin inhibitor; GDMT = guideline-directed medical therapy; HFpEF = heart failure with preserved ejection fraction; SGLT2 = sodium-glucose cotransporter-2.

- **The Canadian Cardiovascular Society (CCS)** provides a grading system for angina pectoris, which helps classify the severity of angina based on the patient's limitations during physical activity. Here are the four classes in the CCS angina grading scale [11]:
  - **Class I:** Patients experience angina only during strenuous or prolonged physical activity (such as walking or climbing stairs). Ordinary physical activity does not cause angina
  - **Class II:** Patients have slight limitation of ordinary activity. Angina occurs during vigorous physical activity, rapid walking, walking uphill, after meals, in cold or windy conditions, under emotional stress, or only during the few hours after awakening. They can still walk more than two blocks on level ground and climb more than one flight of ordinary stairs at a normal pace and in normal conditions
  - **Class III:** Patients experience marked limitation of ordinary physical activity. They can walk only one or two blocks on level ground and climb one flight of stairs at a normal pace and in normal conditions
  - **Class IV**: Patients have inability to carry on any physical activity without discomfort. Anginal symptoms may even be present at rest1.Non-Pharmacological Therapy – While not explicitly listed as a prerequisite in this guideline, it is still important to mention for the sake of completeness, other crucial facets of treatment
- **Non-Pharmacological Therapy –** While not explicitly listed as a prerequisite in this guideline, it is still important to mention for the sake of completeness, other crucial facets

of treatment [7,8]:

- Smoking and alcohol cessation counseling
- Weight management- restrict fluid intake if serum sodium is low; reduce weight if obese
- Lifestyle modifications (e.g., diet, exercise program)
- Limit dietary sodium intake (1500 mg/day for most patients with stage A and B HF; < 3g/day in patients with stage C and D HF)
- Control diabetes mellitus (with DM- HbA1c level ≤ 6.5%) and hypertension (HTN- BP goal < 130/80 mm Hg)
- Cardiac rehabilitation: patient evaluation and monitoring to support drug titration, monitor symptoms, improve health status, and increase exercise tolerance should continue after start of GDMT at least monthly for 3 months and every 3 months thereafter (more frequent follow up may be necessary for select patients)

SUMMARY OF EVIDENCE

2024 ACC Expert Consensus Decision Pathway for Treatment of Heart Failure With Reduced Ejection Fraction [6]

Study Design: This document is an expert consensus decision pathway for the treatment of heart failure with reduced ejection fraction (HFrEF). It was approved by the American College of Cardiology Clinical Policy Approval Committee in February 2024.

Target Population: The target population includes individuals with HFrEF, defined as heart failure with LVEF ≤40%.

Key Factors:

Initiation and Titration of GDMT: The document provides detailed recommendations on how to initiate, add, or switch to evidence-based GDMT for HFrEF, including angiotensin receptor-neprilysin inhibitors, SGLT inhibitors, ivabradine, and vericiguat.

Clinical Assessment: It discusses the importance of clinical assessment, including imaging data, biomarkers, and filling pressures, to guide GDMT.

Referral to HF Specialist: The document outlines when to refer patients to an HF specialist and how to optimize care coordination.

Adherence: It provides strategies to improve medication adherence and manage patients' costs and access to HF medications.

Special Populations: The document includes recommendations for specific patient cohorts, such as African-American populations, older adults, and patients living with frailty.

2023 ACC Expert Consensus Decision Pathway on Management of Heart Failure With Preserved Ejection Fraction [8]

Study Design: This document is an expert consensus decision pathway on the management of heart failure with preserved ejection fraction (HFpEF). It was approved by the American College of Cardiology Clinical Policy Approval Committee in March 2023.

Target Population: The target population includes individuals with HFpEF, which is defined as heart failure with left ventricular ejection fraction (LVEF) ≥50%. The document also addresses specific challenges in the management of women with HFpEF.

Key Factors:

Diagnosis: The document discusses the universal definition of HF, differential diagnosis of dyspnea and edema, and HFpEF diagnostic scoring systems.

Management: It covers guideline-directed medical therapy (GDMT) for HFpEF, including the use of sodium-glucose cotransporter-2 inhibitors, mineralocorticoid antagonists, angiotensin receptor-neprilysin inhibitors, and angiotensin receptor blockers.

Nonpharmacological Management: The document includes recommendations for exercise, calorie restriction, and pulmonary artery pressure monitoring.

Multidisciplinary Considerations: It emphasizes the importance of a team-based approach to care and transitions of care.

2023 AHA/ACC/ACCP/ASPC/NLA/PCNA Guideline for the Management of Patients With Chronic Coronary Disease [9]

Study Design: The document is a clinical practice guideline for the management of patients with chronic coronary disease (CCD). It was developed by the American Heart Association (AHA) and the American College of Cardiology (ACC) Joint Committee on Clinical Practice Guidelines, in collaboration with and endorsed by several other organizations.

Target Population: The target population includes patients with chronic coronary disease, which encompasses a range of conditions such as obstructive and nonobstructive coronary artery disease (CAD), ischemic heart disease diagnosed by noninvasive testing, and chronic angina syndromes.

Key Factors:

Diagnosis and Risk Stratification: The guideline emphasizes the importance of comprehensive risk stratification, incorporating noninvasive and invasive testing results to classify patients' risk levels and guide therapeutic decision-making.

Management: It covers a wide range of management strategies, including lifestyle modifications, pharmacological treatments, and revascularization procedures. Specific recommendations are provided for the use of statins, antiplatelet therapy, beta-blockers, renin-angiotensin-aldosterone system inhibitors, and other medications.

Special Populations: The guideline addresses the management of CCD in special populations, including women, older adults, patients with chronic kidney disease, and those with concurrent conditions such as diabetes and heart failure.

Nonpharmacological Interventions: Recommendations include the use of cardiac rehabilitation, physical activity, and dietary modifications to improve cardiovascular outcomes.

Multidisciplinary Care: The importance of a team-based approach to care, involving cardiologists, primary care providers, and other specialists, is emphasized to optimize patient outcomes.

ANALYSIS OF EVIDENCE

Shared Conclusions [6,8,9]

All three documents emphasize the importance of GDMT in managing heart failure and chronic coronary disease. They highlight the need for comprehensive risk stratification, multidisciplinary care, and the use of evidence-based pharmacological treatments. Additionally, they stress the importance of nonpharmacological interventions, such as lifestyle modifications and cardiac rehabilitation, to improve patient outcomes.

Differing Conclusions [6,8,9]

- **Target Population:** While Virani et al 2023 focuses on chronic coronary disease, Kittleson et al 2023 and Maddox et al 2024 focus on heart failure, with Kittleson et al addressing HFpEF and Maddox et al addressing HFrEF.
- **Management Strategies:** Virani et al 2023 provides a broader range of management strategies for chronic coronary disease, including revascularization procedures, whereas Kittleson et al 2023 and Maddox et al 2024 focus more on specific pharmacological treatments for heart failure.

POLICY HISTORY

Date	Summary
May 2026	• No clinically relevant changes
June 2025	• Added third bullet to General Information • Added Summary of Evidence and Analysis of Evidence
January 2025	• This guideline replaces UM CARDIO_1462 for Guideline Directed Medical Therapy (GDMT) for Heart Failure and Coronary Artery Disease (CAD)

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity

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Evolent Clinical Guideline 7282 for Atrial Fibrillation Ablation

Guideline Number: Evolent_CG_7282	**Applicable Codes**	
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Original Date: January 2025	**Last Revised Date:** August 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Define indications for approval of ablation in the management of atrial fibrillation.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR CATHETER ABLATION OF ATRIAL FIBRILLATION (AF) [6–8]

First Line Therapy for Symptomatic Atrial Fibrillation

Catheter ablation is recommended or reasonable for the following patients:

- Symptomatic paroxysmal or persistent atrial fibrillation who have not undergone trial(s) of class I or III antiarrhythmic therapy
- Long-standing persistent atrial fibrillation (defined as continuous AF for >12 months) who

have not undergone trial(s) of class I or III antiarrhythmic therapy

Failed Antiarrhythmic Therapy

Catheter ablation is recommended or reasonable for any of the following that are refractory or intolerant to at least one Class I or III antiarrhythmic medication:

- Symptomatic paroxysmal AF
- Symptomatic persistent AF
- Symptomatic long standing persistent AF

Heart Failure

Catheter ablation is beneficial or reasonable in the following patients:

- AF and left ventricular systolic dysfunction (LVEF < 50%) related to arrhythmia-mediated cardiomyopathy
- AF and heart failure with reduced ejection fraction regardless of previous antiarrhythmic drug failure or intolerance

Coexistent Rhythm Disorders

Catheter ablation is reasonable in the following patients:

- Atrial flutter frequently accompanies atrial fibrillation. If “typical” clockwise or counterclockwise atrial flutter is encountered during an atrial fibrillation ablation, or has been documented prior to the ablation procedure, further ablation involving the cavo-tricuspid isthmus (atrial flutter ablation) is recommended [9,10]
- Supraventricular tachycardia with AF when the former is considered the main trigger of the latter
- AF and symptomatic bradycardia or prolonged sinus pauses upon AF termination

Other Risk Factors or Diseases

Catheter ablation is reasonable in patients with hypertrophic cardiomyopathy after careful consideration of anticipated clinical benefit, associated risk of procedural complications, and potential need for more than one procedure

INDICATIONS FOR RECURRENCE OF ATRIAL FIBRILLATION OR ATRIAL TACHYCARDIA (AT) AFTER ABLATION [6,8]

- Early recurrence after AF ablation has been defined as any recurrence of AF or AT lasting 30 seconds during the first 3 months of follow-up

NOTE: 50% of early tachycardias are reentrant atrial tachycardias, and 49% resolve spontaneously over the first year. They should be considered for cardioversion, especially within 30 days of arrhythmia onset before treated with Class III antiarrhythmic therapy unless intolerable symptoms persist after this therapy is attempted. (Class Ic drugs are relatively contraindicated, as they tend to promote and prolong these reentrant arrhythmias).

- Late term recurrence has been defined as any recurrence of AF or AT lasting 30 seconds between 3 and 12 months after AF; mapping and ablation of these rhythm disturbances is recommended

INDICATIONS FOR SURGICAL ABLATION OF ATRIAL FIBRILLATION (6,8)

Concomitant "Open" Surgical Ablation

Concomitant "Open" surgical ablation (such as mitral or tricuspid valve surgery) for patients with any of the following:

- Symptomatic AF, refractory or intolerant to at least one Class I or III antiarrhythmic drug, and any form of AF (paroxysmal, persistent, or long-standing persistent), surgical ablation is recommended
- Symptomatic AF prior to a trial of antiarrhythmic therapy with a Class I or III antiarrhythmic drug and any form of AF, surgical ablation is recommended

Concomitant "Closed' Ablation

Concomitant "Closed' Ablation (coronary artery bypass graft (CABG), aortic valve surgery, etc.) for patients with any of the following:

- Symptomatic AF refractory or intolerant to at least one Class I or III antiarrhythmic drug and any form of AF, surgical ablation is recommended
- Symptomatic AF prior to a trial of antiarrhythmic therapy with a Class I or III antiarrhythmic drug and any form of AF, surgical ablation is reasonable

Stand Alone and Hybrid (catheter- and surgical-) Ablation

- Stand Alone and/or Hybrid surgical ablation for patients (after review of the relative safety and efficacy of catheter ablation versus a stand-alone surgical approach):
    - Who have failed one or more attempts at catheter ablation
    - Who are intolerant or refractory to antiarrhythmic drug therapy and prefer a surgical approach

INDICATIONS FOR ATRIOVENTRICULAR (AV) NODAL ABLATION AND PERMANENT PACEMAKER IMPLANTATION (6,8)

- Implantation of a permanent pacemaker, followed by ablation of the AV node, should be reserved for patients in whom rhythm control with antiarrhythmic drugs or catheter ablation, and rate control with pharmacological therapy has failed or is contraindicated or has been refused by the patient (7)
- AV nodal ablation is approvable in patients with atrial fibrillation and with existing bi-ventricular pacing systems, to increase the percentage of resynchronized pacing and efficacy of the pacing system

CODING AND STANDARDS

Codes

Code	Description
93650	Intracardiac catheter ablation of atrioventricular node function, atrioventricular conduction for creation of complete heart block, with or without temporary pacemaker placement
93656	Comprehensive electrophysiologic evaluation with transseptal catheterizations, insertion and repositioning of multiple electrode catheters, induction or attempted induction of an arrhythmia including left or right atrial pacing/recording, and intracardiac catheter ablation of atrial fibrillation by pulmonary vein isolation, including intracardiac electrophysiologic 3-dimensional mapping, intracardiac echocardiography with imaging supervision and interpretation, right ventricular pacing/recording, and His bundle recording, when performed
+93623	Programmed stimulation and pacing after intravenous drug infusion (List separately in addition to code for primary procedure)
+93657	Additional linear or focal intracardiac catheter ablation of the left or right atrium for treatment of atrial fibrillation remaining after completion of pulmonary vein isolation (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Pulmonary vein isolation (PVI) is the cornerstone of atrial fibrillation (AF) ablation, and the primary target endpoint for first-time AF ablation. Because the substrate for atrial fibrillation is typically left atrial, transseptal puncture for access to the left atrium is required in all AF ablation procedures. [6,7]

Risk of atrial fibrillation does not increase appreciably in the setting of heart failure or advancing age (up to age 80).

The most common energy source for atrial fibrillation ablation is radiofrequency (RF) energy. In recent years, cryoablation using a balloon catheter has become a reliable alternative to RF energy. Other techniques for ablation include laser balloon systems, multielectrode arrays and balloon-based ultrasound ablation systems. [6]

Patients with ostensibly asymptomatic atrial fibrillation are often discovered to have been symptomatic once a "trial of sinus rhythm" after cardioversion has been undertaken. Based on this observation, AHA/ACC/HRS guidelines recommend ablation of atrial fibrillation in asymptomatic patients after careful discussion of the risks, benefits, and alternatives of this approach. [6]

Atrio-Esophageal Fistula (AEF) is a rare but life-threatening complication of atrial fibrillation ablation. After ablation, symptoms and findings suggesting the possibility of evolving AEF include chest pain, painful swallowing, fever, leukocytosis, TIA, and/or stroke typically occurring between 1- and 3-weeks post ablation. If esophageal injury is suspected, CT imaging with intravenous and water- soluble oral contrast is recommended. Surgical resection of the fistula may be lifesaving. [6]

Pacemaker implantation followed by AV nodal ablation ("ablate-and-pace") is typically performed in older patients. It has the advantage of improving symptoms related to irregular and rapid heartbeats and may improve LVEF in patients with tachycardia-associated cardiomyopathy. It exposes the patient to the potential complications of long-term indwelling hardware and pacemaker-dependency. [7]

Definitions

- Long-standing atrial fibrillation: continuous atrial fibrillation for greater than 12 months
- Class I antiarrhythmic therapy: Produce Na+ channel block and reduce AP phase 0 slope and overshoot with variable effects on AP duration (APD) and effective refractory period (ERP) [11]
- Class II antiarrhythmic therapy: Class II drugs, comprising β-adrenergic inhibitors, reduce sino-atrial node (SAN) pacing rates and slow atrioventricular node (AVN) conduction [11]
- Class III antiarrhythmic therapy: Comprising K+ channel blockers, prolong AP phase 3 repolarization and lengthen ERP [11]

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ACC: American College of Cardiology

AEF: Atrio-Esophageal Fistula

AF: Atrial fibrillation

AHA: American Heart Association

AP: Action potential

APD: Action potential duration

AT: Atrial tachycardia

AUC: Appropriate use criteria

AV: Atrioventricular

AVN: Atrioventricular node

CABG: Coronary artery bypass graft

CT: Computed tomography

ERP: Effective refractory period

HRS: Heart Rhythm Society

LVEF: Left ventricular ejection fraction

PVI: Pulmonary vein isolation

RF: Radiofrequency

RFA: Radiofrequency ablation

TIA: Transient ischemic attack

SUMMARY OF EVIDENCE

2024 European Heart Rhythm Association/Heart Rhythm Society/Asia Pacific Heart Rhythm Society/Latin American Heart Rhythm Society expert consensus statement on catheter and surgical ablation of atrial fibrillation [6]

Study Design: This document is an expert consensus statement developed by multiple cardiac electrophysiology societies, including the European Heart Rhythm Association, Heart Rhythm Society, Asia Pacific Heart Rhythm Society, and Latin American Heart Rhythm Society. It provides practical guidance and standards for the selection and management of patients undergoing catheter or surgical ablation of atrial fibrillation (AF).

Target Population: The target population includes patients considered for or undergoing catheter or surgical AF ablation.

Key Factors:

- Pathophysiology: The document discusses the mechanisms of AF initiation and maintenance, including the role of triggers, focal and rotational activity, multi-wavelet reentry, and endocardial-epicardial asynchrony.
- Anatomical Considerations: It covers the anatomy relevant to catheter ablation, such as pulmonary veins, epicardial connections, interatrial septum, left atrial musculature, coronary sinus, vein of Marshall, superior vena cava, autonomic ganglionated plexi, pericardial reflections, phrenic nerves, and esophagus.
- Indications for Ablation: The document provides recommendations for catheter ablation in various patient groups, including those with AF-related symptoms, heart failure, coexistent rhythm disorders, and other risk factors.
- Procedural Management: It includes detailed sections on preprocedural management, mapping and ablation tools, procedural techniques, postprocedural management, and ablation outcomes.

2023 ACC/AHA/ACCP/HRS Guideline for the Diagnosis and Management of Atrial Fibrillation [8]

Study Design: This document is a clinical practice guideline developed by the American College of Cardiology, American Heart Association, American College of Clinical Pharmacy, and Heart Rhythm Society. It provides recommendations for the diagnosis and management of atrial fibrillation.

Target Population: The target population includes patients with atrial fibrillation.

Key Factors:

- Epidemiology: The guideline discusses the prevalence, incidence, morbidity, and mortality associated with AF.
- Risk Factors: It identifies various risk factors for AF, including demographic, anthropometric, cardiovascular, noncardiac conditions, biomarkers, and genetic markers.
- Clinical Evaluation: Recommendations for basic clinical evaluation, including transthoracic echocardiogram, laboratory testing, and targeted testing for associated conditions.
- Management: The guideline covers lifestyle and risk factor modification, prevention of thromboembolism, rate control, rhythm control, and management of patients with heart failure.
- Special Populations: It provides recommendations for specific patient groups, such as athletes, pregnant women, and those with congenital heart disease.

Atrial fibrillation: better symptom control with rate and rhythm management [7]

Study Design: This review article discusses the management of atrial fibrillation symptoms through rate and rhythm control strategies.

Target Population: The target population includes patients with atrial fibrillation experiencing significant symptoms.

Key Factors:

- Symptom Control: The review emphasizes the importance of symptom control in AF management and discusses the hemodynamic consequences of AF that contribute to symptom burden.
- Rate Control: It covers various rate control options, including beta-blockers, calcium channel blockers, digoxin, and combination therapies.
- Rhythm Control: The review discusses rhythm control options, including cardioversion, antiarrhythmic drugs, and catheter ablation.
- Catheter Ablation: It highlights the efficacy of catheter ablation in improving symptoms and quality of life, and discusses the procedural risks and benefits.
- Shared Decision Making: The importance of shared decision making in choosing the appropriate treatment strategy for individual patients.

ANALYSIS OF EVIDENCE

Shared Findings [6–8]:

- All three articles agree on the importance of rhythm control in managing AF, particularly for symptomatic patients.
- They all emphasize the role of catheter ablation as an effective treatment option for

maintaining sinus rhythm and improving quality of life.

- The articles highlight the need for individualized treatment plans based on patient characteristics, comorbidities, and preferences.

Conclusion:

In summary, while all three articles provide valuable insights into the management of AF and the role of catheter ablation, they each have unique perspectives and areas of emphasis. Combining the recommendations and findings from these articles can help healthcare providers develop comprehensive and individualized treatment plans for their patients with AF.

POLICY HISTORY

Date	Summary
August 2026	• Removed CPT codes 93653, 93654, +93462, and their descriptions
April 2026	• Added: ○ Coexistent rhythm disorders indication for Atrial Fibrillation Ablation ○ Codes: 93462, 93654 ○ Code description
July 2025	• Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Added other indications of atrial fibrillation ablation and updated treatment for early recurrence after catheter ablation • Adjusted applicable lines of business – Medicare Advantage checked • Updated references • Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7283 for Abdominal Aortography with Bilateral Iliofemoral Lower Extremity Runoff

Guideline Number:	Applicable Codes	
Evolent_CG_7283		
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Original Date:	**Last Revised Date:**	**Implementation Date:**
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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Abdominal Aortography with Bilateral Iliofemoral Lower Extremity Runoff.

Special Note

Decisions regarding the potential utility of invasive therapeutic interventions (percutaneous or surgical) in patients with lower extremity peripheral arterial disease should be made with a complete anatomic assessment of the affected arterial territory, including imaging of the occlusive lesion, as well as arterial inflow and outflow.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS [6,7]

Diagnostic peripheral angiography is seldom necessary for diagnosis of lower extremity arterial conditions. It is expected that noninvasive imaging modalities, including color flow duplex imaging, MRA, and CTA, be used in advance of or in place of invasive imaging to develop an individualized diagnostic strategic plan, including assistance in selection of access sites, identification of significant lesions, and determination of the need for invasive evaluation.

- Diagnostic peripheral angiography performed as a stand-alone procedure or at the time of an intervention is separately reportable if:
  - No prior CTA, MRA, or catheter-based angiographic study is available, and a full diagnostic study is/will be performed, and a decision to intervene is/will be based on the diagnostic study, **OR**
  - A prior study is available, but as documented in the medical record the patient's condition with respect to the clinical indication has changed since the prior study; **OR**
    - There is inadequate visualization of the anatomy or pathology, **OR**
    - There is a clinical change during the interventional procedure that requires new evaluation outside the target area of intervention.
  - For one of the following indications:
    - Chronic Limb Threatening Ischemia (CLTI)
    - Femoropopliteal aneurysm/pseudoaneurysm
    - Arteriovenous fistula or malformation
    - Vascular trauma
    - Primary or Post-procedural Arterial bleeding (internal or external)
    - Vascular lesions, malignancies, or bleeding. [8]
    - Claudication unresponsive to GDMT and a supervised exercise program (>3 days/week for 12 weeks)

CODING AND STANDARDS

Codes

Code	Descriptions
36200	Introduction of catheter, aorta
36245	Selective catheter placement, arterial system; each first order abdominal, pelvic, or lower extremity artery branch, within a vascular family

Code	Descriptions
36246	Selective catheter placement, arterial system; initial second order abdominal, pelvic, or lower extremity artery branch, within a vascular family
36247	Selective catheter placement, arterial system; initial third order or more selective abdominal, pelvic, or lower extremity artery branch, within a vascular family
75625	Aortography, abdominal, by serialography, radiological supervision and interpretation
75630	Aortography, abdominal plus bilateral iliofemoral lower extremity, catheter, by serialography, radiological supervision and interpretation
75710	Angiography, extremity, unilateral, radiological supervision and interpretation
75716	Angiography, extremity, bilateral, radiological supervision and interpretation
75726	Angiography, visceral, selective or supraselective (with or without flush aortogram), radiological supervision and interpretation
+36248	Selective catheter placement, arterial system; additional second order, third order, and beyond, abdominal, pelvic, or lower extremity artery branch, within a vascular family (List in addition to code for initial second or third order vessel as appropriate)
G0278	Iliac and/or femoral artery angiography, nonselective, bilateral or ipsilateral to catheter insertion, performed at the same time as cardiac catheterization and/or coronary angiography, includes positioning or placement of the catheter in the distal aorta or ipsilateral femoral or iliac artery, injection of dye, production of permanent images, and radiologic supervision and interpretation (List separately in addition to primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

SUMMARY OF EVIDENCE

ACC/AHA/SCAI/SIR/SVM 2018 Appropriate Use Criteria for Peripheral Artery Intervention [6]

Study Design: This study involved the development of Appropriate Use Criteria (AUC) for peripheral artery intervention (PAI). The process included drafting patient scenarios, assumptions, and definitions based on published guidelines, trial data, and expert opinions. The scenarios were evaluated by an independent rating panel using a scoring scale from 1 to 9.

Target Population: The study focused on patients with peripheral artery disease (PAD) who may require revascularization treatments. This includes patients with renal artery stenosis, lower extremity disease, critical limb ischemia, asymptomatic artery disease, and secondary treatment options for lower extremity disease.

Key Factors:

Clinical Scenarios: 45 clinical scenarios with up to 6 intervention options per scenario were developed and categorized into 6 general sections.

Scoring: Each indication was scored as "Appropriate" (7 to 9), "May Be Appropriate" (4 to 6), or "Rarely Appropriate" (1 to 3).

Emphasis: Adherence to medical therapy was emphasized, with revascularization considered when medical therapy is insufficient.

Endovascular and Surgical Approaches: Both approaches were deemed appropriate in scenarios involving tissue loss or end organ compromise, with a tendency to select endovascular approaches.

2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease [7]

Study Design

This is a comprehensive evidence-based guideline, synthesizing data from prospective and retrospective cohort studies, randomized controlled trials (RCTs), registries, and systematic reviews.

Target Population

- **Inclusion:** Adults (typically ≥18 years) with suspected or known lower extremity peripheral artery disease (PAD), including those with:
  - Claudication (chronic symptomatic PAD)
  - Chronic limb-threatening ischemia (CLTI)
  - Acute limb ischemia (ALI)
  - Candidates for lower extremity revascularization or vascular mapping
- **Exclusion:** Pediatric patients, nonatherosclerotic arterial disease, microangiopathy, vascular trauma, severe renal dysfunction (eGFR <30 mL/min/1.73m²), severe contrast allergy, pregnancy.

Key Factors

- **Indications:**
  - Pre-intervention planning for revascularization (endovascular or surgical).
  - Assessment of arterial anatomy, lesion location, severity, and runoff quality.
  - Used when noninvasive tests (ABI, duplex, CTA, MRA) are inconclusive or for complex cases.
- **Outcomes Measured:**
  - Anatomic lesion characterization (stenosis, occlusion, calcification).
  - Runoff vessel patency and suitability for intervention.
  - Procedural planning (e.g., bypass conduit selection, target vessel identification).
  - Diagnostic accuracy, technical success, limb salvage rates, and perioperative outcomes.

- **Data Collected:**
  - Demographics, comorbidities (diabetes, CKD, smoking), prior interventions, ABI/TBI, clinical presentation (claudication, rest pain, tissue loss).
- **Safety Endpoints:**
  - Contrast-induced nephropathy, access site complications, allergic reactions, radiation exposure.
- **Reference Standards:**
  - Compared with duplex ultrasound, CTA, MRA; uses standardized nomenclature (e.g., TASC II, GLASS, WIfI).
- **Limitations:**
  - May miss distal microvascular disease.
  - Contraindicated in severe renal dysfunction or contrast allergy.

In summary:
Abdominal aortography with bilateral iliofemoral lower extremity runoff is a catheter-based, contrast-enhanced imaging study used primarily for adults with suspected or known PAD, especially those being considered for revascularization. It provides detailed anatomic information to guide intervention, with risks and contraindications carefully considered. The evidence base is robust, drawing from large-scale guidelines, RCTs, and registry data, and emphasizes multidisciplinary care for best outcomes.

ANALYSIS OF EVIDENCE

Shared Findings [6,7]

Both guidelines recognize abdominal aortography with bilateral iliofemoral runoff as a key imaging modality for:

- Anatomical mapping of aortoiliac and lower extremity arteries.
- Assessing patency, stenosis, occlusion, and runoff for procedural planning.
- Guiding revascularization strategies (endovascular, surgical, hybrid) in PAD, especially for chronic limb-threatening ischemia (CLTI) and acute limb ischemia (ALI

Shared Recommendations:

- Imaging is essential for:
  - Defining anatomy and guiding therapy.
  - Preoperative assessment in CLTI/ALI.
  - Evaluating distal vessel patency and runoff.
- Revascularization is reasonable for functionally limiting claudication after failed guideline-directed medical therapy (GDMT) and structured exercise.

- Multispecialty team evaluation and patient-centered decision-making are emphasized for CLTI and amputation prevention

Differing Emphases:

- Gornik et al 2024 [7]:
  - Provides detailed recommendations for surveillance post-revascularization (clinical assessment, ABI, duplex ultrasound).
  - Addresses health disparities, risk amplifiers (diabetes, CKD, ESKD), and the need for longitudinal follow-up.
  - Discusses “no-option” CLTI and alternative therapies when revascularization is not feasible1.
- Bailey et al 2019 [6]:
  - Offers granular AUC ratings for various clinical scenarios, including appropriateness of imaging and intervention.
  - Stresses that imaging and intervention should be considered only after exhausting medical and exercise therapy.
  - Highlights the importance of documenting rationale for interventions rated as “Rarely Appropriate”.

Conclusion

Both guidelines support the use of abdominal aortography with bilateral iliofemoral lower extremity runoff as a cornerstone imaging modality for PAD diagnosis, procedural planning, and outcome prediction. They agree that imaging should be reserved for patients in whom revascularization is considered, and that endovascular approaches are generally preferred for most anatomical locations. Surgical and hybrid interventions are appropriate for select cases. Both emphasize the importance of guideline-directed medical therapy, structured exercise, and patient-centered care, while Gornik et al 2024 [7] provides more comprehensive recommendations on health disparities, surveillance, and multidisciplinary management.

POLICY HISTORY

Date	Summary
May 2026	● Moved clinical guidance from Special Note to Indications ● Enumerated specific applicable conditions ● Updated citations ● Updated Summary of Evidence and Analysis of Evidence based on new citation ● Added code descriptions
July 2025	● Added Summary of Evidence and Analysis of Evidence

Date	Summary
June 2025	• Removed GDMT requirement • Added third bullet to General Information
January 2025	• This guideline replaces UM 1170 Abdominal Aortography with Bilateral Iliofemoral Lower Extremity Runoff

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7284 for Catheter Ablation of Reentrant or Focal Tachydysrhythmias

Guideline Number: Evolent_CG_7284	**Applicable Codes**	
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Original Date: January 2025	**Last Revised Date:** August 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

To identify the indications for catheter ablation of focal or reentrant cardiac tachydysrhythmias.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR CATHETER ABLATION OF CARDIAC ARRHYTHMIAS

Supraventricular Tachycardias [6,7]

Ablation of Supraventricular Tachycardias

Patients with any of the following:

- Frequent or poorly tolerated episodes of sustained tachycardia that do not adequately respond to drug therapy

- Who prefer ablative therapy compared to pharmacological treatment regardless of whether prior drug therapy has failed
- Frequent episodes of tachycardia requiring drug treatment when there is concern about side effects of the antiarrhythmic drug

Supraventricular Tachycardia Amenable to Ablation

- Inappropriate Sinus Tachycardia: Sinus node modification should be considered only for patients who are highly symptomatic and cannot be adequately treated by medication, and then only with documentation of informing the patient that the risks may outweigh the benefits
- Focal Atrial Tachycardia (AT): patients with symptomatic focal AT as an alternative to pharmacological therapy
- Patients with Atrioventricular Nodal Reentrant Tachycardia (AVNRT— the most common form of SVT)
- Manifest and Concealed Accessory Pathways (Wolff-Parkinson-White WPW with or without atrioventricular reentrant tachycardia (AVRT)), catheter ablation of accessory pathway for any of the following:
    - AVRT and/or pre-excited atrial fibrillation
    - Electrophysiology study (EPS) demonstrates a high risk of dangerous events, including rapidly conducting pre-excited atrial fibrillation (shortest R-R interval ≤250 msec)
    - Asymptomatic persons with high-risk occupations (airline pilots, police, firefighters, etc.)
- Atrial Flutter:
    - Catheter ablation of cavo-tricuspid-dependent (typical type 1 or 2) atrial flutter is recommended as an alternative to pharmacological therapy for symptomatic patients
    - For asymptomatic patients when drug therapy fails to achieve adequate rate control
    - Catheter ablation of non-cavo-tricuspid-dependent (atypical and left sided) atrial flutter is recommended for symptomatic recurrent flutter after failure of at least one antiarrhythmic drug. It may be performed in patients who prefer ablation therapy over pharmacological treatment after thorough discussion of the risks and complexity of ablation.
    - Atrial flutter frequently accompanies atrial fibrillation. If “typical” clockwise or counterclockwise atrial flutter is encountered during an atrial fibrillation ablation, or has been documented prior to the ablation procedure, further ablation involving the cavo-tricuspid isthmus (atrial flutter ablation) is recommended.
- Junctional Tachycardia:
    - Catheter ablation of accelerated junctional rhythm may be performed in symptomatic patients who have failed medical therapy with beta blockers, calcium channel blockers, or Class IC drugs, or when medical therapy is contraindicated

Catheter Ablation in Pediatric Patients: Elective catheter ablation is reserved for patients > 15 kg. Ablation of SVT in smaller patients (< 15 kg) should be reserved for arrhythmias refractory to drug therapy or resulting in tachycardia-related cardiomyopathy.

Ventricular Arrhythmias [6,8,9]

Ventricular Extrasystoles

- Isolated frequent (> 15% total burden) monomorphic premature ventricular contractions (PVCs) resulting in tachycardia-associated cardiomyopathy (Left ventricular ejection fraction LVEF < 50%) are an indication for mapping and ablation of the source of the extrasystoles
- PVC ablation may be performed in patients with **highly symptomatic**, monomorphic PVCs, couplets, or non-sustained ventricular tachycardia (NSVT), independent of ejection fraction
- Mapping and ablation of frequent monomorphic ventricular extrasystoles may be performed in patients with other risk factors for future arrhythmic events, such as:
    - Positive signal-averaged electrocardiogram (ECG)
    - Nonsustained VT on ambulatory ECG recordings with inducible sustained monomorphic ventricular tachycardia on EPS

NOTE: Catheter ablation is **NOT** indicated for asymptomatic patients with PVCs, couplets, and nonsustained VT without other risk factors for sustained arrhythmias.

Ventricular Tachycardia without Apparent Structural Heart Disease

- In patients with symptomatic outflow tract ventricular tachycardias in an otherwise normal heart for whom antiarrhythmic medications are ineffective, not tolerated, or not the patient's preference
- Catheter ablation of fascicular ventricular tachycardia is indicated for patients with symptomatic ventricular tachycardia (VT) when refractory to medical therapy or when the patient prefers catheter ablation over medical therapy
- Catheter ablation may be performed in patients with symptomatic papillary muscle ventricular tachycardia for whom antiarrhythmic medications are ineffective, not tolerated, or not the patient's preference

Ventricular Tachycardia with Structural Heart Disease

- In patients with ischemic heart disease and recurrent ventricular tachycardia with an implantable cardioverter-defibrillator (ICD) in place, catheter ablation may be performed after failure of antiarrhythmic therapy (i.e., treatment with amiodarone or sotalol should be utilized to suppress recurrent VT prior to consideration of catheter ablation)
- With prior myocardial infarction and ICD shocks for sustained monomorphic VT or symptomatic sustained monomorphic VT that is recurrent and hemodynamically tolerated, catheter ablation as first-line therapy may be performed to reduce recurrent ventricular tachycardia

- Nonischemic cardiomyopathy and recurrent sustained monomorphic VT with failure or intolerance of antiarrhythmic medications, catheter ablation may be performed for reducing recurrent VT and ICD shocks
- In bundle branch reentrant ventricular tachycardia, catheter ablation may be performed for reducing the risk of recurrent VT

Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC)

- Ablation is appropriate for:
  - Arrhythmogenic right ventricular cardiomyopathy (ARVC) patients who have experienced recurrent VT or ICD therapies (shocks or antitachycardia pacing), refractory to antiarrhythmic therapy
  - ARVC that has failed one or more attempts at catheter ablation of recurrent ventricular tachycardia, ablation using an epicardial approach is recommended
  - ARVC patients with recurrent VT that is symptomatic or requires ICD therapy who prefer not to use antiarrhythmic drugs

CODING AND STANDARDS

Codes

Code	Description
93653	Comprehensive electrophysiologic evaluation with insertion and repositioning of multiple electrode catheters, induction or attempted induction of an arrhythmia with right atrial pacing and recording and catheter ablation of arrhythmogenic focus, including intracardiac electrophysiologic 3-dimensional mapping, right ventricular pacing and recording, left atrial pacing and recording from coronary sinus or left atrium, and His bundle recording, when performed; with treatment of supraventricular tachycardia by ablation of fast or slow atrioventricular pathway, accessory atrioventricular connection, cavo-tricuspid isthmus or other single atrial focus or source of atrial re-entry
93654	Comprehensive electrophysiologic evaluation with insertion and repositioning of multiple electrode catheters, induction or attempted induction of an arrhythmia with right atrial pacing and recording and catheter ablation of arrhythmogenic focus, including intracardiac electrophysiologic 3-dimensional mapping, right ventricular pacing and recording, left atrial pacing and recording from coronary sinus or left atrium, and His bundle recording, when performed; with treatment of ventricular tachycardia or focus of ventricular ectopy including left ventricular pacing and recording, when performed

Code	Description
+93462	Left heart catheterization by transseptal puncture through intact septum or by transapical puncture (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

With the exception of incessant rhythm disturbances and atrial fibrillation, most ablation procedures will be performed after (frequently immediately after) electrophysiology studies in which the mechanism of the dysrhythmia will have been elucidated. [6]

Ablation of cardiac arrhythmias involves the use of multielectrode catheters introduced into the cardiac chambers, and typically positioned in the right atrium, right ventricle, region of the A-V Node and/or the Bundle of His, and frequently the coronary sinus. Several access sites are typically required, and may include the femoral vein(s), jugular vein(s), subclavian vein(s) and the brachial vein(s). When access to the left heart is required, an atrial transseptal puncture may be utilized, or a retrograde approach via the femoral artery and across the aortic valve; systemic anticoagulation is mandated in these cases. Sophisticated mapping systems are often utilized in ablation procedures to generate 3-dimensional representations of the cardiac chambers, characterizing the sequence of activation of myocardium during arrhythmia, the presence of scar tissue and areas of slow conduction of electrical impulses, and anatomic barriers that serve as targets to modify the substrate and eliminate or reduce arrhythmia recurrence. [10]

Radiofrequency current is the most used energy source for ablation. Cryoablation is a useful alternative to radiofrequency ablation. Cryoablation has been shown to minimize injury to the AV node during ablation of specific arrhythmias, such as AVNRT, para-Hisian atrial tachycardia, and para-Hisian accessory pathways, especially in children and young adults. Selection of the energy source depends on operator experience, arrhythmia target location, and patient preference. Catheter ablation is typically performed using an endocardial approach. In selected cases, particularly in ventricular tachycardias in patients with nonischemic cardiomyopathy, an epicardial approach accessing the pericardial space, may be required to reach target sites for ablation. [7–9]

Typical counterclockwise atrial flutter depends on a large reentrant circuit with a region of slow conduction in the cavo-tricuspid isthmus and has a characteristic appearance of the P waves on 12 lead ECG. Non-cavo-tricuspid isthmus-dependent flutters are generated by atrial scarring, which may develop after prior ablation procedures in the atrium (such as atrial fibrillation ablation), and after surgical interventions involving atriotomy. They require more extensive and complex mapping than typical atrial flutter. (7)

Paroxysmal junctional tachycardia (aka junctional ectopic tachycardia is rare in adults) is seen most commonly in pediatric postoperative patients and after surgery for congenital heart disease in adults. Nonparoxysmal junctional tachycardia (aka accelerated junctional rhythm) is more common, typically benign, and usually responds well to pharmacological therapy. It is sometimes seen after slow pathway ablation for AVNRT and is usually self-limited. (7)

Idiopathic monomorphic ventricular tachycardias in patients with structurally normal hearts are commonly the result of triggered activity or abnormal automaticity, while a few involve microreentry. They have a more benign clinical course than VT seen in association with structural heart disease, and often respond to calcium channel blockers and Type Ic antiarrhythmic drugs. Catheter ablation is appropriate for symptomatic patients who are either refractory to medical therapy or who prefer catheter ablation over medical treatment. (8,9)

Sustained ventricular tachycardia in patients with structural heart disease is usually treated with implantation of an ICD. Ablation is reserved for patients with frequent episodes of symptomatic VT that is refractory to therapy with antiarrhythmic drugs or in whom pharmacological therapy is not tolerated or contraindicated. Some patients have sustained VT which is hemodynamically well-tolerated, but often recurrent or incessant. In these cases, catheter ablation is recommended and often effective. (8)

Bellhausen's idiopathic left ventricular tachycardia (fascicular VT) is caused by reentry involving a portion of the left ventricular Purkinje system, usually the left posterior fascicle as the retrograde limb of the circuit and a poorly defined segment of LV tissue as the anterograde limb. Parts of the circuit are often verapamil-sensitive These VTs demonstrate a right bundle-branch block configuration with a superior axis and are amenable to catheter ablation with high rates of success. (8,9)

Bundle branch reentrant ventricular tachycardia is normally seen in patients with advanced left ventricular cardiomyopathy. The reentrant circuit incorporates the right bundle branch for anterograde conduction and the left bundle as the retrograde limb. Rates are usually more than 200 bpm and are poorly tolerated hemodynamically. Ablation of the right bundle branch can be curative. (9)

Definitions

- Frequent ventricular extrasystoles: >30 PVCs per hour on Holter or other extended monitoring system
- Monomorphic ventricular extrasystoles: PVCs with a single, identical morphology in all the leads recorded on an ECG or heart monitor
- Sustained tachycardia: tachycardias lasting 20 seconds or longer, or requiring cardioversion because of hemodynamic collapse or compromise

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ARVC: arrhythmogenic right ventricular cardiomyopathy

AT: atrial tachycardia

AUC: appropriate use criteria

AV: atrioventricular

AVNRT: atrioventricular nodal reentrant tachycardia

AVRT: atrioventricular reentrant tachycardia

ECG: electrocardiogram

EPS: electrophysiology study

ICD: implantable cardioverter-defibrillator

kg: kilogram

LVEF: left ventricular ejection fraction

NSVT: non-sustained ventricular tachycardia

PVC: premature ventricular contractions

SVT: supraventricular tachycardia

VT: ventricular tachycardia

WPW: Wolff-Parkinson-White syndrome

SUMMARY OF EVIDENCE

2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death [8]

Study Design: This document is a clinical practice guideline developed by the American College of Cardiology, American Heart Association, and Heart Rhythm Society. It is based on a systematic review of the literature and expert consensus.

Target Population: The guidelines are intended for patients with ventricular arrhythmias and those at risk of sudden cardiac death.

Key Factors: The document covers a wide range of topics, including the epidemiology of ventricular arrhythmias, mechanisms of arrhythmias, general evaluation of patients, and various therapies for treatment or prevention. It also discusses specific disease states and populations, such as athletes, pregnant women, and older patients.

Recommendations for the use of electrophysiological study: Update 2018 [6]

Study Design: This is a review article that provides updated recommendations for the use of electrophysiological studies (EPS) in clinical practice. The recommendations are based on a comprehensive review of the literature and clinical guidelines from various cardiology societies.

Target Population: The recommendations apply to patients with different types of cardiac pathologies, including sinus node dysfunction, atrioventricular block, bundle branch block, and various types of tachycardias.

Key Factors: The document discusses the role of EPS in diagnosing and managing various cardiac conditions, the indications for EPS, and the evidence supporting its use. It also provides specific recommendations for different cardiac diseases and patient populations.

2015 ACC/AHA/HRS Guideline for the Management of Adult Patients With Supraventricular Tachycardia [7]

Study Design: This document is a clinical practice guideline for the management of adult patients with supraventricular tachycardia (SVT). It is developed by the American College of Cardiology, American Heart Association, and Heart Rhythm Society, based on a systematic review of the literature.

Target Population: The guidelines are intended for adult patients with SVT, excluding atrial fibrillation.

Key Factors: The document covers the mechanisms and definitions of SVT, epidemiology, clinical evaluation, and principles of medical therapy. It also provides detailed recommendations for the acute and ongoing management of various types of SVT, including focal atrial tachycardia, atrioventricular nodal reentrant tachycardia, and atrial flutter.

ANALYSIS OF EVIDENCE

Shared Conclusions:

- Effectiveness: All three documents agree on the effectiveness of catheter ablation in treating various types of cardiac arrhythmias, including ventricular arrhythmias, SVT, and atrial flutter.
- Patient Selection: They emphasize the importance of careful patient selection to ensure successful outcomes and minimize complications.
- Expertise: High expertise and experience in performing catheter ablation are crucial for achieving optimal results.

Conclusion:

In summary, while all three documents support the use of catheter ablation for treating cardiac arrhythmias, they differ in their focus on specific conditions, the prognostic value of EPS, and considerations for specific populations.

POLICY HISTORY

Date	Summary
August 2026	• Added CPT 93653 and its description
April 2026	• Added: ○ Additional atrial flutter indication for Catheter Ablation ○ Code description
July 2025	• Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • No significant clinical changes • Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guideline 7285 for Abdominal Aortic and Iliac Artery Aneurysm Repair

Guideline Number: Evolent_CG_7285	**Applicable Codes**	
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Original Date: September 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for repair of an abdominal aortic or iliac artery aneurysm.

Special Note

Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used including continued conservative treatment, and their potential outcomes. If a stent is to be inserted, the potential for stent migration and death must be included. The clinical note must include the need for ongoing surveillance, possible late interventions, or rupture and death.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [2–6]

INDICATIONS

The choice of endovascular or open surgical repair for elective treatment of abdominal aortic aneurysm (AAA) or iliac artery aneurysm (IAA) should be individualized with appropriate consideration of the following [1]:

- Anatomic suitability for endovascular aneurysm repair (EVAR)
- Comorbidities and physical fitness
- Life expectancy
- Compliance with postoperative surveillance
- Patient preference

Abdominal Aortic Aneurysm

Repair is indicated for **ANY** of the following [1,7,8]:

- Ruptured AAA
- AAA when maximal aneurysm diameter as measured by CTA (unless contraindicated) is ≥ 5.5 cm in men or ≥ 5.0 cm in women
- AAA growth rate of ≥ 0.5 cm in 6 months
- In patients with back or abdominal pain that can be attributed to the AAA
- Saccular AAA
- Inflammatory AAA
- Mycotic AAA
- Perianastomotic graft aneurysm
- Pseudoaneurysm or complicated penetrating aortic ulcer (PAU), isolated dissection, or intramural hematoma (IM) with ANY of the following:
    - Expansion
    - Co-existing peri-aortic or extra-aortic hematoma
    - Embolization
    - Recurrent pain
    - Malperfusion

Iliac Aneurysm

Includes: common iliac, internal iliac, external iliac, or any combination thereof as measured by CTA (unless contraindicated). Repair is indicated for **ANY** of the following [8]:

- Aneurysm ≥ 40 mm
    - Repair of an aneurysm ≥ 35 mm in a female patient may be reasonable due to sex

differences in normal artery size

- Aneurysms ≤ 40 mm in conjunction with repair of an AAA

Endoleak

Endovascular treatment should be the first line treatment for endoleak. Open surgery should be utilized when endovascular procedures have been unsuccessful. Examples of endoleak that indicate repair include [9]:

- Type I endoleak
- Type II endoleak with evidence of expansion
- Type III endoleak
- Unexplained aneurysm expansion following graft

Other Considerations

- Elective repair of AAA, by either endovascular or open surgical procedures, is not recommended in patients with a limited life expectancy (<2-3 years) [8]
- Open surgical repair of AAA is preferred over endovascular procedures in patients with long life expectancies (>10-15 years) [8]

Limitations

- When commercially available grafts are used for endovascular repair of aortic aneurysms, implantation must follow the device's specific instructions for use (IFU)
- Approval for outpatient treatment does not extend to outpatient endovascular repair of AAA or iliac aneurysms.

CODING AND STANDARDS

Codes

Code	Description
34701	Endovascular repair of infrarenal aorta by deployment of an aorto-aortic tube endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the aortic bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the aortic bifurcation; for other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer)

Code	Description
34702	Endovascular repair of infrarenal aorta by deployment of an aorto-aortic tube endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the aortic bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the aortic bifurcation; for rupture including temporary aortic and/or iliac balloon occlusion, when performed (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer, traumatic disruption)
34703	Endovascular repair of infrarenal aorta and/or iliac artery(ies) by deployment of an aorto-uni-iliac endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the iliac bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the iliac bifurcation; for other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer)
34704	Endovascular repair of infrarenal aorta and/or iliac artery(ies) by deployment of an aorto-uni-iliac endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the iliac bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the iliac bifurcation; for rupture including temporary aortic and/or iliac balloon occlusion, when performed (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer, traumatic disruption)
34705	Endovascular repair of infrarenal aorta and/or iliac artery(ies) by deployment of an aorto-bi-iliac endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the iliac bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the iliac bifurcation; for other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer)
34706	Endovascular repair of infrarenal aorta and/or iliac artery(ies) by deployment of an aorto-bi-iliac endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the iliac bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the iliac bifurcation; for rupture including temporary aortic and/or iliac balloon occlusion, when performed (eg, for aneurysm,

Code	Description
	pseudoaneurysm, dissection, penetrating ulcer, traumatic disruption)
34707	Endovascular repair of iliac artery by deployment of an ilio-iliac tube endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, and all endograft extension(s) proximally to the aortic bifurcation and distally to the iliac bifurcation, and treatment zone angioplasty/stenting, when performed, unilateral; for other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, arteriovenous malformation)
34708	Endovascular repair of iliac artery by deployment of an ilio-iliac tube endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, and all endograft extension(s) proximally to the aortic bifurcation and distally to the iliac bifurcation, and treatment zone angioplasty/stenting, when performed, unilateral; for rupture including temporary aortic and/or iliac balloon occlusion, when performed (eg, for aneurysm, pseudoaneurysm, dissection, arteriovenous malformation, traumatic disruption)
34710	Delayed placement of distal or proximal extension prosthesis for endovascular repair of infrarenal abdominal aortic or iliac aneurysm, false aneurysm, dissection, endoleak, or endograft migration, including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, and treatment zone angioplasty/stenting, when performed; initial vessel treated
34712	Transcatheter delivery of enhanced fixation device(s) to the endograft (eg, anchor, screw, tack) and all associated radiological supervision and interpretation
34718	Endovascular repair of iliac artery, not associated with placement of an aorto-iliac artery endograft at the same session, by deployment of an iliac branched endograft, including pre-procedure sizing and device selection, all ipsilateral selective iliac artery catheterization(s), all associated radiological supervision and interpretation, and all endograft extension(s) proximally to the aortic bifurcation and distally in the internal iliac, external iliac, and common femoral artery(ies), and treatment zone angioplasty/stenting, when performed, for other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, arteriovenous malformation, penetrating ulcer), unilateral
34841	Endovascular repair of visceral aorta (eg, aneurysm, pseudoaneurysm, dissection, penetrating ulcer, intramural hematoma, or traumatic disruption) by deployment of a fenestrated visceral aortic endograft and

Code	Description
	all associated radiological supervision and interpretation, including target zone angioplasty, when performed; including one visceral artery endoprosthesis (superior mesenteric, celiac or renal artery)
34842	Endovascular repair of visceral aorta (eg, aneurysm, pseudoaneurysm, dissection, penetrating ulcer, intramural hematoma, or traumatic disruption) by deployment of a fenestrated visceral aortic endograft and all associated radiological supervision and interpretation, including target zone angioplasty, when performed; including two visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
34843	Endovascular repair of visceral aorta (eg, aneurysm, pseudoaneurysm, dissection, penetrating ulcer, intramural hematoma, or traumatic disruption) by deployment of a fenestrated visceral aortic endograft and all associated radiological supervision and interpretation, including target zone angioplasty, when performed; including three visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
34844	Endovascular repair of visceral aorta (eg, aneurysm, pseudoaneurysm, dissection, penetrating ulcer, intramural hematoma, or traumatic disruption) by deployment of a fenestrated visceral aortic endograft and all associated radiological supervision and interpretation, including target zone angioplasty, when performed; including four or more visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
34845	Endovascular repair of visceral aorta and infrarenal abdominal aorta (eg, aneurysm, pseudoaneurysm, dissection, penetrating ulcer, intramural hematoma, or traumatic disruption) with a fenestrated visceral aortic endograft and concomitant unibody or modular infrarenal aortic endograft and all associated radiological supervision and interpretation, including target zone angioplasty, when performed; including one visceral artery endoprosthesis (superior mesenteric, celiac or renal artery)
34846	Endovascular repair of visceral aorta and infrarenal abdominal aorta (eg, aneurysm, pseudoaneurysm, dissection, penetrating ulcer, intramural hematoma, or traumatic disruption) with a fenestrated visceral aortic endograft and concomitant unibody or modular infrarenal aortic endograft and all associated radiological supervision and interpretation, including target zone angioplasty, when performed; including two visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
34847	Endovascular repair of visceral aorta and infrarenal abdominal aorta (eg, aneurysm, pseudoaneurysm, dissection, penetrating ulcer, intramural hematoma, or traumatic disruption) with a fenestrated visceral aortic

Code	Description
	endograft and concomitant unibody or modular infrarenal aortic endograft and all associated radiological supervision and interpretation, including target zone angioplasty, when performed; including three visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
34848	Endovascular repair of visceral aorta and infrarenal abdominal aorta (eg, aneurysm, pseudoaneurysm, dissection, penetrating ulcer, intramural hematoma, or traumatic disruption) with a fenestrated visceral aortic endograft and concomitant unibody or modular infrarenal aortic endograft and all associated radiological supervision and interpretation, including target zone angioplasty, when performed; including four or more visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
35081	Direct repair of aneurysm, pseudoaneurysm, or excision (partial or total) and graft insertion, with or without patch graft; for aneurysm, pseudoaneurysm, and associated occlusive disease, abdominal aorta
35082	Direct repair of aneurysm, pseudoaneurysm, or excision (partial or total) and graft insertion, with or without patch graft; for ruptured aneurysm, abdominal aorta
35091	Direct repair of aneurysm, pseudoaneurysm, or excision (partial or total) and graft insertion, with or without patch graft; for aneurysm, pseudoaneurysm, and associated occlusive disease, abdominal aorta involving visceral vessels (mesenteric, celiac, renal)
35092	Direct repair of aneurysm, pseudoaneurysm, or excision (partial or total) and graft insertion, with or without patch graft; for ruptured aneurysm, abdominal aorta involving visceral vessels (mesenteric, celiac, renal)
35102	Direct repair of aneurysm, pseudoaneurysm, or excision (partial or total) and graft insertion, with or without patch graft; for aneurysm, pseudoaneurysm, and associated occlusive disease, abdominal aorta involving iliac vessels (common, hypogastric, external)
35103	Direct repair of aneurysm, pseudoaneurysm, or excision (partial or total) and graft insertion, with or without patch graft; for ruptured aneurysm, abdominal aorta involving iliac vessels (common, hypogastric, external)
35131	Direct repair of aneurysm, pseudoaneurysm, or excision (partial or total) and graft insertion, with or without patch graft; for aneurysm, pseudoaneurysm, and associated occlusive disease, iliac artery (common, hypogastric, external)

Code	Description
35132	Direct repair of aneurysm, pseudoaneurysm, or excision (partial or total) and graft insertion, with or without patch graft; for ruptured aneurysm, iliac artery (common, hypogastric, external)
+34709	Placement of extension prosthesis(es) distal to the common iliac artery(ies) or proximal to the renal artery(ies) for endovascular repair of infrarenal abdominal aortic or iliac aneurysm, false aneurysm, dissection, penetrating ulcer, including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, and treatment zone angioplasty/stenting, when performed, per vessel treated (List separately in addition to code for primary procedure)
+34711	Delayed placement of distal or proximal extension prosthesis for endovascular repair of infrarenal abdominal aortic or iliac aneurysm, false aneurysm, dissection, endoleak, or endograft migration, including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, and treatment zone angioplasty/stenting, when performed; each additional vessel treated (List separately in addition to code for primary procedure)
+34713	Percutaneous access and closure of femoral artery for delivery of endograft through a large sheath (12 French or larger), including ultrasound guidance, when performed, unilateral (List separately in addition to code for primary procedure)
+34714	Open femoral artery exposure with creation of conduit for delivery of endovascular prosthesis or for establishment of cardiopulmonary bypass, by groin incision, unilateral (List separately in addition to code for primary procedure)
+34715	Open axillary/subclavian artery exposure for delivery of endovascular prosthesis by infraclavicular or supraclavicular incision, unilateral (List separately in addition to code for primary procedure)
+34716	Open axillary/subclavian artery exposure with creation of conduit for delivery of endovascular prosthesis or for establishment of cardiopulmonary bypass, by infraclavicular or supraclavicular incision, unilateral (List separately in addition to code for primary procedure)
+34717	Endovascular repair of iliac artery at the time of aorto-iliac artery endograft placement by deployment of an iliac branched endograft including pre-procedure sizing and device selection, all ipsilateral selective iliac artery catheterization(s), all associated radiological supervision and interpretation, and all endograft extension(s) proximally

Code	Description
	to the aortic bifurcation and distally in the internal iliac, external iliac, and common femoral artery(ies), and treatment zone angioplasty/stenting, when performed, for rupture or other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, arteriovenous malformation, penetrating ulcer, traumatic disruption), unilateral (List separately in addition to code for primary procedure)
+34808	Endovascular placement of iliac artery occlusion device (List separately in addition to code for primary procedure)
+34812	Open femoral artery exposure for delivery of endovascular prosthesis, by groin incision, unilateral (List separately in addition to code for primary procedure)
+34813	Placement of femoral-femoral prosthetic graft during endovascular aortic aneurysm repair (List separately in addition to code for primary procedure)
+34820	Open iliac artery exposure for delivery of endovascular prosthesis or iliac occlusion during endovascular therapy, by abdominal or retroperitoneal incision, unilateral (List separately in addition to code for primary procedure)
+34833	Open iliac artery exposure with creation of conduit for delivery of endovascular prosthesis or for establishment of cardiopulmonary bypass, by abdominal or retroperitoneal incision, unilateral (List separately in addition to code for primary procedure)
+34834	Open brachial artery exposure for delivery of endovascular prosthesis, unilateral (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children’s Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

- **Aneurysm**: a ballooning of all the walls of the artery resulting in a 1.5x increase its original size.
- **Endoleak**: implies continuous filling of the aneurysm sac despite prior endograft. It is classified as Type I-IV depending on from where the endoleak arises.
- **Endovascular Aortic Aneurysm repair (EVAR)**: involves the placement of a stent graft within the affected blood vessel through an artery (usually the femoral artery), and which seals the aneurysm sac from within.
- **Open Surgery**: a direct procedure on the aorta or its branches via a midline or retroperitoneal approach.
- **Pseudoaneurysm**: blood outside the wall of the aneurysm but contained by surrounding structures.
- **Saccular aneurysm**: a ballooning of part of the wall of an artery. It accrues a greater risk of rupture.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AAA: Abdominal aortic aneurysm

AUC: Appropriate use criteria

CTA: Computed tomographic Angiography

IFU: Instructions for use

IH: Intramural hematoma

IRB: Institutional Review Board

PAU: Penetrating aortic ulcer

TAAA: Thoracoabdominal aortic aneurysm

SUMMARY OF EVIDENCE

Society for Vascular Surgery implementation of clinical practice guidelines for patients with an abdominal aortic aneurysm: Repair of an abdominal aortic aneurysm [1]

Study Design: This document outlines the Society for Vascular Surgery's clinical practice guidelines for the repair of abdominal aortic aneurysms (AAA). The guidelines are based on a comprehensive review of observational studies and randomized controlled trials (RCTs) to determine the optimal timing and method of AAA repair.

Target Population: The guidelines are intended for patients with AAA, including those with ruptured, symptomatic non-ruptured, and asymptomatic aneurysms. The recommendations are aimed at vascular surgeons, interventional radiologists, and other healthcare professionals involved in the management of AAA.

Key Factors:

Timing of Repair: Emergent repair is recommended for ruptured AAAs, urgent treatment for symptomatic non-ruptured aneurysms, and elective repair for asymptomatic AAAs after preoperative assessment.

Surgical Approach: Endovascular aneurysm repair (EVAR) is recommended for ruptured AAAs if anatomically feasible, with a suggested door-to-intervention time of less than 90 minutes. Open surgical repair (OSR) is considered for elective treatment when EVAR is not suitable.

Risk Assessment: The guidelines emphasize the importance of using risk assessment tools to predict treatment outcomes and inform patient-centered communication and decision-making.

Implementation Strategy: The implementation of structured, multidisciplinary triage protocols for the emergent management of ruptured AAAs is associated with a significant decrease in 30-day mortality.

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease: A Report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines [7]

Study Design: The guidelines were developed by the American Heart Association (AHA) and the American College of Cardiology (ACC) Joint Committee on Clinical Practice Guidelines. The recommendations are based on a comprehensive literature search conducted from January 2021 to April 2021, encompassing studies, reviews, and other evidence conducted on human subjects published in English from PubMed, EMBASE, the Cochrane Library, CINHL Complete, and other selected databases relevant to this guideline. Additional relevant studies published through June 2022 were also considered by the writing committee.

Target Population: The guidelines are intended for clinicians involved in the diagnosis, genetic evaluation, family screening, medical therapy, endovascular and surgical treatment, and long-term surveillance of patients with aortic disease across its multiple clinical presentation subsets (i.e., asymptomatic, stable symptomatic, and acute aortic syndromes). The recommendations apply to patients with or at risk of developing cardiovascular disease, with a focus on medical practice in the United States but relevant to patients worldwide.

Key Factors:

Recommendations: The guidelines update previously published AHA/ACC guidelines on thoracic aortic disease, peripheral artery disease, and bicuspid aortic valve disease with new evidence. New recommendations addressing comprehensive care for patients with aortic disease have been developed, emphasizing shared decision-making and the importance of institutional interventional volume and multidisciplinary aortic team expertise.

Imaging Techniques: The guidelines provide detailed recommendations on aortic imaging techniques, including computed tomography (CT), magnetic resonance imaging (MRI), echocardiography, and ultrasound, to determine the presence and progression of aortic disease.

Surgical and Endovascular Management: The guidelines discuss the timing and types of surgical and endovascular interventions for aortic aneurysms, acute aortic syndromes, and other aortic conditions. They emphasize the importance of multidisciplinary aortic teams and high-volume centers for optimizing treatment outcomes.

Medical Management: The guidelines include recommendations for medical therapy, including antihypertensive medications, statins, smoking cessation, and antiplatelet therapy, to manage aortic disease and reduce the risk of adverse aortic events.

Surveillance: The guidelines provide recommendations for surveillance imaging after aortic repair to monitor for complications and progression of residual aortic pathology

Editor's Choice – European Society for Vascular Surgery (ESVS) 2024 Clinical Practice Guidelines on the management of Abdominal Aorto-Iliac Artery Aneurysms [8]

Study Design: This document presents the European Society for Vascular Surgery (ESVS) 2024 clinical practice guidelines on the management of abdominal aorto-iliac artery aneurysms. The guidelines are based on a combination of scientific evidence and expert opinion, with recommendations graded according to a modified European Society of Cardiology grading system.

Target Population: The guidelines are intended for physicians and healthcare professionals involved in the management of patients with aneurysms of the abdominal aorta and iliac arteries. This includes vascular surgeons, interventional radiologists, and other specialists.

Key Factors:

Service Standards: The guidelines emphasize the importance of quality control, surgical volume, and training in aortic surgery. They recommend that centers performing aortic surgery participate in validated prospective registries to monitor practice and outcomes.

Epidemiology, Diagnosis, and Screening: The guidelines provide recommendations for the diagnosis and screening of AAAs, including the use of ultrasonography and computed tomography angiography (CTA) for treatment planning.

Management of Small AAAs: The guidelines outline surveillance intervals for small AAAs and recommend cardiovascular risk factor management, including smoking cessation, blood pressure control, and statin and antiplatelet therapy.

Elective AAA Repair: The guidelines provide detailed recommendations for the pre-operative management, including risk assessment and optimization, and the choice of surgical technique (open or endovascular repair).

Ruptured and Symptomatic AAAs: The guidelines discuss the peri-operative management of ruptured and symptomatic AAAs, including the use of permissive hypotension and aortic occlusion balloons.

Long-term Follow-up: The guidelines emphasize the importance of long-term follow-up after AAA repair to detect late complications and ensure the durability of the repair. These guidelines provide comprehensive, up-to-date recommendations for the management of abdominal aorto-iliac artery aneurysms, aiming to assist healthcare professionals in selecting the best management strategies for their patients.

ANALYSIS OF EVIDENCE

Shared Conclusions [1,7,8]

- **Indications for Surgery**:
  - All three articles agree that AAA repair is indicated for patients with symptomatic or ruptured AAA. They also concur that elective repair should be considered for asymptomatic AAA when the aneurysm reaches a certain diameter threshold.
- **Surgical Techniques**:
  - **Endovascular Aneurysm Repair (EVAR)** is preferred over **Open Surgical Repair (OSR)** when anatomically feasible, as it is associated with lower perioperative mortality and faster recovery. However, OSR is recommended when the aortic anatomy does not meet the criteria for EVAR.
- **Preoperative Assessment**:
  - Comprehensive preoperative assessment including imaging techniques like CT and MRI is emphasized to evaluate the aneurysm and plan the intervention.

Summary [1,7,8]

The three articles provide a comprehensive overview of AAA repair, with shared conclusions on indications for surgery, surgical techniques, and preoperative assessment.

POLICY HISTORY

Date	Summary
May 2026	• Guideline name changed from Abdominal Aortic Aneurysm Repair to Abdominal Aortic and Iliac Artery Aneurysm Repair • Added a section for Shared Decision-Making Process under the Special Note heading

Date	Summary
	• Corrected the second bullet point under the Iliac Artery section to read as: Aneurysms ≤40mm in conjunction with repair of an AAA • Added technical description to codes
May 2025	• Edited text for clarity • Added third General Information bullet • Added Summary of Evidence and Analysis of Evidence
January 2025	• This guideline merges, and replaces, UM CARDIO_1162 for Endovascular Aortic and Iliac Artery Aneurysm Repair and UM CARDIO_1337 for Abdominal Aorta and Iliac Aneurysm Open Repair • Indications, CPT codes, and Applicable Lines of Business were merged and reconciled • Clinical indications were updated per societal guidance

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such

criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7286 for Endomyocardial Biopsy

Guideline Number: Evolent_CG_7286	**Applicable Codes**	
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Original Date: February 2020	**Last Revised Date:** June 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for endomyocardial biopsy.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Heart Transplant (HT) Recipients [6]

Patients with no evidence of rejection:

Endomyocardial biopsy (EMB) may be used for routine monitoring of heart transplant patients on the following schedule:

- Periodically during the first 3-12 months postoperatively
- For continued surveillance of patients at high risk for rejection 1-5 years postoperatively

- Surveillance EMB > 5 years after HT at the discretion of the transplant service

Patients with known or suspected rejection:

- Signs and symptoms of acute rejection including:
  - Sustained ventricular tachycardia
  - New onset atrial arrhythmia
  - New onset ventricular arrhythmia
  - Aborted sudden death
- 2-4 weeks after initiation of treatment for acute cellular rejection
- Surveillance of untreated asymptomatic moderate cellular rejection
- 1-4 weeks after initiation of treatment for antibody mediated rejection

Suspected Myocarditis [7–9]

EMB may be appropriate in patients for whom a histological diagnosis may inform treatment in the following circumstances:

- Suspected fulminant/acute myocarditis. Signs may include:
  - Unexplained acute heart failure (HF) and left ventricular (LV) dysfunction
  - Cardiogenic shock or hemodynamic instability
  - Ventricular arrhythmias and/or second- or third-degree heart block
  - Conduction abnormalities
- Hemodynamically stable patients with suspected myocarditis based upon new onset HF and associated signs of myocarditis such as ECG abnormalities and elevated biomarkers (i.e. troponin) in the absence of coronary artery disease

Cardiomyopathy/Heart Failure [8–12]

EMB may be appropriate in patients for whom a histological diagnosis may inform treatment in the following circumstances:

- Recent onset heart failure with dilated cardiomyopathy and moderate to severe LV dysfunction, refractory to standard therapy and after exclusion of specific etiologies.
- Second- or third-degree heart block, syncope and/or unexplained ventricular arrhythmias refractory to therapy without obvious cardiac abnormalities or with minimal cardiac structural abnormalities (possible sarcoidosis, arrhythmogenic right ventricular dysplasia (ARVD), etc.)
- Dilated cardiomyopathy of any duration with suspected hypersensitivity (i.e. allergic) reaction and/or eosinophilia
- Suspected immune checkpoint inhibitor (ICI)-mediated toxicity (i.e., acute HF early after drug initiation)

- HF associated with suspected anthracycline cardiomyopathy
- HF associated with unexplained restrictive or hypertrophic cardiomyopathy (possible amyloidosis or other infiltrative/depositional/storage disorder)
- Autoimmune disorders with worsening HF unresponsive to therapy
- Suspected idiopathic inflammatory myopathy (IIM) with cardiac involvement
- Cardiac tumors
- Unexplained cardiomyopathy in children
- Heart transplant candidates suspected of having an infiltrative or inflammatory cardiomyopathy

CODING AND STANDARDS

Codes

CPT	
Code	**Description**
76932	Ultrasonic guidance for endomyocardial biopsy, imaging supervision and interpretation
93505	Endomyocardial biopsy

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ARVD: Arrhythmogenic right ventricular dysplasia

EMB: Endomyocardial biopsy

HF: Heart failure

HT: Heart transplant

ICI: Immune checkpoint inhibitor

IIM: Idiopathic inflammatory myopathy

LV: Left ventricle

SUMMARY OF EVIDENCE

The International Society for Heart and Lung Transplantation (ISHLT) guidelines for the care of heart transplant recipients [6]

Study Design: The guidelines were developed through a focused update to the original practice guidelines published in 2010. The update involved a vast effort by 39 writers from 11 countries worldwide, organized into four Task Force groups. Each group was co-chaired by a pediatric heart transplant clinician to ensure adequate representation of issues unique to the pediatric heart transplant population. The guidelines were endorsed by the Pediatric Heart Transplant Society and reviewed by independent experts.

Target Population: The guidelines are intended for heart transplant recipients, including both adult and pediatric populations. Specific considerations are given to pediatric recipients, particularly those under 2 years of age, and patients with unique conditions such as congenital heart disease, sensitization, and those requiring mechanical circulatory support.

Key Factors

- **Perioperative Care**: This includes pre-transplant optimization, surgical issues impacting immediate post-operative care, and management of patients bridged with mechanical circulatory support.
- **Immunosuppression and Rejection**: The guidelines cover rejection surveillance,

monitoring of immunosuppressive drug levels, principles of immunosuppression, and treatment of acute cellular and antibody-mediated rejection.

- **Long-term Care**: This involves management of complications such as chronic kidney disease, malignancy, cardiac allograft vasculopathy, and neurologic complications. It also includes recommendations for minimizing immunosuppression and managing cardiovascular risk factors.
- **Special Populations**: Specific guidelines are provided for pediatric recipients, including those undergoing ABO-incompatible transplants and those with congenital heart disease.
- **Emerging Therapies**: The guidelines discuss the use of newer immunosuppressive agents and techniques, such as belatacept and tocilizumab, and the role of extended-release formulations of tacrolimus.

Heart Failure Association of the ESC, Heart Failure Society of America and Japanese Heart Failure Society Position statement on endomyocardial biopsy [9]

Study Design: The document is a result of the Trilateral Cooperation Project between the Heart Failure Association of the European Society of Cardiology, the Heart Failure Society of America, and the Japanese Heart Failure Society. It represents an expert consensus aiming to provide a comprehensive, up-to-date perspective on EMB.

Target Population: The target population includes patients undergoing heart transplant (HTx) and those with diverse cardiac disorders such as myocarditis, cardiomyopathies, drug-related cardiotoxicity, amyloidosis, other infiltrative and storage disorders, and cardiac tumors.

Key Factors:

- **Overview of Practical Approach to EMB**: The document provides an overview of the practical approach to EMB, including the selection of the access site, patient monitoring, and the number of EMBs per operator required to maintain procedural skill.
- **Indications for EMB**: It updates the indications for EMB, including its role in diagnosing various cardiac disorders and monitoring HTx rejection.
- **Impact of Multimodality Imaging on EMB**: The document discusses the impact of multimodality imaging on EMB, highlighting the role of imaging in guiding EMB and improving diagnostic accuracy.
- **Current Clinical Practice**: It provides insights into the current clinical practice of EMB worldwide, including the variability in its use across different countries.

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure [10]

Study Design: This document is a clinical practice guideline by the American College of Cardiology/American Heart Association/Heart Failure Society of America (ACC/AHA/HFSA) for the management of heart failure. It includes recommendations based on systematic literature reviews and expert consensus.

Target Population: Patients with heart failure, including those with reduced ejection fraction (HFrEF), preserved ejection fraction (HFpEF), mildly reduced ejection fraction (HFmrEF), and improved ejection fraction (HFimpEF).

Key Factors:

- **Epidemiology:** The document provides data on the prevalence of heart failure and discusses risk factors such as hypertension, diabetes, obesity, and atherosclerotic cardiovascular disease.
- **Stages of Heart Failure:** It outlines the ACC/AHA stages of heart failure, emphasizing the development and progression of the disease.
- **Diagnostic Algorithm:** Recommendations for the classification of heart failure based on left ventricular ejection fraction (LVEF) and diagnostic criteria.
- **Management:** Guidelines for the use of guideline-directed medical therapy (GDMT), including ACE inhibitors, ARBs, ARNIs, beta blockers, MRAs, and SGLT2 inhibitors. Recommendations for nonpharmacological interventions such as exercise training, cardiac rehabilitation, and dietary sodium restriction.
- **Special Populations:** Management strategies for patients with comorbidities, including atrial fibrillation, coronary artery disease, and diabetes.

ANALYSIS OF EVIDENCE

Shared Conclusions [6,9,10]

- **Heart Failure Management**: All three articles emphasize the importance of managing heart failure (HF) through various strategies. They discuss the use of medications, lifestyle changes, and monitoring techniques to improve patient outcomes and reduce hospitalizations.
- **Role of Biomarkers**: The articles highlight the significance of biomarkers such as B-type natriuretic peptide (BNP) and N-terminal prohormone of B-type natriuretic peptide (NT-proBNP) in diagnosing and managing HF. These biomarkers are useful for risk stratification and guiding treatment decisions.

Importance of Multidisciplinary Care: All three articles stress the need for a multidisciplinary approach to HF management, involving cardiologists, nurses, pharmacists, and other healthcare professionals. This team-based care is crucial for optimizing treatment and improving patient outcomes.

POLICY HISTORY

Date	Summary
June 2026	• Updated Suspected Myocarditis section • CPT table added

Date	Summary
December 2025	• Added the following CPT Codes to reflect Evolent prior authorization scope: 76932
June 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• Added new bullet-point to the General Statement section • No clinical changes
December 2024	• This guideline replaces UM 1388 Endomyocardial Biopsy • Updated references • Revised heart transplant monitoring schedule to conform with new professional guidance

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7287 for Endovascular Femoropopliteal Interventions

Guideline Number: Evolent_CG_7287	Applicable Codes	
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Original Date: September 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Endovascular Femoropopliteal Interventions.

Special Note

Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used including continued conservative treatment, and their potential outcomes. The possibility of continued symptoms despite therapy as well as the need for subsequent procedures must also be discussed. This process must be reflected in notes provided.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

General Considerations

Procedures can be straightforward or complex. A complex procedure is defined as one where the lesion being treated has caused a total occlusion. For the purpose of this guideline, the

femoropopliteal anatomical region is divided into two areas, and the notes must detail which region(s) will be treated:

- Common and deep femoral arteries (see **Limitations**)
- Superficial femoral and popliteal arteries

INDICATIONS

NOTE: Failure to treat claudication will not result in limb loss and should not be a consideration for interventional planning.

Angioplasty

- The type of balloon (plain or drug-eluting) should be described in the prior authorization request or procedure note. [6,7]

Stent [8]

Primary stenting is medically necessary and preferred when percutaneous transluminal angioplasty alone is not expected to provide a durable result for patients. [8] Examples include:

- Arterial occlusions or highly irregular lesions that carry an elevated risk for distal embolization or rapid recurrence
- Significantly calcified lesions, eccentric lesions, or lesions related to external compression, or ostial lesions
- Lesions longer than 5 cm
- The type of stent (drug eluting, covered or plain) that will be/is used should be described in the prior authorization request or procedural note

Atherectomy

The term atherectomy applies to a number of different approved devices which may decrease arterial wall thickness, improve patency, and decrease the need for stenting. **However, due to insufficient evidence for widespread use, Evolent will only approve Atherectomy for the following indications** [8]:

- Lesions proven to be resistant to angioplasty during a prior procedure
- Heavily calcified lesions as evidenced by CTA, angiography, intravascular ultrasound or prior duplex scan
- Complete occlusions
- Symptomatic and verified in-stent restenosis as verified by noninvasive criteria listed below in the section “Other Indications”

Lithotripsy

Lithotripsy involves delivery of high intensity ultrasound via an intraarterial catheter to break up vascular wall calcification to enable more effective angioplasty. Either lithotripsy or atherectomy can be used but not for the same lesion unless for a heavily calcified total occlusion. Indications include any of the following [9]:

- Calcified lesions proven to be resistant to angioplasty during a prior procedure
- Heavily calcified lesions causing at least a 70% reduction in diameter as evidenced by CTA, angiography, intravascular ultrasound or prior duplex scan

Claudication [6,7,10,11]

When **ALL** the following requirements have been met:

- Impairment of activities of daily living and/or work
- Absence of other conditions that would limit exercise even if claudication is improved (e.g. arthritis, angina, chronic respiratory disease)
- Member is on guideline-directed medical therapy (GDMT)
- Inadequate response to a supervised or structured exercise program for 12 weeks (see **Definitions**)
- Proximal clinically significant aortoiliac disease is not present or successfully treated such that it is unlikely to be responsible for ongoing claudication.
- A noninvasive study such as:
  - A resting Ankle Brachial Index (ABI) < 0.9 OR
  - Toe-brachial-index (TBI) < 0.7 OR
  - 20% reduction in ankle pressure on exercise testing OR
    - If the ABI is > 1.4, incompressible, or unobtainable due to local conditions, then:
      - TBI < 0.7,
      - Absent or monophasic Doppler tracings or Pulse Volume Recordings (PVR) at the ankle
- Femoral or popliteal arteries with anatomically suitable lesion(s) (see **Definitions**) for intervention with one of the following:
  - ≥ 70% stenosis on angiography (e.g., CTA, invasive angiography, MRA) [10] OR
  - Duplex ultrasound with no flow or stenosis with peak systolic velocity (PSV) ≥ 300 cm/s, or PSV ratio ≥ 4.0 with distal monophasic flow pattern in all tibial arteries

Chronic Limb Threatening Ischemia [10–12]

Chronic limb Threatening ischemia (CLTI) is present when there are nonhealing wounds, gangrene or rest pain. For the purposes of this guideline Rest Pain has its own noninvasive physiological requirements.

When BOTH of the following requirements have been met:

- **Clinical indications** – at least ONE of the following must be met:
  - ***Gangrene or nonhealing ischemic wounds*** present for more than 2 weeks despite provider directed and described wound care [11] **OR** wound Grade 1-3 based on the Society for Vascular Surgery Lower Extremity Threatened Limb Classification System (WIfI). [12] One of the following must **ALSO** be present:
    - A CTA, MRA, or invasive angiography demonstrates ≥ 50% stenosis that if treated would improve the potential for healing. In these scenarios, no additional non-invasive studies are required.
    - Non-invasive testing shows BOTH of the following:
      - Duplex ultrasound with absent velocities **OR** peak systolic velocity (PSV) ≥ 250 cm/s **AND** PSV ratio of ≥ 2.0 across the stenosis with monophasic distal flow
      - At least ONE of the following:
        - An ABI ≤ 0.8
        - Ankle pressure ≤ 100 mmHg
        - Toe pressures or transcutaneous partial pressure of O_2 ($TcPO_2$) ≤ 60 mmHg
        - If ABI ≥ 1.4, then one of the following [12]:
          - Toe pressures or $TcPO_2$ ≤ 60 mmHg
          - TBI ≤ 0.7
          - Monophasic PVR or Doppler waveforms at the ankle
  - ***No Gangrene or non-healing wounds but Rest Pain***, then with BOTH of the following:
    - An anatomically suitable lesion with imaging demonstrating at least one of the following:
      - ≥ 50% stenosis, as shown by CTA, MRA, or invasive angiography [10]
      - Duplex ultrasound with absent velocities OR peak systolic velocity (PSV) ≥ 250 cm/s AND PSV ratio of ≥ 2.0 across the stenosis with monophasic distal flow
    - At least ONE of the following:
      - An ABI ≤ 0.4 [12]
      - If ankle pressures unrecordable, Toe pressure or $TcPO_2$ ≤ 30 mmHg
      - PVR amplitude or Doppler waveforms showing flat line or ≤ 5 mm with absent dicrotic notch at the ankle
- **Other requirements** – ALL of the following must be met:
  - Proximal clinically significant aortoiliac disease is not present or has been

successfully treated such that it is unlikely to be responsible for ongoing CLTI, OR will be treated concurrently with the femoropopliteal procedure

Other Indications [10,12]

When at least one of the following requirements has been met:

- For the treatment of in-stent stenosis or occlusion associated with new or recurrent rest pain or claudication, or new or persistent ulceration or gangrene, and at least one of the following):
  - A drop in ABI of ≥ 20%,
  - A peak systolic velocity of ≥ 300 cm/sec
  - A tripling of velocity across the stenosis
  - A translesional mean pressure gradient of ≥ 10 mmHg
  - A systolic gradient of ≥ 20 mmHg
  - Stent occlusion documented by an imaging study
- For the treatment of stenosis within a vein bypass graft in a member with new, progressive, or recurrent symptoms, or new, persistent, or lack of improvement in CLTI **(AUC Score 7)** [13]
- For the treatment of stenosis within a vein bypass graft in an asymptomatic patient with concern for impending graft failure with one of the following **(AUC Score 7)** [13,14]:
  - Peak Systolic Velocity (PSV) of ≥ 180 cm/sec
  - A velocity ratio of ≥ 2.0
  - An end diastolic velocity of < 45 cm/sec
- For the treatment of stenosis within a prosthetic bypass graft with concern for impending graft failure **AND** an end diastolic velocity of < 45 cm/sec **(AUC Score 7)** [14]
- For the treatment of femoropopliteal aneurysms with any of the following [15]:
  - ≥ 20 mm diameter
  - 10-19 mm diameter with thrombus and at least one of the following:
    - Evidence of distal embolization
    - Poor distal runoff
- To allow local podiatric or orthopedic interventions when circulation may be tenuous but in and of itself not severe enough to warrant intervention; with ANY of the following:
  - An ABI < 0.8 OR
  - Ankle pressure < 100 mmHg OR
  - Toe Pressure or TcPO2 < 60 mmHg OR
  - If ABI ≥ 1.4 then one of the following:
    - Toe Pressure or TcPO2 <60 mmHg OR

- Monophasic PVR or Doppler waveforms

Limitations [10,11]

- Acute lower extremity ischemia is not considered in this policy
- Measurements of ankle perfusion using a photoplethysmography device, which does not directly evaluate the dorsalis pedis and posterior tibial arteries individually, cannot be substituted for a doppler derived ABI (see **Definitions**)
- Intervention for PAD is not indicated in the absence of symptoms, ulceration, or gangrene regardless of hemodynamic measures or imaging findings demonstrating PAD
- Requests to perform a subsequent intervention on the same limb must have documentation detailing new or worsening symptoms or findings, or persistent (> 12 weeks) clinical indications
- Requests to perform the *same* intervention on the same anatomical location must have documentation detailing new or worsening symptoms or findings, or persistent (> 12 weeks) clinical indications, supported by new noninvasive (see **Definitions**) and imaging studies, and a discussion about why other alternative treatments have not been considered
- Endovascular procedures are not indicated for non-ambulatory patients with a life expectancy < 6 months and extensive lower extremity tissue necrosis. Consider primary amputation at the lowest level possible to ensure healing of the surgical site
- When tibial access is utilized to perform intervention on an artery proximal to that tibial artery, endovascular therapy of the transited artery is not indicated unless its treatment is required to revascularize a target distal to that transited tibial artery
- Endovascular treatment of Common femoral PAD involving the bifurcation or deep femoral artery is approvable for patients at high medical risk or at risk for local groin complications such as those with prior radiation, multiple prior surgeries, or infections. [7,16] If an endovascular procedure including the use of lithotripsy fails to improve the circulation, prior authorization will require documentation that the patient has been informed that surgical endarterectomy or bypass remain contraindicated or that the patient has refused such treatment.

CODING AND STANDARDS

Codes

Code	Description
37263	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the

Code	Description
	angioplasty within the same artery, unilateral; straightforward lesion, initial vessel
37265	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, initial vessel
37267	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel
37269	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel
37271	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel
37273	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel

Code	Description
37275	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel
37277	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel
+37264	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37266	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)
+37268	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral;

Code	Description
	straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37270	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)
+37272	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37274	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)
+37276	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37278	Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when

Code	Description
	performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)
+76937	Ultrasound guidance for vascular access requiring ultrasound evaluation of potential access sites, documentation of selected vessel patency, concurrent realtime ultrasound visualization of vascular needle entry, with permanent recording and reporting (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

- **Anatomical Location**
  - For the purpose of this guideline, the femoropopliteal anatomical region is divided into two areas, and the notes must detail which region(s) will be treated:
    - Common and deep femoral arteries (see **Limitations**)
    - Superficial Femoral and popliteal arteries.
- **Anatomically suitable lesion** [10]**:** one where the appropriate intervention would have low risk, and a high probability of initial and long-term success (> 2 years) based on accepted lesion classifications such as TASC II or GLASS.
- **Ankle Brachial Index (ABI)** [11]: The Ankle Brachial Pressure Index, known more commonly as an ABI, is performed using a doppler device and is calculated by dividing

the resting systolic blood pressure at the dorsalis pedis and posterior tibial arteries by the systolic blood pressures in the arm and is expressed as a ratio. The ABI is the higher of the two measurements. Photoplethysmographic techniques to measure ABI are not an acceptable substitute for a doppler derived ABI. The ABI can be spurious if there is heavy arterial calcification making the blood pressures unrecordable or falsely elevated.

  - **ABI Reference Ranges**:
    - Abnormal: ≤ 0.90
    - Borderline: 0.91-0.99
    - Normal: 1.00-1.40
    - Rest pain: ≤ 0.40
    - Noncompressible: > 1.40

- **Chronic Limb Threatening Ischemia** (CLTI) has replaced Critical Limb Ischemia (CLI) since the threat to limb viability in patients with PAD is not only related to ischemia but other factors such as infection, neuropathy, and general patient morbidities. Further, "critical" implies that treatment is urgent to avoid limb loss, while some patients can keep their legs for extended periods of time even in the absence of revascularization. CLTI is defined clinically by the presence of rest pain (see definition), gangrene, a nonhealing wound or ulceration lasting more than 2 weeks despite appropriate wound care. Infection may make invasive treatment more urgent. The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System (WIfI) is helpful in defining CLTI and prognosticating indications for treatment and outcome. [(12)]
- **Claudication**: a symptom complex of pain that begins with ambulation and that is relieved within a brief time by walking cessation. It will usually resume at the same distance walked. It is described by the intensity of discomfort, the distance walked, the duration of the walk and the impact that it has on quality of life (QOL) and activities of daily living (ADL). Claudication does not occur at rest. If left untreated, the natural history of claudication is slow progression, yet amputation is rare occurring in less than 5% of patients.
- **Clinically significant disease** is such that it is likely causing ischemic symptoms or findings
- **Complexity of the Procedure**
  - Procedures can be straightforward or complex. A complex procedure is defined as one where the lesion being treated has caused a total occlusion.
- **Endovascular intervention**: the treatment of vascular pathology with angioplasty, atherectomy, intravascular lithotripsy, drugs, stents or any such treatment performed from within the blood vessel and access from a remote site
- **Guideline Directed Medical Therapy (GDMT)** includes recommendations for antiplatelet therapy, cilostazol (unless contraindicated or not tolerated), statins, glycemic and hypertension control, structured exercise program (see definition), smoking cessation including planning, counseling, or behavior modification and pharmacotherapy if needed. Duration should be for at least 12 weeks.

- **Noninvasive tests/studies** include ABI, TBI, Toe pressures, TCPO2, PVR or Doppler tracings. A duplex scan is noninvasive but for the purposes of this guideline is considered an imaging study.
- **Rest Pain**: a distinct pain syndrome lasting more than 2 weeks, implying CLTI. It is defined as pain in the foot or toes aggravated by elevation and relieved by dependency. Nocturnal pain is not necessarily rest pain since there are other causes of pain at night. Rest pain does not usually imply the same urgency for treatment as gangrene or nonhealing wounds.
- **Structured exercise program** is provider-directed and monitored. It involves walking to a pain threshold 3 times a week.
- **Toe Brachial Index** is measured by dividing the highest brachial arm pressure by the pressure obtained from the first toe by any method. Unlike the ABI, the toe pressures are usually not affected by arterial calcification.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ABI: Ankle Brachial Index

AR: Authorization Request

AUC: Appropriate use criteria

CFA: Common Femoral Artery

CLI: Chronic limb ischemia

CLTI: Chronic limb threatening ischemia

CTO: Chronic total occlusion

CTA: Computed Tomography Angiography

DFA: Deep Femoral Artery

DSA: Digital Subtraction Angiography

EDV: End Diastolic Velocity

GDMT: Guideline directed medical therapy

GLASS: Global Anatomic Staging System

ISR: In-stent restenosis

PAD: Peripheral artery disease

PTA: Percutaneous transluminal angioplasty

PVR: Pulse Volume Recording

SFA: Superficial Femoral Artery

TASC: Trans-Atlantic Inter-Society Consensus

TBI: Toe Brachial Index

WIfI Classification: Wound, Ischemia, and Foot Infection

Guideline Directed Medical Therapy

Guideline directed medical therapy (GDMT) are outlined by joint American College of Cardiology (ACC)/American Heart Association (AHA) in cardiovascular clinical practice guidelines as Class I recommendation. These are maximally tolerated medications for a cardiovascular condition, when prescribed, have shown to improve healthcare outcomes such as survival along with significant reduction in major adverse cardiovascular events and hospitalization. For all recommended drug treatment regimens, the prescriber should confirm the dosage with product insert material and carefully evaluate for contraindications and interactions. For PAD structured exercise and Cilostazol are added to the Guidelines.

SUMMARY OF EVIDENCE

ACC/AHA/SCAI/SIR/SVM 2018 Appropriate Use Criteria for Peripheral Artery Intervention [10]

Study Design: This study involved the development of Appropriate Use Criteria (AUC) for peripheral artery intervention (PAI). The process included drafting patient scenarios, assumptions, and definitions based on published guidelines, trial data, and expert opinions. The scenarios were evaluated by an independent rating panel using a scoring scale from 1 to 9.

Target Population: The study focused on patients with peripheral artery disease (PAD) who may require revascularization treatments. This includes patients with renal artery stenosis, lower extremity disease, critical limb ischemia, asymptomatic artery disease, and secondary treatment options for lower extremity disease.

Key Factors:

Clinical Scenarios: 45 clinical scenarios with up to 6 intervention options per scenario were developed and categorized into 6 general sections.

Scoring: Each indication was scored as “Appropriate” (7 to 9), “May Be Appropriate” (4 to 6), or “Rarely Appropriate” (1 to 3).

Emphasis: Adherence to medical therapy was emphasized, with revascularization considered when medical therapy is insufficient.

Endovascular and Surgical Approaches: Both approaches were deemed appropriate in scenarios involving tissue loss or end organ compromise, with a tendency to select endovascular approaches.

2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease [11]

Study Design: This document is the 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS guideline for the management of lower extremity peripheral artery disease. It was developed by the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines in collaboration with several other organizations.

Target Population: The guidelines are intended for clinicians treating patients with lower extremity peripheral artery disease across its multiple clinical presentation subsets, including asymptomatic PAD, chronic symptomatic PAD, chronic limb-threatening ischemia, and acute limb ischemia.

Key Factors: The document provides comprehensive recommendations on the clinical assessment, diagnostic testing, medical therapy, preventive foot care, exercise therapy, revascularization techniques, management of chronic limb-threatening ischemia, and acute limb ischemia. It also addresses special considerations such as risk amplifiers, health disparities, and management of PAD in older patients.

The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System: Risk stratification based on Wound, Ischemia, and foot Infection (WIfI) [12]

Study Design: This document introduces the Society for Vascular Surgery Lower Extremity Threatened Limb Classification System, known as WIfI (Wound, Ischemia, and foot Infection).

Target Population: The classification system is designed for patients with threatened lower extremities due to chronic ischemia, particularly those with diabetes and diabetic foot ulcers.

Key Factors: The WIfI system stratifies patients based on the severity of wounds, ischemia, and infection. It aims to provide a more precise description of disease burden and improve outcomes analysis for various therapies. The system includes four grades for each factor and uses a Delphi consensus process to estimate the risk of amputation and the benefit of revascularization.

ANALYSIS OF EVIDENCE

Shared Conclusions [10–12]

- All three documents emphasize the importance of medical therapy and structured exercise before considering revascularization for femoropopliteal interventions.
- Endovascular revascularization is recommended for patients with claudication not responsive to medical therapy and structured exercise.
- There is a preference for stenting in longer lesions, with drug-coated balloons and drug-eluting stents being highlighted as effective options.

In summary, while all three documents support the use of endovascular femoropopliteal interventions for patients with claudication not responsive to medical therapy and structured

exercise, they differ in their emphasis on the criteria for revascularization, the importance of a multispecialty care team, and the consideration of wound, ischemia, and infection severity.

POLICY HISTORY

Date	Summary
May 2026	• Documentation Requirements section was edited and moved to the Statement and Background sections • Clarified and reorganized indications for Chronic Limb Threatening Ischemia • Added technical description to codes • Updated Background section
December 2025	• Codes within the Coding section were edited to reflect changes made by the American Medical Association. Deleted: 37224, 37225, 37226, 37227. Added: 37263, 37265, 37267, 37269, 37271, 37273, 37275, 37277, +37264, +37266, +37268, +37270, +37272, +37274, +37276, +37278 • Added Shared decision making • Added documentation requirements • Added indications for Atherectomy and Lithotripsy • Added description of Complexity • Added new definition of Anatomical regions • Clarified noninvasive test requirements • Updated references
June 2025	• Updated citations • Added AUC scores • Added third bullet to General Information Section • Added Summary of Evidence and Analysis of Evidence
January 2025	• This guideline replaces UM CARDIO_1173 for Endovascular Femoropopliteal Interventions • Clinical indications updated and expanded per current guidance from major cardiovascular societies

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7288 for Endovascular Aortoiliac Arterial Interventions

Guideline Number: Evolent_CG_7288	**Applicable Codes**	
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Original Date: September 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Endovascular Aortoiliac Interventions.

Special Note

Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used including continued conservative treatment, and their potential outcomes. The possibility of continued symptoms despite therapy as well as the need for subsequent procedures must also be discussed. This process must be reflected in notes provided.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [4–8]

General Considerations

Procedures can be straightforward or complex. A complex procedure is defined as one where the lesion being treated has caused a total occlusion. For the purpose of this guideline, the iliac

anatomical region is divided into three areas, common, internal, and external iliac arteries, and the notes must detail which region(s) will be treated.

INDICATIONS

NOTE: Failure to treat claudication will not result in limb loss and should not be a consideration for interventional planning.

Angioplasty

- The type of balloon (plain or drug-eluting) should be described in the prior authorization request or procedure note.

Stents [9]

Primary stenting is medically necessary and preferred when percutaneous transluminal angioplasty alone is not expected to provide a durable result for patients. [1] Examples include:

- Arterial occlusions or highly irregular lesions that carry an elevated risk for distal embolization or rapid recurrence
- Significantly calcified lesions, eccentric lesions, or lesions related to external compression, or ostial lesions
- Lesions longer than 5cm
- The type of stent (drug eluting, covered or plain) that will be/is used should be described in the prior authorization request or procedural note.

Lithotripsy

Involves delivery of high intensity ultrasound via an intraarterial catheter to break up vascular wall calcification to enable more effective angioplasty. Indications include any of the following [10]:

- Calcified lesions proven to be resistant to angioplasty during a prior procedure
- Heavily calcified lesions causing at least a 70% reduction in diameter as evidenced by CTA, angiography, intravascular ultrasound or prior duplex scan

Claudication [1–3,11]

When <u>ALL</u> the following requirements have been met:

- Impairment of activities of daily living and/or work
- Absence of other conditions that would limit exercise even if claudication is improved [3] (e.g., arthritis, angina, chronic respiratory disease)
- Member is on guideline-directed medical therapy (GDMT)
- Inadequate response to a supervised or structured exercise program for 12 weeks

- A noninvasive study such as:
  - A resting Ankle Brachial Index (ABI) < 0.9) OR
  - Toe-brachial-index (TBI) < 0.7 OR
  - 20% reduction in ankle pressure on exercise testing OR
  - If the ABI is > 1.4, incompressible, or unobtainable due to local conditions, then:
    - TBI < 0.7 OR
    - Absent or monophasic Doppler tracings or Pulse Volume Recordings (PVR) distally
- Aortoiliac arteries with anatomically suitable lesion(s) (see **Definitions**) for intervention with one of the following:
  - ≥ 70% stenosis on angiography (e.g., CTA, invasive angiography, MRA) [3]
  - Duplex ultrasound showing no flow or Doppler velocity in the stenosis with peak systolic velocity (PSV) ≥ 300 cm/s **OR** PSV ratio ≥ 4.0 and with monophasic flow pattern distally [12]

Chronic Limb Threatening Ischemia [3,11,13]

Chronic limb Threatening ischemia (CLTI) is present when there are nonhealing wounds, gangrene or rest pain. For the purposes of this guideline Rest Pain has its own noninvasive physiological requirements.

When **BOTH** of the following requirements have been met:

- **Clinical indications** – at least ONE of the following must be met:
  - ***Gangrene or nonhealing ischemic wounds*** present for more than 2 weeks despite provider directed and described wound care [11] **OR** wound Grade 1-3 based on the Society for Vascular Surgery Lower Extremity Threatened Limb Classification System (WIfI). [13] One of the following must **ALSO** be present:
    - A CTA, MRA, or invasive angiography demonstrates ≥ 50% stenosis that if treated would improve the potential for healing. In these scenarios, no additional non-invasive studies are required.
    - Non-invasive testing shows BOTH of the following:
      - Duplex ultrasound with absent velocities **OR** peak systolic velocity (PSV) ≥ 250 cm/s **AND** PSV ratio of ≥ 2.0 across the stenosis with monophasic distal flow
      - At least ONE of the following:
        - An ABI ≤ 0.8
        - Ankle pressure ≤ 100 mmHg
        - Toe pressures or transcutaneous partial pressure of O_2 ($TcPO_2$) ≤ 60 mmHg
        - If ABI ≥ 1.4, then one of the following [13]:

- ◇ Toe pressures or $TcPO_2$ ≤ 60 mmHg
- ◇ TBI ≤ 0.7
- ◇ Monophasic PVR or Doppler waveforms at all levels from the thigh to the ankle

- No Gangrene or non-healing wounds but Rest Pain, then with BOTH of the following:
  - An anatomically suitable lesion with imaging demonstrating at least one of the following:
    - ≥ 50% stenosis, as shown by CTA, MRA, or invasive angiography [3]
    - Duplex ultrasound with absent velocities **OR** peak systolic velocity (PSV) ≥ 250 cm/s **AND** PSV ratio of ≥ 2.0 across the stenosis with monophasic distal flow
  - At least ONE of the following:
    - An ABI ≤ 0.4 [13]
    - If ankle pressures unrecordable, Toe pressure or $TcPO_2$ ≤ 30 mmHg
    - PVR amplitude or Doppler waveforms showing flat line or ≤ 5mm with absent dicrotic notch at the ankle

Other Indications [3,13]

When at least one of the following requirements have been met:

- To provide access for large bore devices required for treating pathology proximal to the abdominal aorta. Examples include:
  - Transaortic Valve Replacement (TAVR)
  - Extracorporeal Membrane Oxygenation (ECMO)
- To provide access for implanting endovascular devices for the treatment of Abdominal Aortic Aneurysms
- For the treatment of in-stent stenosis associated with new or recurrent rest pain or claudication, or new or persistent ulceration or gangrene, and at least one of the following criteria:
  - A drop in ABI of ≥ 20%
  - A peak systolic velocity of ≥ 300 cm/s
  - A tripling of velocity across the stenosis
  - A translesional mean pressure gradient of ≥ 10 mmHg
  - A systolic gradient of 20 mmHg
- For the treatment of symptomatic or asymptomatic covered in-stent stenosis confirmed by a drop in ABI of ≥ 20%, or one of the following criteria:
  - A peak systolic velocity of ≥ 300 cm/sec

- A tripling of velocity across the stenosis,
- A translesional mean pressure gradient of 10 mmHg
- A systolic gradient of ≥ 20 mmHg

- To allow local podiatric or orthopedic interventions when circulation may be tenuous but in and of itself not severe enough to warrant intervention; with ANY of the following:
  - An ABI < 0.8
  - Ankle pressure < 100 mmHg
  - Toe Pressure or TcPO2 < 60 mmHg
  - If ABI ≥ 1.4, then one of the following:
    - Toe Pressure or TcPO2 < 60 mmHg
    - Monophasic PVR or Doppler waveforms
- Internal iliac intervention may be appropriate for buttock claudication or vasculogenic impotence provided it is supported by noninvasive testing [9]

Limitations [3,11]

- Acute lower extremity ischemia is not considered in this policy
- Atherectomy of the aortoiliac arteries is not considered medically reasonable or necessary
- Intervention for PAD is not indicated in the absence of symptoms, ulceration, or gangrene regardless of hemodynamic measures or imaging findings demonstrating PAD
- Requests to perform a subsequent intervention on the same limb must have documentation detailing new symptoms or findings, or persistence (> 12 weeks) of clinical indications, supported by new physiologic and imaging studies. A discussion about why other alternative treatments have not been considered is necessary.
- Measurements of ankle perfusion using a photoplethysmography device, which does not directly evaluate the dorsalis pedis and posterior tibial arteries individually, cannot be substituted for a doppler derived ABI (see **Definitions**)
- Endovascular procedures are not indicated for non-ambulatory patients with a life expectancy < 6 months and extensive lower extremity tissue necrosis. Consider primary amputation at the lowest level possible to ensure healing of the surgical site

CODING AND STANDARDS

Codes

Code	Description
37254	Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, initial vessel
37256	Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, initial vessel
37258	Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel
37260	Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel
+37255	Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37257	Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers

Code	Description
	necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)
+37259	Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37261	Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

- **Anatomical Location**

- For the purpose of this guideline, the iliac anatomical region is divided into three areas, common, internal, and external iliac arteries, and the notes must detail which region(s) will be treated

- **Anatomically suitable lesion** [3]**:** one where the appropriate intervention would have low risk, and a high probability of initial and long-term success (> 2 years) based on accepted lesion classifications such as TASC II or GLASS.
- **Ankle Brachial Index (ABI)** [11]: The Ankle Brachial Pressure Index, known more commonly as an ABI, is performed using a doppler device and is calculated by dividing the resting systolic blood pressure at the dorsalis pedis and posterior tibial arteries by the systolic blood pressures in the arm and is expressed as a ratio. The ABI is the higher of the two measurements. Photoplethysmographic techniques to measure ABI are not an acceptable substitute for a doppler derived ABI. The ABI can be spurious if there is heavy arterial calcification making the blood pressures unrecordable or falsely elevated.
  - **ABI Reference Ranges**:
    - Abnormal: ≤ 0.90
    - Borderline: 0.91-0.99
    - Normal: 1.00-1.40
    - Rest pain: ≤ 0.40
    - Noncompressible: > 1.40
- **Chronic Limb Threatening Ischemia** (CLTI) has replaced Critical Limb Ischemia (CLI) since the threat to limb viability in patients with PAD is not only related to ischemia but other factors such as infection, neuropathy, and general patient morbidities. Further, “critical” implies that treatment is urgent to avoid limb loss, while some patients can keep their legs for extended periods of time even in the absence of revascularization. CLTI is defined clinically by the presence of rest pain (see definition), gangrene, a nonhealing wound or ulceration lasting more than 2 weeks despite appropriate wound care. Infection may make invasive treatment more urgent. The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System (WIfI) is helpful in defining CLTI and prognosticating indications for treatment and outcome. [13]
- **Claudication**: a symptom complex of pain that begins with ambulation and that is relieved within a brief time by walking cessation. It will usually resume at the same distance walked. It is described by the intensity of discomfort, the distance walked, the duration of the walk and the impact that it has on quality of life (QOL) and activities of daily living (ADL). Claudication does not occur at rest. If left untreated, the natural history of claudication is slow progression, yet amputation is rare occurring in less than 5% of patients.
- **Clinically significant disease** is such that it is likely causing ischemic symptoms or findings.
- **Complexity of the Procedure**
  - Procedures can be straightforward or complex. A complex procedure is defined as one where the lesion being treated has caused a total occlusion.

- **Endovascular intervention**: the treatment of vascular pathology with angioplasty, atherectomy, intravascular lithotripsy, drugs, stents or any such treatment performed from within the blood vessel and access from a remote site
- **Guideline Directed Medical Therapy (GDMT)** includes recommendations for antiplatelet therapy, cilostazol (unless contraindicated or not tolerated), statins, glycemic and hypertension control, structured exercise program (see definition), smoking cessation including planning, counseling, or behavior modification and pharmacotherapy if needed. Duration should be for at least 12 weeks.
- **Physiologic studies** include ABI, TBI, Toe pressures, TCPO2, PVR or Doppler tracings
- **Rest Pain**: a distinct pain syndrome lasting more than 2 weeks, implying CLTI. It is defined as pain in the foot or toes aggravated by elevation and relieved by dependency. Nocturnal pain is not necessarily rest pain since there are other causes of pain at night. Rest pain does not usually imply the same urgency for treatment as gangrene or nonhealing wounds.
- **Structured exercise program** is provider-directed and monitored. It involves walking to a pain threshold 3 times a week.
- **Toe Brachial Index** is measured by dividing the highest brachial arm pressure by the pressure obtained from the first toe by any method. Unlike the ABI, the toe pressures are usually not affected by arterial calcification.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [5]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ABI: Ankle Brachial Index

AUC: Appropriate use criteria

CFA: Common femoral artery

CLTI: Chronic limb Threatening ischemia

CTA: Computed Tomography Angiography

CTO: Chronic Total Occlusion

DSA: Digital Subtraction Angiography

EIA: External iliac artery

ECMO: Extracorporeal membrane oxygenation

GDMT: Guideline directed medical therapy

GLASS: Global Anatomic Staging System

ISR: In-stent stenosis

PAD: Peripheral arterial disease

PSV: Peak systolic velocity

PTA: Percutaneous transluminal Angioplasty

PVR: Pulse Volume Recording

TASC: Trans-Atlantic Inter-Society Consensus

TAVR: Transaortic valve replacement

TBI: Toe brachial index

WIfI Classification: Wound, Ischemia, and Foot Infection

Guideline Directed Medical Therapy

Guideline directed medical therapy (GDMT) are outlined by joint American College of Cardiology (ACC)/American Heart Association (AHA) in cardiovascular clinical practice guidelines as Class I recommendation. These are maximally tolerated medications for a cardiovascular condition, when prescribed, have shown to improve healthcare outcomes such as survival along with significant reduction in major adverse cardiovascular events and hospitalization. For all recommended drug treatment regimens, the prescriber should confirm the dosage with product insert material and carefully evaluate for contraindications and interactions. For PAD, structured exercise and Cilostazol are added to the Guidelines.

SUMMARY OF EVIDENCE

ACC/AHA/SCAI/SIR/SVM 2018 Appropriate Use Criteria for Peripheral Artery Intervention [3]

Study Design: This study involved the development of Appropriate Use Criteria (AUC) for peripheral artery intervention (PAI). The process included drafting patient scenarios, assumptions, and definitions based on published guidelines, trial data, and expert opinions. The scenarios were evaluated by an independent rating panel using a scoring scale from 1 to 9.

Target Population: The study focused on patients with peripheral artery disease (PAD) who may require revascularization treatments. This includes patients with renal artery stenosis, lower extremity disease, critical limb ischemia, asymptomatic artery disease, and secondary treatment options for lower extremity disease.

Key Factors:

Clinical Scenarios: 45 clinical scenarios with up to 6 intervention options per scenario were developed and categorized into 6 general sections.

Scoring: Each indication was scored as “Appropriate” (7 to 9), “May Be Appropriate” (4 to 6), or “Rarely Appropriate” (1 to 3).

Emphasis: Adherence to medical therapy was emphasized, with revascularization considered when medical therapy is insufficient.

Endovascular and Surgical Approaches: Both approaches were deemed appropriate in scenarios involving tissue loss or end organ compromise, with a tendency to select endovascular approaches.

2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease [11]

Study Design: This document is the 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS guideline for the management of lower extremity peripheral artery disease. It was developed by the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines in collaboration with several other organizations.

Target Population: The guidelines are intended for clinicians treating patients with lower extremity peripheral artery disease across its multiple clinical presentation subsets, including asymptomatic PAD, chronic symptomatic PAD, chronic limb-threatening ischemia, and acute limb ischemia.

Key Factors: The document provides comprehensive recommendations on the clinical assessment, diagnostic testing, medical therapy, preventive foot care, exercise therapy, revascularization techniques, management of chronic limb-threatening ischemia, and acute limb ischemia. It also addresses special considerations such as risk amplifiers, health disparities, and management of PAD in older patients.

The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System: Risk stratification based on Wound, Ischemia, and foot Infection (WIfI) [13]

Study Design: This document introduces the Society for Vascular Surgery Lower Extremity Threatened Limb Classification System, known as WIfI (Wound, Ischemia, and foot Infection).

Target Population: The classification system is designed for patients with threatened lower extremities due to chronic ischemia, particularly those with diabetes and diabetic foot ulcers.

Key Factors: The WIfI system stratifies patients based on the severity of wounds, ischemia, and infection. It aims to provide a more precise description of disease burden and improve outcomes analysis for various therapies. The system includes four grades for each factor and uses a Delphi consensus process to estimate the risk of amputation and the benefit of revascularization.

ANALYSIS OF EVIDENCE

Shared Conclusions [3,11,13]

- All three documents emphasize the importance of medical therapy and structured exercise before considering revascularization for femoropopliteal interventions.

- Endovascular revascularization is recommended for patients with claudication not responsive to medical therapy and structured exercise.
- There is a preference for stenting in longer lesions, with drug-coated balloons and drug-eluting stents being highlighted as effective options.

In summary, while all three documents support the use of endovascular femoropopliteal interventions for patients with claudication not responsive to medical therapy and structured exercise, they differ in their emphasis on the criteria for revascularization, the importance of a multispecialty care team, and the consideration of wound, ischemia, and infection severity.

POLICY HISTORY

Date	Summary
May 2026	• Guideline name changed from Endovascular Aortoiliac Interventions to Endovascular Aortoiliac Arterial Interventions • Documentation Requirements section was edited and moved to the Statement and Background sections • Clarified and reorganized indications for Claudication and Chronic Limb Threatening Ischemia • Added technical description to codes • Updated Background section
December 2025	• Codes within the Coding section were edited to reflect changes made by the American Medical Association. Deleted: 37220, 37221, 37222, 37223. Added: 37254, 37256, 37258, 37260, +37255, +37257, +37259, +37261 • Added Shared decision making • Added documentation requirements • Added indications for Atherectomy and Lithotripsy • Added description of Complexity • Added new definition of Anatomical regions • Clarified noninvasive test requirements • Added indications for access to iliac arteries • Updated references
June 2025	• Updated citations • Added AUC scores

Date	Summary
	● Added third bullet to General Information ● Checked Medicare Advantage Line of Business ● Added Summary of Evidence and Analysis of Evidence
January 2025	● This guideline replaces UM CARDIO_1172 for Endovascular Iliac Interventions ○ The guideline name has been changed to **Endovascular Aortoiliac Interventions** ● Clinical indications were updated per societal guidance

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7289 for Endovascular Infrapopliteal (Tibioperoneal) and Inframalleolar Interventions

Guideline Number: Evolent_CG_7289	**Applicable Codes**	
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Original Date: September 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Endovascular Infrapopliteal (Tibioperoneal) Interventions.

Special Note

Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used including continued conservative treatment, and their potential outcomes. The possibility of continued symptoms despite therapy as well as the need for subsequent procedures must also be discussed. This process must be reflected in notes provided.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

General Considerations

Procedures can be straightforward or complex. A complex procedure is defined as one where the lesion being treated has caused a total occlusion. For the purpose of this guideline, there are three tibial arteries, the Anterior and Posterior Tibial and the Peroneal artery. Treatment of the tibioperoneal artery will only be considered as a separate vessel if it is the only “Tibial” being treated. Otherwise, it is considered as part of either the Posterior Tibial or the Peroneal artery.

INDICATIONS

NOTE: Failure to treat claudication will not result in limb loss and should not be a consideration for interventional planning.

Angioplasty

- The type of balloon (plain or drug-eluting) should be described in the prior authorization request or procedure note.

Stents

Primary stenting tibial arteries is rarely appropriate. However, secondary stenting may be medically necessary for [6]:

- Arterial occlusions or highly irregular lesions that carry an elevated risk for distal embolization or rapid recurrence
- Lack of response to angioplasty despite maximal approvable inflation pressures
- If a stent is used, the type of stent (drug eluting or plain) should be recorded

Atherectomy

The term atherectomy applies to a number of different approved devices which may decrease arterial wall thickness, improve patency, and decrease the need for stenting. However, due to insufficient evidence for widespread use, Evolent will only approve Atherectomy for the following indications [6]:

- Lesions proven to be resistant to angioplasty during a prior procedure
- Heavily calcified lesions as evidenced by CTA, angiography, intravascular ultrasound or prior duplex scan
- Complete occlusions
- Symptomatic and verified in-stent restenosis as verified by noninvasive criteria listed below in Other Indications

Claudication [7–10]

Revascularization of infra-popliteal PAD is generally limited to those patients presenting with critical limb threatening ischemia (CLTI). [6] However, infrequently, intervention may be indicated when **ALL** the following requirements have been met:

- *Severe* impairment of activities of daily living and/or work
- Absence of other conditions that would limit exercise even if claudication is improved (e.g. arthritis, angina, chronic respiratory disease)
- Member is on guideline-directed medical therapy (GDMT)
- Inadequate response to a supervised or structured exercise program for 12 weeks (see Definitions)
- Proximal clinically significant aortoiliac and/or femoropopliteal disease is not present or successfully treated such that it is unlikely to be responsible for ongoing claudication
- A resting Ankle Brachial Index (ABI) of abnormal (≤ 0.9) or noncompressible (>1.4) or either:
    - TBI < 0.7
    - 20% reduction in ankle pressure during exercise testing
    - If arteries are noncompressible (ABI > 1.4) due to arterial calcification, or cannot be assessed due to local skin or wound conditions, abnormal Doppler waveforms or pulse volume recordings (PVR) can be provided
- Duplex ultrasound showing no flow or Doppler findings in all three tibial arteries with peak systolic velocities (PSV) ≥ 300 cm/s or PSV ratios ≥ 4.0 and with monophasic flow patterns
- ≥ 70% stenosis in all three tibial arteries on angiography (e.g., CTA, invasive angiography, MRA)

NOTE: When claudication is the indication, authorization will be for the treatment of only one tibial artery

Chronic Limb Threatening Ischemia [7,8,11]

Chronic limb Threatening ischemia (CLTI) is present when there are nonhealing wounds, gangrene or rest pain. For the purposes of this guideline Rest Pain has its own noninvasive physiological requirements.

When **BOTH** of the following requirements have been met:

- **Clinical indications** – at least ONE of the following must be met:
    - ***Gangrene or nonhealing ischemic wounds*** present for more than 2 weeks despite provider directed and described wound care [8] **OR** wound Grade 1-3 based on the Society for Vascular Surgery Lower Extremity Threatened Limb Classification System (WIfI). [11] AND:
        - Infrapopliteal disease (≥ 50%) stenosis involving all three tibial arteries, or the

anterior tibial and tibioperoneal trunk, or a single artery supplying the involved angiosome, with anatomically suitable lesion(s) (see **Definitions**), for intervention AND BOTH [12]:

- **Non-invasive testing** shows At least ONE of the following:
  - An ABI ≤ 0.8
  - Ankle pressure ≤ 100 mmHg
  - Toe pressures or transcutaneous partial pressure of O_2 ($TcPO_2$) ≤ 60 mmHg
  - PVR or Doppler waveforms with flat line or monophasic tracings with amplitude ≤5 mm at the ankle
  - If ABI ≥ 1.4, then one of the following [11]:
    - Toe pressures or $TcPO_2$ ≤ 60 mmHg
    - TBI ≤ 0.7
    - PVR or Doppler waveforms with flat line or monophasic tracings with amplitude ≤ 5mm at the ankle
- **Imaging** by either
  - CTA, MRA or invasive angiography, confirming the above stenoses OR
  - Duplex ultrasound showing no flow or Doppler velocity in the stenoses with peak systolic velocity (PSV) ≥ 250 cm/s **OR** PSV ≥ 2.0. When there is duplex or angiographic confirmation that the SFA or Popliteal has a severe stenosis or occlusion, ALL tibial arteries may show blunted velocities less than 250 cm/sec. Then, provided there is an accompanying request to treat the occluded proximal femoropopliteal lesion, tibial intervention can also be approved if at least two tibial arteries are also occluded.

- ***No Gangrene or non-healing wounds but Rest Pain***, AND
  - Infrapopliteal disease(≥ 50%) stenosis in all 3 tibial arteries, or the anterior tibial and tibioperoneal trunk, with anatomically suitable lesion(s) (see **Definitions**), for intervention AND [12]:
    - Noninvasive testing with either:
      - An ABI ≤ 0.4 [11]
      - If ankle pressures unrecordable, Toe pressure or $TcPO_2$ ≤ 30 mmHg
      - PVR amplitude or Doppler waveforms showing flat line or ≤ 5mm with absent dicrotic notch at the ankle
    - Imaging and either:
      - CTA, MRA or invasive angiography, confirming the above stenoses [6]
      - Duplex ultrasound showing no flow or Doppler velocity in the stenoses with peak systolic velocity (PSV) ≥ 250 cm/s **OR** PSV ≥ 2.0. When there

is duplex or angiographic confirmation that the SFA or Popliteal has a severe stenosis or occlusion, ALL tibial arteries may show blunted velocities less than 250 cm/sec. Then, provided there is an accompanying request to treat the occluded proximal femoropopliteal lesion, tibial intervention can also be approved if at least two tibial arteries are also occluded.

- **Other Requirements** –the following must be met:
  - Proximal clinically significant aortoiliac and/or femoropopliteal disease is not present or has been successfully treated such that it is unlikely to be responsible for ongoing CLTI, **OR** will be treated concurrently with the tibial procedure

Other Indications [7,11]

- **Inframalleolar procedures** will be considered to treat continued poor healing or gangrene (not rest pain) only after a more proximal tibial intervention has not provided improvement and open bypass is not an alternative [13]
- For the treatment of **in-stent** stenosis or occlusion associated with new or recurrent rest pain, or new or persistent ulceration or gangrene, and at least one of the following criteria:
  - A drop in ABI of ≥ 20%
  - A peak systolic velocity of ≥ 300 cm/s
  - A tripling of velocity across the stenosis
  - A translesional mean pressure gradient of ≥ 10 mmHg
  - A systolic gradient of ≥ 20 mmHg
  - Stent occlusion documented by an imaging study
- For the treatment of stenosis within a tibial vein bypass graft in a patient with new, progressive, or recurrent symptoms, or new, persistent, or lack of improvement in CLTI [14]
- For the treatment of stenosis within a tibial vein bypass graft in an asymptomatic patient with concern for impending graft failure with one of the following [14,15]
  - peak systolic velocity (PSV) of > 180 cm/s
  - Velocity ratio of > 2.0
  - an end diastolic velocity of < 45 cm/s
- For the treatment of stenosis within a tibial prosthetic bypass graft with concern for impending graft failure **AND** an end diastolic velocity of < 45 cm/s [15]
- To allow local podiatric or orthopedic interventions when circulation may be tenuous but in and of itself not severe enough to warrant intervention, with ALL of the following:
  - Physiologic noninvasive studies which must include:
    - An ABI < 0.9

- Ankle pressure < 100 mmHg
- Toe pressures or TCPO2 < 60 mmHg
- If ABI ≥ 1.4, then one of the following:
  - Toe pressures or TCPO2 < 60 mmHg
  - TBI < 0.7
  - PVR or Doppler waveforms with flat line tracing or monophasic tracings with amplitude < 5 mm.

- Infrapopliteal disease involving all three tibial arteries, or the anterior tibial and tibioperoneal trunk, or a single artery supplying the involved angiosome, with anatomically suitable lesion(s) (see **Definitions**), for intervention and documentation of any of the following within the involved tibial artery(s) [12]:
  - ≥ 50% stenosis on angiography (e.g., CTA, invasive angiography, MRA) [6]
  - Duplex ultrasound showing no flow or Doppler velocity in the stenosis with peak systolic velocity (PSV) ≥ 250 cm/s **OR** PSV ≥ 2.0. When there is duplex or angiographic confirmation that the SFA or Popliteal has a severe stenosis or occlusion, ALL tibial arteries may show blunted velocities less than 250 cm/sec. Then, provided there is an accompanying request to treat the occluded proximal femoropopliteal lesion, tibial intervention can also be approved if at least one tibial artery is also occluded.

Limitations [7,8]

- Acute lower extremity ischemia is not considered in this policy
- Measurements of ankle perfusion using a photoplethysmography instrument that does not directly evaluate flow in the dorsalis pedis and the posterior tibial artery, cannot be substituted for a doppler derived ABI (see **Definitions**)
- Intervention for PAD is not indicated in the absence of symptoms, ulceration, or gangrene regardless of hemodynamic measures or imaging findings demonstrating PAD
- Requests to perform a subsequent intervention on the same limb must have documentation detailing new or worse symptoms or findings, or persistence (> 12 weeks), supported by new physiologic (see **Definitions**) and imaging studies. **A discussion about why other alternative treatments have not been considered is necessary** and must be included in the documentation
- Endovascular procedures are not indicated for non-ambulatory patients with a life expectancy < 6 months and extensive lower extremity tissue necrosis. Consider primary amputation at the lowest level possible to ensure healing of the surgical site
- When tibial access is utilized to perform intervention on an artery proximal to that tibial artery, endovascular therapy of the transited artery is not indicated unless its treatment is required to revascularize a target distal to that transited tibial artery
- Inframalleolar interventions are not considered necessary for the management of rest pain or claudication [9]

CODING AND STANDARDS

Codes

Code	Description
37280	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, initial vessel
37282	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, initial vessel
37284	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel
37286	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel
37288	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy

Code	Description
	and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel
37290	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel
37292	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel
37294	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel
37296	Revascularization, endovascular, open or percutaneous, inframalleolar vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, initial vessel
37298	Revascularization, endovascular, open or percutaneous, inframalleolar vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, initial vessel

Code	Description
+37281	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37283	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, complex lesion, each additional vessel (List separately in addition to code for primary procedure)
+37285	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37287	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)
+37289	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral;

Code	Description
	straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37291	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)
+37293	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37295	Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)
+37297	Revascularization, endovascular, open or percutaneous, inframalleolar vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)
+37299	Revascularization, endovascular, open or percutaneous, inframalleolar vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and

Code	Description
	crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

- **Anatomical Location**
  - For the purpose of this guideline, there are three tibial arteries, the Anterior and Posterior Tibial and the Peroneal artery. Treatment of the tibioperoneal artery will only be considered as a separate vessel if it is the only "Tibial" being treated. Otherwise, it is considered as part of either the Posterior Tibial or the Peroneal artery.
- **Anatomically suitable lesion** [7]**:** one where the appropriate intervention would have low risk, and a high probability of initial and long-term success (> 2 years) based on accepted lesion classifications such as TASC II or GLASS.
- **Ankle Brachial Index (ABI)** [8]: The Ankle Brachial Pressure Index, known more commonly as an ABI, is performed using a doppler device and is calculated by dividing the resting systolic blood pressure at the dorsalis pedis and posterior tibial arteries by the systolic blood pressures in the arm and is expressed as a ratio. The ABI is the higher of the two measurements. Photoplethysmographic techniques to measure ABI are not an acceptable substitute for a doppler derived ABI. The ABI can be spurious if there is heavy arterial calcification making the blood pressures unrecordable or falsely elevated.
  - **ABI Reference Ranges**:
    - Abnormal: ≤ 0.90

- Borderline: 0.91-0.99
- Normal: 1.00-1.40
- Rest pain: ≤ 0.40
- Noncompressible: > 1.40

- **Chronic Limb Threatening Ischemia** (CLTI) has replaced Critical Limb Ischemia (CLI) since the threat to limb viability in patients with PAD is not only related to ischemia but other factors such as infection, neuropathy, and general patient morbidities. Further, "critical" implies that treatment is urgent to avoid limb loss, while some patients can keep their legs for extended periods of time even in the absence of revascularization. CLTI is defined clinically by the presence of rest pain (see definition), gangrene, a nonhealing wound or ulceration lasting more than 2 weeks despite appropriate wound care. Infection may make invasive treatment more urgent. The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System (WIfI) is helpful in defining CLTI and prognosticating indications for treatment and outcome. [11]
- **Claudication**: a symptom complex of pain that begins with ambulation and that is relieved within a brief time by walking cessation. It will usually resume at the same distance walked. It is described by the intensity of discomfort, the distance walked, the duration of the walk and the impact that it has on quality of life (QOL) and activities of daily living (ADL). Claudication does not occur at rest. If left untreated, the natural history of claudication is slow progression, yet amputation is rare occurring in less than 5% of patients.
- **Clinically significant disease** is such that it is likely causing ischemic symptoms or findings.
- **Complexity of the Procedure**
  - Procedures can be straightforward or complex. A complex procedure is defined as one where the lesion being treated has caused a total occlusion.
- **Endovascular intervention**: the treatment of vascular pathology with angioplasty, atherectomy, intravascular lithotripsy, drugs, stents or any such treatment performed from within the blood vessel and access from a remote site
- **Guideline Directed Medical Therapy (GDMT)** includes recommendations for antiplatelet therapy, cilostazol (unless contraindicated or not tolerated), statins, glycemic and hypertension control, structured exercise program (see definition), smoking cessation including planning, counseling, or behavior modification and pharmacotherapy if needed. Duration should be for at least 12 weeks.
- **Peripheral Artery Disease:** Disease of the arteries to the extremities, usually due to atherosclerosis. These can be asymptomatic or lead to symptoms of pain, sensory or motor loss, and ultimately non-healing wounds, gangrene or limb loss. Physiologic studies are noninvasive test that evaluate definable physical properties of vascular insufficiency and include ankle brachial index (ABI), toe brachial index (TBI) (see definition), toe pressures, TCPO2 (see definition), pulse volume recording (PVR) (see definition) or Doppler tracings

- **Physiologic studies** include ABI, TBI, Toe pressures, TCPO2, PVR or Doppler tracings
- **Rest Pain**: a distinct pain syndrome lasting more than 2 weeks, implying CLTI. It is defined as pain in the foot or toes aggravated by elevation and relieved by dependency. Nocturnal pain is not necessarily rest pain since there are other causes of pain at night. Rest pain does not usually imply the same urgency for treatment as gangrene or nonhealing wounds.
- **Structured exercise program** is provider-directed and monitored. It involves walking to a pain threshold 3 times a week.
- **Toe Brachial Index** is measured by dividing the highest brachial arm pressure by the pressure obtained from the first toe by any method. Unlike the ABI, the toe pressures are usually not affected by arterial calcification.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ABI: Ankle Brachial Index

AR: Authorization Request

AUC: Appropriate use criteria

BMS: Bare metal stent

CFA: Common femoral artery

CLTI: Chronic limb Threatening ischemia

CTO: Chronic total occlusion

CTA: Computed Tomography Angiography

DFA: Deep Femoral Artery

DSA: Digital Subtraction Angiography

GDMT: Guideline directed medical therapy

GLASS: Global Anatomic Staging System

ISR: In-stent restenosis

PAD: Peripheral artery disease

PTA: Percutaneous transluminal angioplasty

PVR: Pulse Volume Recording

SFA: Superficial Femoral Artery

TASC: Trans-Atlantic Inter-Society Consensus

TBI: Toe Brachial Index

WIfI Classification: Wound, Ischemia, and Foot Infection

Guideline Directed Medical Therapy

Guideline directed medical therapy (GDMT) are outlined by joint American College of Cardiology (ACC)/American Heart Association (AHA) in cardiovascular clinical practice guidelines as Class I recommendation. These are maximally tolerated medications for a cardiovascular condition, when prescribed, have shown to improve healthcare outcomes such as survival along with significant reduction in major adverse cardiovascular events and hospitalization. For all recommended drug treatment regimens, the prescriber should confirm the dosage with product insert material and carefully evaluate for contraindications and interactions. For PAD structured exercise and Cilostazol are added to the Guidelines.

SUMMARY OF EVIDENCE

ACC/AHA/SCAI/SIR/SVM 2018 Appropriate Use Criteria for Peripheral Artery Intervention [7]

Study Design: This study involved the development of Appropriate Use Criteria (AUC) for peripheral artery intervention (PAI). The process included drafting patient scenarios, assumptions, and definitions based on published guidelines, trial data, and expert opinions. The scenarios were evaluated by an independent rating panel using a scoring scale from 1 to 9.

Target Population: The study focused on patients with peripheral artery disease (PAD) who may require revascularization treatments. This includes patients with renal artery stenosis, lower extremity disease, critical limb ischemia, asymptomatic artery disease, and secondary treatment options for lower extremity disease.

Key Factors:

Clinical Scenarios: 45 clinical scenarios with up to 6 intervention options per scenario were developed and categorized into 6 general sections.

Scoring: Each indication was scored as “Appropriate” (7 to 9), “May Be Appropriate” (4 to 6), or “Rarely Appropriate” (1 to 3).

Emphasis: Adherence to medical therapy was emphasized, with revascularization considered when medical therapy is insufficient.

Endovascular and Surgical Approaches: Both approaches were deemed appropriate in scenarios involving tissue loss or end organ compromise, with a tendency to select endovascular approaches.

2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease [8]

Study Design: This document is the 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS guideline for the management of lower extremity peripheral artery disease. It was developed by the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines in collaboration with several other organizations.

Target Population: The guidelines are intended for clinicians treating patients with lower extremity peripheral artery disease across its multiple clinical presentation subsets, including asymptomatic PAD, chronic symptomatic PAD, chronic limb-threatening ischemia, and acute limb ischemia.

Key Factors: The document provides comprehensive recommendations on the clinical assessment, diagnostic testing, medical therapy, preventive foot care, exercise therapy, revascularization techniques, management of chronic limb-threatening ischemia, and acute limb ischemia. It also addresses special considerations such as risk amplifiers, health disparities, and management of PAD in older patients.

The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System: Risk stratification based on Wound, Ischemia, and foot Infection (WIfI) [11]

Study Design: This document introduces the Society for Vascular Surgery Lower Extremity Threatened Limb Classification System, known as WIfI (Wound, Ischemia, and foot Infection).

Target Population: The classification system is designed for patients with threatened lower extremities due to chronic ischemia, particularly those with diabetes and diabetic foot ulcers.

Key Factors: The WIfI system stratifies patients based on the severity of wounds, ischemia, and infection. It aims to provide a more precise description of disease burden and improve outcomes analysis for various therapies. The system includes four grades for each factor and uses a Delphi consensus process to estimate the risk of amputation and the benefit of revascularization.

ANALYSIS OF EVIDENCE

Shared Conclusions [7,8,11]

- All three documents emphasize the importance of medical therapy and structured exercise before considering revascularization for femoropopliteal interventions.
- Endovascular revascularization is recommended for patients with claudication not responsive to medical therapy and structured exercise.
- There is a preference for stenting in longer lesions, with drug-coated balloons and drug-eluting stents being highlighted as effective options.

In summary, while all three documents support the use of endovascular femoropopliteal interventions for patients with claudication not responsive to medical therapy and structured

exercise, they differ in their emphasis on the criteria for revascularization, the importance of a multispecialty care team, and the consideration of wound, ischemia, and infection severity.

POLICY HISTORY

Date	Summary
May 2026	• Guideline name changed from Endovascular Infrapopliteal (Tibioperoneal) Interventions to Endovascular Infrapopliteal (Tibioperoneal) and Inframalleolar Interventions • Documentation Requirements section was edited and moved to the Statement and Background sections • Clarified and reorganized indications for Chronic Limb Threatening Ischemia • Added technical description to codes • Updated Background section
December 2025	• Codes within the Coding section were edited to reflect changes made by the American Medical Association. Deleted: 37228, 37229, 37230, 37231, 37232, 37233, 37234, 37235. Added: 37280, 37282, 37284, 37286, 37288, 37290, 37292, 37294, 37296, 37298, +37281, +37283, +37285, +37287, +37289, +37291, +37293, +37295, +37297, +37299 • Added Shared decision making • Added documentation requirements • Added indications for Atherectomy • Added description of Complexity • Added new definition of Anatomical regions • Clarified noninvasive test requirements • Added indications for Inframalleolar interventions • Updated references
June 2025	• Updated citations • Added AUC scores • Added third bullet to General Information • Checked Medicare Advantage Line of Business

Date	Summary
	● Added Summary of Evidence and Analysis of Evidence
January 2025	● This guideline replaces UM CARDIO_1174 Endovascular Tibioperoneal Interventions ○ The name of the guideline has been changed to **Endovascular Infrapopliteal (Tibioperoneal) Interventions** ● Added CPT Codes 37232 and 37233 ● Clinical indications were updated per societal guidance

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7290 for Treatment of Varicose Veins

Guideline Number: Evolent _CG_7290	**Applicable Codes**	
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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

GENERAL

- Varicose veins can be treated by different methods depending on the anatomy of the vein, and surgeon or patient preference
    - Anatomical features that can determine treatment include:
        - Spider veins
        - Reticular veins
        - Individual varicosities or clusters of varicose veins
        - Perforator veins
        - Truncal veins which include the greater saphenous, small saphenous and its thigh extension, anterior saphenous, and posterior accessory saphenous.

- Tributary veins
- Abnormalities of the deep veins do not constitute varicose veins, but may contribute to them

- Treatment methods include:
  - Conservative measures including medical grade compression (e.g. > 20 mmHg), ambulation, limb elevation, venoactive compounds, and avoiding prolonged sitting and standing
  - High ligation and stripping
  - Stab avulsion Phlebectomy (SAP) also known as mini- or micro-phlebectomy
  - Cluster excision
  - Transilluminated powered phlebectomy
  - Sclerotherapy of varicose veins with polidocanol or sodium tetradecyl sulfate
  - Thermal ablation of truncal veins using laser or radiofrequency
  - Nonthermal ablation of truncal veins including mechanico-chemical ablation, medical adhesive, and foam sclerotherapy (physician compounded and non-compounded foam)

INDICATIONS [6–9]

Plan of Treatment

- Prior authorization can be requested for both legs, but all treatments must be completed within 90 days from the first approval.
- A treatment plan, assuming indications listed below, can include a maximum of three sclerotherapy and three phlebectomy sessions per leg, as well as a plan to treat two truncal veins, and two perforator veins. Subsequent vein treatments will only be considered after this plan has been completed. A complete, new authorization will be required also detailing which veins were treated, by what procedure, and why further treatments are necessary. [6–9]
- Unless treatment is for bleeding, ulceration or wounds, a 6-week course of conservative measures including use of medical grade stockings (e.g. > 20 mmHg compression) must have been completed prior to the authorization request. If contraindicated, the reason must be documented
- The treatment plan must be based on a venous duplex ultrasound:
  - Performed in an accredited vascular laboratory OR
  - Performed by a certified vascular technologist with RVT (Registered Vascular Technologist), RVS (Registered Vascular Specialist, or RPhs (Registered Phlebology Sonographer) certification OR
  - Interpreted or performed by a physician who is a Registered Physician in Vascular

Interpretation (RPVI), or a board-certified (BC) vascular surgeon, (BC) cardiologist or (BC) radiologist or has the same credentials as those for a certified vascular technologist

- The Duplex scan must be performed standing or steep reverse Trendelenburg position, AND
    - It must demonstrate ≥ 500 msec reflux by Valsalva or *distal* (not proximal) compression and release in at least two separate areas/vein
- The ***complete detailed*** 2020 CEAP classification (see **Definitions**) must be provided
- The Venous Clinical Severity Score (VCSS) (see **Definitions**) components and total score must be provided. This can be simplified with just the component headings and associated scores e.g. Pain/Discomfort 1, Varicose Vein 2, Venous edema 0, Total Score 3
- If multiple veins are to be treated, the provider must identify which vein/s will be treated (including the side) and with which modality. If that vein was previously treated list the date/s and procedure name/s.
- When Truncal treatment is the primary treatment and Sclerotherapy or SAP is also being considered for that extremity, SAP and/or sclerotherapy should be performed at the same time unless:
    - There are circumferential limb varicosities requiring changing the patient's position from supine to decubitus
    - There is a need for general anesthesia or large amounts of local or tumescent anesthetic
- Ablation of the great saphenous vein involves treating it from the ankle to the groin. It is expected that this will be performed in one setting
- Ablation of two continuous saphenous segments accessed by a single or multiple access points is still considered a single ablation
- If both the anterior saphenous and great saphenous require treatment both should be treated concurrently unless a reason is specified

Truncal Veins

Truncal veins include the Great, Small, Anterior, and Posterior Accessory Saphenous Veins. Indications for Truncal vein ablation include BOTH of the following:

- CEAP classification ≥ C2s (see **Definitions**) with clinical symptoms or findings that limit the patient's quality of life or ability to perform work
- Axial reflux ≥ 500 ms (see **Definitions**) which must be uninterrupted reflux from the junction of the truncal vein and the appropriate deep vein and extending distally at least to the knee for the great, anterior or posterior accessory, or ankle for the small saphenous vein. Duplex imaging demonstration of Axial reflux will require at least two areas of reflux in the vein, not including close to the junction with its associated deep vein. Ablation can be used for:

- The great saphenous vein irrespective of any size diameter
- An anterior saphenous vein in the thigh of any size diameter
- The small saphenous vein ≥ 3 mm
- A posterior accessory saphenous vein in the thigh of any size diameter, provided all other axial reflux is absent, or successfully treated > 3 months previously, and the patient has continued CEAP ≥ C2s

Perforator Veins

- Perforator vein with reflux ≥ 500 milliseconds (ms) and diameter ≥ 3.5 mm **AND ANY** of the following:
  - It is located in close proximity to an open venous ulcer and corresponding truncal reflux has been corrected or will be treated concurrently
  - It is located beneath a healed venous ulcer and corresponding truncal reflux has been corrected
- It lies directly beneath a symptomatic vein or cluster of veins with persistent or recurrent symptoms > 3 months after complete ablation of refluxing superficial truncal veins

Varicose and Tributary Veins

- Varicose and Tributary veins (see **Definitions** and **Limitations**) can be treated by sclerotherapy or stab avulsion phlebectomy provided the CEAP classification is ≥ C2s (see **Definitions**) with clinical symptoms or findings that limit the patient's quality of life or ability to perform work and which are related to that vein or cluster of veins, and with reflux ≥ 500 ms with size ≥ 3 mm OR
- Superficial thrombophlebitis (past or present) OR
- Bleeding (any size including spider or telangiectasia) or in the elderly where the vein is judged to be a substantial risk for hemorrhage with minimal trauma

Spider and Reticular Veins

- Treatment is considered cosmetic and cannot be authorized unless associated with bleeding (current or recent) or in the elderly where the vein is judged to be a substantial risk for hemorrhage with minimal trauma

LIMITATIONS (6–9)

- Persistent, or recurrent, venous reflux without other indications for treatment
- Tributary veins cannot be treated by ANY ablation technique including non-physician compounded foam sclerotherapy
- Bilateral leg edema (CEAP C3) unless other reasons for edema have been discussed and excluded

- CEAP C3 with reflux limited to the below knee great saphenous or tributary veins
- Any ablation procedure on an anterior saphenous or posterior accessory saphenous vein below the knee
- Isolated saphenofemoral junctional incompetence
- Isolated reflux in great saphenous vein segments, in the presence of competent segments proximally and distally
- Previous administration of sclerotherapy agent in the same vein less than 6 weeks prior
- The following are contradictions to intervention
    - Allergy to adhesives (glues) or sclerotherapy agents
    - Pregnancy or within 3 months after delivery
    - Acute febrile illness
    - Local or general infection
    - Severe distal arterial occlusive disease (ankle brachial index < 0.4 arterial ulcer or gangrene)
    - Obliteration of the deep venous system
    - Acute deep venous phlebitis
    - Prolonged immobility
    - Ultrasound guided foam sclerotherapy in a patient with symptomatic right to left shunt
    - Imminent requirement of the great or small saphenous vein for an arterial or coronary artery bypass e.g. prior coronary artery stents, current or persistent angina, significant claudication, rest pain or chronic limb threatening ischemia

CODING AND STANDARDS

Codes

Code	Description
36465	Injection of non-compounded foam sclerosant with ultrasound compression maneuvers to guide dispersion of the injectate, inclusive of all imaging guidance and monitoring; single incompetent extremity truncal vein (eg, great saphenous vein, accessory saphenous vein)
36466	Injection of non-compounded foam sclerosant with ultrasound compression maneuvers to guide dispersion of the injectate, inclusive of all imaging guidance and monitoring; multiple incompetent truncal veins (eg, great saphenous vein, accessory saphenous vein), same leg

Code	Description
36470	Injection of sclerosant; single incompetent vein (other than telangiectasia)
36471	Injection of sclerosant; multiple incompetent veins (other than telangiectasia), same leg
36473	Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, mechanochemical; first vein treated
36475	Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, radiofrequency; first vein treated
36478	Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, laser; first vein treated
36482	Endovenous ablation therapy of incompetent vein, extremity, by transcatheter delivery of a chemical adhesive (eg, cyanoacrylate) remote from the access site, inclusive of all imaging guidance and monitoring, percutaneous; first vein treated
37700	Ligation and division of long saphenous vein at saphenofemoral junction, or distal interruptions
37718	Ligation, division, and stripping, short saphenous vein
37722	Ligation, division, and stripping, long (greater) saphenous veins from saphenofemoral junction to knee or below
37735	Ligation and division and complete stripping of long or short saphenous veins with radical excision of ulcer and skin graft and/or interruption of communicating veins of lower leg, with excision of deep fascia
37760	Ligation of perforator veins, subfascial, radical (Linton type), including skin graft, when performed, open,1 leg
37761	Ligation of perforator vein(s), subfascial, open, including ultrasound guidance, when performed, 1 leg
37765	Stab phlebectomy of varicose veins, 1 extremity; 10-20 stab incisions
37766	Stab phlebectomy of varicose veins, 1 extremity; more than 20 incisions

Code	Description
37780	Ligation and division of short saphenous vein at saphenopopliteal junction (separate procedure)
37785	Ligation, division, and/or excision of varicose vein cluster(s), 1 leg
+36474	Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, mechanochemical; subsequent vein(s) treated in a single extremity, each through separate access sites (List separately in addition to code for primary procedure)
+36476	Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, radiofrequency; subsequent vein(s) treated in a single extremity, each through separate access sites (List separately in addition to code for primary procedure)
+36479	Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, laser; subsequent vein(s) treated in a single extremity, each through separate access sites (List separately in addition to code for primary procedure)
+36483	Endovenous ablation therapy of incompetent vein, extremity, by transcatheter delivery of a chemical adhesive (eg, cyanoacrylate) remote from the access site, inclusive of all imaging guidance and monitoring, percutaneous; subsequent vein(s) treated in a single extremity, each through separate access sites (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

- Ablation of a truncal vein implies that a procedure has effectively closed the vein along its length. This can be achieved by damaging the vein wall by heat transfer to the wall or blood (radiofrequency or laser), or chemical applications to the lumen and vein wall, mechanical irritation, or by glueing the walls together
- An accredited vascular laboratory is accredited by the Intersocietal Accreditation Commission (IAC), or The American College of Radiology, or for hospitals The Joint Commission
- A certified vascular technologist may be any of the following: A physician with RPVI, a Registered Vascular technologist (RVT), Registered Cardiovascular Technologist (RCVT), Registered Vascular Specialist (RVS), American Registry of Radiologic Technologists (ARRT) credentials in vascular technology, RPhs (Registered Phlebology Sonographer
- Axial reflux: is defined as uninterrupted reflux from the junction of a truncal vein and the appropriate deep vein and extending distally at least to the knee for the great, anterior or posterior accessory, or ankle for the small saphenous vein. The small saphenous can extend above the knee. Axial reflux requires documentation of at least two areas of reflux not including close to the junction with a deep vein
- Conservative measures for treating varicose veins: include medical grade compression (> 20 mmHg), ambulation, limb elevation, avoiding prolonged sitting and standing, and can include venotonic medications
- Perforating veins connect the deep and superficial system of veins
- Tributary veins are extra-fascial extensions of truncal veins. They can be straight or tortuous. Extensions of the anterior and posterior accessory saphenous veins below the knee are tributary veins and no longer considered truncal
- Truncal veins are the great, small, anterior saphenous, and posterior accessory saphenous veins. Note that the anterior saphenous and posterior accessory saphenous veins do not extend beyond the knee
- Varicose veins: are abnormally dilated, tortuous veins virtually always in the lower extremities, lower abdominal wall or pelvic region. They can be asymptomatic, cause cosmetic embarrassment, or may be symptomatic with a sense of discomfort, pressure, itching and heaviness
- Venous reflux: is retrograde flow due to valvular incompetence. It cannot be produced by proximal compression maneuvers

Venous Clinical Severity Score (VCSS) [10]

Pain/Discomfort	None: 0	Mild: 1	Moderate: 2	Severe: 3
e.g., aching, fatigue, soreness, heaviness, burning		Occasional pain that does not restrict daily activities	Daily pain may interfere with regular daily activities (does not prevent)	Daily pain limiting most regular daily activities

Varicose Veins	None: 0	Mild: 1	Moderate: 2	Severe: 3
≥ 3 mm (diameter) in standing position		Few: scattered (varicosities confined to branch veins or clusters) Includes corona phlebectatica (ankle flare)	Multiple varicosities confined to the calf or the thigh	Multiple varicosities involves calf and thigh

Venous Edema	None: 0	Mild: 1	Moderate: 2	Severe: 3
Presumes venous origin		Edema limited to the foot and ankle	Edema extends above the ankle but below the knee	Edema extends to the knee and above

Skin Pigmentation	None: 0	Mild: 1	Moderate: 2	Severe: 3
Presumes venous origin Does not include focal pigmentation over varicose veins or due to other chronic diseases (e.g., vasculitis purpura)		Pigmentation is limited to perimalleolar area	Diffuse pigmentation that involves lower third of the calf	Wider distribution pigmentation above the lower third of the calf

Inflammation	None: 0	Mild: 1	Moderate: 2	Severe: 3
More than recent pigmentation (i.e., erythema, cellulitis, venous eczema, dermatitis)		Inflammation limited to perimalleolar area	Diffuse inflammation over lower third of calf	Wider distribution inflammation above lower third of calf

Induration	None: 0	Mild: 1	Moderate: 2	Severe: 3
Presumes venous origin of secondary skin & subcutaneous changes (e.g., chronic edema with fibrosis, hypodermitis); includes white atrophy & Lipodermatosclerosis		Limited to perimalleolar area	Diffuse over lower third of calf	Wider distribution above lower third of calf

Active Ulcer Number	0	1	2	≥ 3
Active Ulcer Duration (longest active)	N/A	< 3 months	> 3 months but < 1 y	Not healed for > 1 y
Active Ulcer Size (largest active)	N/A	< 2 cm (diameter)	2-6 cm (diameter)	> 6 cm (diameter)

Compression Therapy Use	0	1	2	3
	Not Used	Intermittent stocking use	Stocking use most days	Stocking use full compliance

2020 CEAP Classification (Clinical Class, Etiology, Anatomy, Pathology)

CEAP categories; Clinical (C), Etiological (E), Anatomical (A), and Pathophysiological (P) [11]

Clinical (C) Classifications (C Classes present in Limb)

- C_0 – No visible or palpable signs of venous disease
- C_1 – Telangiectasias or reticular veins (< 3 mm)

- C_2 – Simple varicose veins (≥ 3 mm diameter)
  - C_{2r} – Recurrent varicose veins
- C_3 – Ankle edema of venous origin (not foot edema)
- C_4 – Changes in skin and subcutaneous tissue secondary to CVD
  - C_{4a} – Pigmentation or eczema
  - C_{4b} – Lipodermatosclerosis or atrophie blanche
  - C_{4c} – Corona phlebectatica
- C_5 – Healed venous ulcer
- C_6 – Open venous ulcer
  - C_{6r} – Recurrent active venous ulcer

Subscripts of C Classes Indicating presence or absence of symptoms

- **S - Symptomatic**
  - Ache
  - Pain
  - Tightness
  - Skin irritation
  - Heaviness
  - Muscle cramps
  - Other complaints attributable to venous dysfunction
- **A – Asymptomatic**

Etiologic (E) Classification

- E_c – Congenital
- E_p – Primary
- E_s – Secondary
  - E_{si} – Secondary – intravenous
  - E_{se} – Secondary – extravenous
- E_n – No cause identified

Anatomic (A) Classification

- A_s – Superficial veins
  - Telangiectasia
  - Reticular Veins
  - Great saphenous vein above knee

- Great saphenous vein below knee
- Small saphenous vein
- Anterior accessory saphenous vein
- Nonsaphenous vein

- A_p – Perforator veins
  - Thigh perforator vein
  - Calf perforator vein
- A_d – Deep veins
  - Inferior vena cava
  - Common iliac vein
  - Internal iliac vein
  - External iliac vein
  - Pelvic veins
  - Common femoral vein
  - Deep femoral vein
  - Femoral vein
  - Popliteal vein
  - Crural (tibial) vein
  - Peroneal vein
  - Anterior tibial vein
  - Posterior tibial vein
  - Muscular veins
  - Gastrocnemius vein
  - Soleal vein
- A_n – No venous anatomic location identified

Pathophysiologic (P) Classification

- P_r – Reflux
- P_o – Obstruction
- $P_{r,o}$ – Reflux and obstruction
- P_n – No venous pathophysiology

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ASV: Anterior saphenous vein (now known as the anterior saphenous vein)

AUC: Appropriate Use Criteria (Scores)

BC: Board Certification

CEAP: Clinical (C), Etiology (e), Anatomical (A), and Pathophysiological (P)

PCF: Physician compounded foam

SAP: Stab avulsion phlebectomy

r-VCSS: Revised Venous Clinical Severity Score

SUMMARY OF EVIDENCE

European Society for Vascular Surgery (ESVS) 2022 Clinical Practice Guidelines on the Management of Chronic Venous Disease of the Lower Limbs [6]

Study Design: This document is a clinical practice guideline by the European Society for Vascular Surgery (ESVS) on the management of chronic venous disease (CVD) of the lower limbs. It includes recommendations based on systematic literature reviews and expert consensus.

Target Population: Patients with chronic venous disease of the lower limbs, including those with superficial, perforating, and deep vein pathologies.

Key Factors:

Epidemiology: The document provides prevalence data for different CEAP classes of CVD and discusses risk factors such as female gender, age, obesity, prolonged standing, positive family history, and parity.

Anatomy: Detailed descriptions of the superficial, perforating, and deep veins of the lower limbs.

Pathophysiology: Discusses the inflammatory phenomena leading to venous wall and valve changes, venous hypertension, and subsequent skin changes.

Clinical Presentation: Symptoms include heaviness, tired legs, itching, nocturnal cramps, burning pain, and venous claudication.

Investigations: Recommendations for duplex ultrasound, abdominal ultrasound, cross-sectional imaging, and intravascular ultrasound.

Management: Conservative management options such as physical methods, compression therapy, and pharmacological treatment. Interventional treatments for superficial venous incompetence, including thermal and non-thermal ablation techniques.

The 2022 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part 1 [7]

Study Design: This document is part I of the clinical practice guidelines by the Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society for the management of varicose veins of the lower extremities. It includes evidence-based recommendations based on systematic reviews and meta-analyses.

Target Population: Patients with varicose veins of the lower extremities, including those with CEAP class 2 varicose veins.

Key Factors:

Duplex Ultrasound: Recommendations for using duplex ultrasound scanning as the diagnostic test of choice to evaluate venous reflux.

Treatment Options: Comparison of open surgical treatment (ligation and stripping) vs endovenous ablation techniques, thermal vs non-thermal ablation, and management of incompetent perforating veins.

Concomitant Treatment: Recommendations on the concomitant vs staged treatment of varicose tributaries using phlebectomy or sclerotherapy.

The 2023 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part II [9]

Study Design: This document is part II of the clinical practice guidelines by the Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society for the management of varicose veins of the lower extremities. It includes evidence-based recommendations based on systematic reviews and meta-analyses.

Target Population: Patients with varicose veins of the lower extremities, including those with CEAP class 2 varicose veins.

Key Factors:

Compression Therapy: Recommendations for the use of compression therapy vs intervention and post-procedure compression therapy.

Pharmacological Treatment: Recommendations for the use of venoactive drugs and nutritional supplements for symptomatic patients.

Evaluation and Treatment: Guidelines for the evaluation and treatment of varicose tributaries, management of superficial venous aneurysms, and management of complications such as thrombosis and bleeding.

ANALYSIS OF EVIDENCE

Key Points of Agreement [6,7,9]

- **Duplex Ultrasound Scanning**: All articles agree on its importance for diagnosing venous reflux.
- **Endovenous Ablation**: Preferred over traditional surgical methods due to better patient outcomes and quicker recovery.
- **Compression Therapy**: Recommended as an initial treatment, especially for less severe cases.

While there is a consensus on the importance of duplex ultrasound scanning and the effectiveness of endovenous ablation techniques, the guidelines differ in their emphasis on pharmacological treatments, ethical considerations, and the management of complications. These differences highlight the evolving nature of varicose vein treatment and the need for personalized approaches based on individual patient needs and clinical judgment.

POLICY HISTORY

Date	Summary
May 2026	• Added technical description to codes • Corrected error in the Background section • No clinical changes
March 2026	• Clarified language in the General section • Defined nonthermal types of ablation including medical adhesives • Added plan of treatment section • Added sections on truncal veins, perforator veins, varicose and tributary veins, spider and reticular veins • Adjusted limitations • Adjusted definitions and acronyms/abbreviations in the background section
January 2026	• Added Plan of Treatment • Added Shared decision-making requirements • Added documentation requirements • Added technologist certifications

Date	Summary
	• Added definition of truncal veins • Added limitations on treating truncal veins • Added defining extent of the Anterior saphenous and posterior accessory saphenous veins • Added requirement for detailed 2020 CEAP and R-VCSS
December 2025	• Codes within the Coding section were edited to reflect changes made by the American Medical Association. Deleted: 37500
June 2025	• Added third bullet to general information • Added medical adhesive as a General treatment method • Added Summary of Evidence and Analysis of Evidence
January 2025	• This guideline replaces UM 1252 Endovascular Venous Laser-Radiofrequency Ablation • This guideline replaces UM 1253 Lower Extremity Venous Ligation/Stripping • This guideline replaces UM 1254 Lower Extremity Venous Sclerotherapy • This guideline replaces UM 1255 Lower Extremity Venous Stab Phlebectomy

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug.

Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7291 for Enhanced External Counter Pulsation

Guideline Number: Evolent_CG_7291	Applicable Codes	
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Original Date: July 2011	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines, and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Enhanced External Counterpulsation (EECP).

Special Note

- To review a request for medical necessity, the following items must be submitted for review:
  - Progress note that prompted request, including list of current medications
  - Records from last EECP treatment (if applicable)
  - Most recent echocardiogram, stress test
  - Most recent cardiac catheterization report

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

An initial treatment course of 35 one-hour sessions, given five days per week, will be considered for:

- Patients with chronic coronary disease, refractory angina pectoris, or with Class III or IV angina symptoms per New York Heart Association (NYHA) or Canadian Cardiovascular Society (CCS), **AND** on maximally tolerated guideline-directed medical therapy (GDMT) [6,7]
- Patients who are not amenable for revascularization, either percutaneously (percutaneous coronary intervention (PCI)) **OR** surgically (coronary artery bypass graft (CABG)) due to **ANY** of the following [8]:
    - Inoperative condition or high risk of operative complications or post-operative failure
    - Recurrent angina pectoris despite multiple revascularization procedures
    - Unsuitable coronary anatomy
    - Additional co-morbid states that could create excessive risk

Repeat courses of EECP will be considered on a case-by-case basis for patients with refractory angina pectoris (RAP) if **ALL** the following criteria are met [8]:

- Patient meets medical necessity criteria for EECP
- Prior EECP has resulted in a sustained improvement in symptoms, with a significant (> 25%) reduction in frequency of angina symptoms **OR** improvement by one or more angina classes (NYHA or CCS), **AND**
    - Three or more months has elapsed from the prior EECP treatment

CONTRAINDICATIONS [6–8]

- Decompensated heart failure
- Severe aortic regurgitation
- Severe peripheral artery disease
- Recent myocardial infarction within the last 3 months
- Recent surgical intervention within the last 6 weeks
- Recent cardiac catheterization (1-2 weeks) or arterial femoral puncture
- Unstable angina pectoris
- Severe hypertension > 180/110 mmHg
- Heart rate of < 35 or > 125 beats per minute
- Arrhythmias that interfere with EECP triggering
- Severe venous disease (thrombophlebitis, deep vein thrombosis, or pulmonary

embolism)

- Severe chronic obstructive pulmonary disease (COPD)
- Severe lower extremity vaso-occlusive disease
- Coagulopathy with international normalized ratio of prothrombin time > 2.0
- Presence of a documented aortic aneurysm requiring surgical repair
- Pregnancy

CODING AND STANDARDS

Codes

Code	Description
G0166	External counterpulsation, per treatment session
I20.0	Unstable angina
I20.1	Angina pectoris with documented spasm
I20.2	Refractory angina pectoris
I20.8	Other forms of angina pectoris
I20.81	Angina pectoris with coronary microvascular dysfunction
I20.89	Other forms of angina pectoris
I20.9	Angina pectoris, unspecified
I25.10	Atherosclerotic heart disease of native coronary artery without angina pectoris
I25.110	Atherosclerotic heart disease of native coronary artery with unstable angina pectoris
I25.111	Atherosclerotic heart disease of native coronary artery with angina pectoris with documented spasm
I25.112	Atherosclerotic heart disease of native coronary artery with refractory angina pectoris
I25.118	Atherosclerotic heart disease of native coronary artery with other forms of angina pectoris

Code	Description
I25.119	Atherosclerotic heart disease of native coronary artery with unspecified angina pectoris
I25.6	Silent myocardial ischemia
I25.700	Atherosclerosis of coronary artery bypass graft(s), unspecified, with unstable angina pectoris
I25.701	Atherosclerosis of coronary artery bypass graft(s), unspecified, with angina pectoris with documented spasm
I25.702	Atherosclerosis of coronary artery bypass graft(s), unspecified, with refractory angina pectoris
I25.708	Atherosclerosis of coronary artery bypass graft(s), unspecified, with other forms of angina pectoris
I25.709	Atherosclerosis of coronary artery bypass graft(s), unspecified, with unspecified angina pectoris
I25.710	Atherosclerosis of autologous vein coronary artery bypass graft(s) with unstable angina pectoris
I25.711	Atherosclerosis of autologous vein coronary artery bypass graft(s) with angina pectoris with documented spasm
I25.712	Atherosclerosis of autologous vein coronary artery bypass graft(s) with refractory angina pectoris
I25.718	Atherosclerosis of autologous vein coronary artery bypass graft(s) with other forms of angina pectoris
I25.719	Atherosclerosis of autologous vein coronary artery bypass graft(s) with unspecified angina pectoris
I25.720	Atherosclerosis of autologous artery coronary artery bypass graft(s) with unstable angina pectoris
I25.721	Atherosclerosis of autologous artery coronary artery bypass graft(s) with angina pectoris with documented spasm
I25.722	Atherosclerosis of autologous artery coronary artery bypass graft(s) with refractory angina pectoris
I25.728	Atherosclerosis of autologous artery coronary artery bypass graft(s) with other forms of angina pectoris

Code	Description
I25.729	Atherosclerosis of autologous artery coronary artery bypass graft(s) with unspecified angina pectoris
I25.730	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with unstable angina pectoris
I25.731	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with angina pectoris with documented spasm
I25.732	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with refractory angina pectoris
I25.738	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with other forms of angina pectoris
I25.739	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with unspecified angina pectoris
I25.750	Atherosclerosis of native coronary artery of transplanted heart with unstable angina
I25.751	Atherosclerosis of native coronary artery of transplanted heart with angina pectoris with documented spasm
I25.752	Atherosclerosis of native coronary artery of transplanted heart with refractory angina pectoris
I25.758	Atherosclerosis of native coronary artery of transplanted heart with other forms of angina pectoris
I25.759	Atherosclerosis of native coronary artery of transplanted heart with unspecified angina pectoris
I25.760	Atherosclerosis of bypass graft of coronary artery of transplanted heart with unstable angina
I25.761	Atherosclerosis of bypass graft of coronary artery of transplanted heart with angina pectoris with documented spasm
I25.762	Atherosclerosis of bypass graft of coronary artery of transplanted heart with refractory angina pectoris
I25.768	Atherosclerosis of bypass graft of coronary artery of transplanted heart with other forms of angina pectoris

Code	Description
I25.769	Atherosclerosis of bypass graft of coronary artery of transplanted heart with unspecified angina pectoris
I25.790	Atherosclerosis of other coronary artery bypass graft(s) with unstable angina pectoris
I25.791	Atherosclerosis of other coronary artery bypass graft(s) with angina pectoris with documented spasm
I25.792	Atherosclerosis of other coronary artery bypass graft(s) with refractory angina pectoris
I25.798	Atherosclerosis of other coronary artery bypass graft(s) with other forms of angina pectoris
I25.799	Atherosclerosis of other coronary artery bypass graft(s) with unspecified angina pectoris
I25.810	Atherosclerosis of coronary artery bypass graft(s) without angina pectoris
I25.811	Atherosclerosis of native coronary artery of transplanted heart without angina pectoris
I25.812	Atherosclerosis of bypass graft of coronary artery of transplanted heart without angina pectoris
I25.82	Chronic total occlusion of coronary artery
I25.85	Chronic coronary microvascular dysfunction
I25.89	Other forms of chronic ischemic heart disease
I25.9	Chronic ischemic heart disease, unspecified

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Enhanced External Counterpulsation is a nonsurgical outpatient treatment of angina pectoris and coronary artery disease (CAD) refractory to medical and/or surgical therapy. This therapy increases blood flow to the heart by compressing blood vessels in the lower extremities. The patient is placed on a treatment table where their lower trunk and lower extremities are wrapped in a series of three compressive air cuffs which inflate and deflate in synchronization with the patient's cardiac cycle.

Although EECP devices are cleared by the Food and Drug Administration (FDA) for use in treating a variety of cardiac conditions, including stable or unstable angina pectoris, acute myocardial infarction, and cardiogenic shock, the use of this device to treat cardiac conditions other than stable angina pectoris is not covered, since only that use has developed sufficient evidence to demonstrate its medical effectiveness. Non-coverage of hydraulic versions of these types of devices remains in force.

New York Heart Association Grading Scale for Heart Failure [9]

- Class I: No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, or shortness of breath.
- Class II: Slight limitation of physical activity. Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, shortness of breath, or chest pain.
- Class III: Marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, shortness of breath, or chest pain.
- Class IV: Symptoms of heart failure at rest. Any physical activity causes further discomfort.

Canadian Cardiovascular Society Grading Scale for Angina [10]

- Class I: Ordinary physical activity does not cause angina, such as walking or climbing stairs. Angina occurs with strenuous, rapid, or prolonged exertion at work or recreation.

- Class II: Slight limitation of ordinary activity. Angina occurs when walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals, or in cold, or in wind, or under emotional stress, or only during the few hours after awakening. Walking more than two blocks on the level and climbing more than one flight of ordinary stairs at a normal pace and in normal conditions.
- Class III: Marked limitation of ordinary physical activity. Angina occurs when walking one or two blocks on the level and climbing one flight of stairs in normal conditions and at a normal pace.
- Class IV: Inability to carry on any physical activity without discomfort. Anginal syndrome may be present at rest.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(3)]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

AATS: American Association for Thoracic Surgery

ACCF: American College of Cardiology Foundation

ACP: American College of Physicians

AHA: American Heart Association

AUC: Appropriate use criteria

CABG: Coronary artery bypass graft

CAD: Coronary artery disease

CCS: Canadian Cardiovascular Society

EECP: Enhanced External Counter Pulsation

FDA: Food and Drug Administration

GDMT: Guideline-Directed Medical Therapy

NYHA: New York Heart Association

PCI: Percutaneous coronary intervention

PCNA: Preventive Cardiovascular Nurses Association

RAP: Refractory angina pectoris

SCAI: Society for Cardiovascular Angiography and Interventions

SIHD: Stable ischemic heart disease

STS: Society of Thoracic Surgeons

SUMMARY OF EVIDENCE

Enhanced external counterpulsation: A unique treatment for the "No-Option" refractory angina patient [8]

Study design: Involved a literature review to evaluate the safety and efficacy of EECP in patients with RAP.

Target population: Patients with symptomatic coronary artery disease (CAD) who have not responded to standard revascularization procedures and aggressive pharmacotherapy. These patients typically have advanced CAD with recurrent angina pectoris not amenable to revascularization due to unsuitable coronary anatomy, multiple previous revascularization attempts, age, additional comorbid conditions, or patient preference.

Key factors: The review involved a sweeping search and analysis of existing published literature on EECP. The review found that EECP consistently reduces angina pectoris, extends time to exercise-induced ischemia, decreases dependency on nitroglycerine for frequent chest pain, increases maximum workload, and improves the quality of life in patients with symptomatic stable angina. EECP was also found to be well-tolerated by the vast majority of patients, with relatively few adverse events reported. The study suggests that EECP is a safe and likely the best available method of treatment for patients presenting with symptomatic CAD not amenable to further revascularization.

2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease [6]

Study design: A targeted review of randomized controlled trials, observational cohort studies, patient registries, and meta-analyses evaluating EECP for the treatment of refractory angina in patients with stable ischemic heart disease (SIHD). The evidence base includes one moderate-sized randomized, sham-controlled trial (MUST-EECP) and multiple nonrandomized studies and registries incorporated into the 2012 ACCF/AHA guideline evidence review.

Target population: Adult patients with SIHD who have chronic or refractory angina despite GDMT, particularly those who are not candidates for further coronary revascularization or who have persistent symptoms following PCI or CABG. The population generally includes patients with CCS class III–IV angina and documented CAD, while excluding individuals with decompensated heart failure, severe peripheral arterial disease, or significant valvular disease.

Key factors: EECP is presented as a noninvasive adjunctive therapy aimed at symptomatic relief rather than improvement in survival or prevention of myocardial infarction. The guideline emphasizes that EECP may be considered for select patients with refractory angina after optimization of GDMT and careful assessment of revascularization options. Evidence demonstrates improvement in angina frequency, CCS angina class, exercise-induced ischemia, and quality of life measures, but does not establish benefit for hard cardiovascular outcomes. Shared decision-making is emphasized, balancing symptom burden, treatment intensity, patient preferences, and the absence of demonstrated mortality benefit.

ANALYSIS OF EVIDENCE

Analysis [6,8]

Both articles support the use of EECP as a safe and effective treatment for patients with RAP. They share conclusions on the benefits of EECP in reducing angina, improving exercise tolerance and enhancing quality of life.

Shared Conclusions:

Both articles highlight the benefits of EECP in improving symptoms and quality of life for patients with RAP:

- Both articles agree that EECP consistently reduces angina pectoris.
- EECP extends the time to exercise-induced ischemia and increases maximum workload.
- Both articles emphasize that EECP improves the quality of life in patients with symptomatic stable angina.

POLICY HISTORY

Date	Summary
April 2026	• Clarified indications for repeat courses of EECP • Expanded contraindications to include COPD and coagulopathy • Updated Summary of Evidence and Analysis of Evidence to reflect adjusted references
July 2025	• No substantial clinical content changes • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Applicable Line of Business adjusted – Medicare checked • Added in ICD-10 codes applicable to the guideline • Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7292 for Infrainguinal Open Arterial Vascular Surgery

Guideline Number:	Applicable Codes	
Evolent_CG_7292		
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Original Date:	**Last Revised Date:**	**Implementation Date:**
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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for infrainguinal open arterial bypass surgery.

Special Note

Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used including continued conservative treatment, and their potential outcomes. The possibility of continued symptoms despite therapy as well as the need for subsequent procedures must also be discussed. This process must be reflected in notes provided.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

General Considerations

For this policy procedures will be considered if they involve the common, deep (profunda), superficial femoral, or popliteal arteries. Arteries below the popliteal artery may be referred to as

"infrapopliteal" and include the tibioperoneal trunk, anterior tibial, posterior tibial, peroneal, plantar, dorsalis pedis, and tarsal arteries.

INDICATIONS

NOTE: Failure to treat claudication will not result in limb loss and should not be a consideration for interventional planning.

Claudication [6–9]

When **ALL** the following requirements have been met:

- Impairment of activities of daily living and/or work
- Absence of other conditions that would limit exercise even if claudication is improved (e.g. arthritis, angina, chronic respiratory disease)
- Member is on guideline-directed medical therapy (GDMT)
- Inadequate response to a supervised or structured exercise program for 12 weeks (see **Definitions**)
- Proximal clinically significant aortoiliac disease is not present or successfully treated such that it is unlikely to be responsible for ongoing claudication.
    - If still present and clinically significant it will be treated concurrently with the infrainguinal procedure by open or endovascular techniques
- A noninvasive study such as:
    - A resting Ankle Brachial Index (ABI) <0.9 OR
    - Toe-brachial-index (TBI) <0.7 OR
    - 20% reduction in ankle pressure on exercise testing OR
        - If the ABI is >1.4, incompressible, or unobtainable due to local conditions, then:
            - TBI <0.7,
            - Absent or monophasic Doppler tracings or Pulse Volume Recordings (PVR) at the ankle
- Femoral or popliteal arteries with anatomically suitable lesion(s) (see **Definitions**) for intervention with one of the following:
    - ≥70% stenosis on angiography (e.g., CTA, invasive angiography, MRA) [6] OR
    - Duplex ultrasound with no flow or stenosis with peak systolic velocity (PSV) ≥300 cm/s, or PSV ratio ≥4.0 with distal monophasic flow pattern in all tibial arteries
- A duplex scan of the ipsilateral great saphenous vein has been performed to evaluate suitability for use as a bypass graft (unless contraindicated or unavailable, the contralateral vein should be evaluated if the ipsilateral vein is absent or unusable. If bypass to a tibial artery is contemplated and leg vein is not available, arm vein should be

evaluated) [10]

Chronic Limb Threatening Ischemia [6,7,11]

Chronic limb Threatening ischemia (CLTI) is present when there are nonhealing wounds, gangrene or rest pain. For the purposes of this guideline Rest Pain has its own noninvasive physiological requirements.

When BOTH of the following requirements have been met:

- **Clinical indications** – at least ONE of the following must be met:
  - ***Gangrene or nonhealing ischemic wounds*** present for more than 2 weeks despite provider directed and described wound care [7] **OR** wound Grade 1-3 based on the Society for Vascular Surgery Lower Extremity Threatened Limb Classification System (WIfI). [11] One of the following must **ALSO** be present:
    - A CTA, MRA, or invasive angiography demonstrates ≥ 50% stenosis that if treated would improve the potential for healing. In these scenarios, no additional non-invasive studies are required.
    - Non-invasive testing shows BOTH of the following:
      - Duplex ultrasound with absent velocities **OR** peak systolic velocity (PSV) ≥ 250 cm/s **AND** PSV ratio of ≥ 2.0 across the stenosis with monophasic distal flow
      - At least ONE of the following:
        - An ABI ≤ 0.8
        - Ankle pressure ≤ 100 mmHg
        - Toe pressures or transcutaneous partial pressure of O_2 ($TcPO_2$) ≤ 60 mmHg
        - If ABI ≥ 1.4, then one of the following [11]:
          - Toe pressures or $TcPO_2$ ≤ 60 mmHg
          - TBI ≤ 0.7
          - Monophasic PVR or Doppler waveforms at the ankle
  - ***No Gangrene or non-healing wounds but Rest Pain***, then with BOTH of the following:
    - An anatomically suitable lesion with imaging demonstrating at least one of the following:
      - ≥ 50% stenosis, as shown by CTA, MRA, or invasive angiography [6]
      - Duplex ultrasound with absent velocities OR peak systolic velocity (PSV) ≥ 250 cm/s AND PSV ratio of ≥ 2.0 across the stenosis with monophasic distal flow
    - At least ONE of the following:
      - An ABI ≤ 0.4 [11]

- If ankle pressures unrecordable, Toe pressure or $TcPO_2 \leq 30$ mmHg
- PVR amplitude or Doppler waveforms showing flat line or ≤ 5mm with absent dicrotic notch at the ankle

- **Other requirements** – ALL of the following must be met:
  - Proximal clinically significant aortoiliac disease is not present or has been successfully treated such that it is unlikely to be responsible for ongoing CLTI, OR will be treated concurrently with the femoropopliteal procedure
  - A duplex scan of the ipsilateral great saphenous vein has been performed to evaluate suitability for use as a bypass graft (unless contraindicated or unavailable, the contralateral vein should be evaluated if the ipsilateral vein is absent or unusable. If bypass to a tibial artery is contemplated and leg vein is not available, arm vein should be evaluated) [10]
  - If a graft material other than autogenous vein will be used, the reason(s) for choosing that graft must be described in the notes provided since vein is the conduit of choice especially for bypass to the below knee popliteal or infrapopliteal arteries (see **Definitions**). [10]

Other Indications or Specific Open Vascular Procedures [10,11]

- For the treatment of femoral-popliteal aneurysms with **ANY** of the following:
  - ≥ 20 mm
  - < 20 mm with extensive thrombus (≥ 50% lumen involvement) and at least one of the following:
    - Evidence of distal embolization
    - Poor distal runoff

    NOTE: If a graft other than vein will be used, the reason(s) for that choice must be described in the notes provided since vein is the conduit of choice especially for bypass to the below knee popliteal or tibial arteries.
- For the treatment of common femoral aneurysms with **ANY** of the following [12,13]:
  - > 3.5 cm
  - Compressive symptoms
  - Proven distal embolization
  - Pseudoaneurysm
  - Mycotic or secondarily infected
  - Causing local pain or neuropathy
  - Overlying skin compromise
- To allow local podiatric or orthopedic interventions when circulation may be tenuous but in and of itself not severe enough to warrant intervention; with ANY of the following:
  - An ABI ≤ 0.8.

- Ankle pressure ≤ 100 mmHg
- Toe Pressure or $TcPO_2$ ≤ 60 mmHg
- If ABI ≥ 1.4 then one of the following:
  - Toe Pressure or $TcPO_2$ ≤ 60 mmHg
  - Monophasic PVR or Doppler waveforms at the ankle

- Common femoral endarterectomy to treat claudication or CLTI will follow the same policies listed above (but preoperative evaluation of the saphenous vein is not a requirement since often prosthetic patch is used instead). Common femoral endarterectomy can be performed as a standalone procedure.
- For procedures in which a patch (synthetic or vein) is used as an add-on procedure where the provider places the patch (also known as a cuff) to the distal end of the graft to help maintain patency
- For procedures in which a patch (synthetic or vein) is used for the treatment of stenosis within a vein bypass graft in a symptomatic or asymptomatic member with concern for impending graft failure and **ANY** one of the following [14,15]:
  - Peak Systolic Velocity (PSV) of ≥ 180 cm/s
  - A velocity ratio of ≥ 2.0
  - An end diastolic velocity of ≤ 45 cm/s
- For Embolectomy or Thrombectomy performed for acute ischemia

Limitations

- If a bypass is being requested for claudication there can be no assertion, directly or indirectly, that treatment is required to prevent imminent amputation.
- Femoral-tibial artery bypass with prosthetic or non-autogenous graft material should only be used if ALL possible autologous vein is not available and an endovascular alternative is not feasible or has been unsuccessful.
- Common femoral endarterectomy cannot be requested concurrently with a bypass unless it involves the contralateral limb.

CODING AND STANDARDS

Codes

Code	Description
35302	Thromboendarterectomy, including patch graft, if performed; superficial femoral artery

Code	Description
35303	Thromboendarterectomy, including patch graft, if performed; popliteal artery
35304	Thromboendarterectomy, including patch graft, if performed; tibioperoneal trunk artery
35351	Thromboendarterectomy, including patch graft, if performed; iliac
35355	Thromboendarterectomy, including patch graft, if performed; iliofemoral
35361	Thromboendarterectomy, including patch graft, if performed; combined aortoiliac
35363	Thromboendarterectomy, including patch graft, if performed; combined aortoiliofemoral
35371	Thromboendarterectomy, including patch graft, if performed; common femoral
35372	Thromboendarterectomy, including patch graft, if performed; deep (profunda) femoral
35539	Bypass graft, with vein; aortofemoral
35540	Bypass graft, with vein; aortobifemoral
35556	Bypass graft, with vein; femoral-popliteal
35558	Bypass graft, with vein; femoral-femoral
35560	Bypass graft, with vein; aortorenal
35563	Bypass graft, with vein; ilioiliac
35565	Bypass graft, with vein; iliofemoral
35566	Bypass graft, with vein; femoral-anterior tibial, posterior tibial, peroneal artery or other distal vessels
35570	Bypass graft, with vein; tibial-tibial, peroneal-tibial, or tibial/peroneal trunk-tibial
35571	Bypass graft, with vein; popliteal-tibial, -peroneal artery or other distal vessels
35583	In-situ vein bypass; femoral-popliteal

Code	Description
35585	In-situ vein bypass; femoral-anterior tibial, posterior tibial, or peroneal artery
35587	In-situ vein bypass; popliteal-tibial, peroneal
35646	Bypass graft, with other than vein; aortobifemoral
35647	Bypass graft, with other than vein; aortofemoral
35650	Bypass graft, with other than vein; axillary-axillary
35654	Bypass graft, with other than vein; axillary-femoral-femoral
35656	Bypass graft, with other than vein; femoral-popliteal
35661	Bypass graft, with other than vein; femoral-femoral
35663	Bypass graft, with other than vein; ilioiliac
35665	Bypass graft, with other than vein; iliofemoral
35666	Bypass graft, with other than vein; femoral-anterior tibial, posterior tibial, or peroneal artery
35671	Bypass graft, with other than vein; popliteal-tibial or -peroneal artery
35701	Exploration not followed by surgical repair, artery; neck (eg, carotid, subclavian)
35702	Exploration not followed by surgical repair, artery; upper extremity (eg, axillary, brachial, radial, ulnar)
35703	Exploration not followed by surgical repair, artery; lower extremity (eg, common femoral, deep femoral, superficial femoral, popliteal, tibial, peroneal)
35721	Exploration (not followed by surgical repair), with or without lysis of artery; femoral artery
35741	Exploration (not followed by surgical repair), with or without lysis of artery; popliteal artery
35860	Exploration for postoperative hemorrhage, thrombosis or infection; extremity

Code	Description
35879	Revision, lower extremity arterial bypass, without thrombectomy, open; with vein patch angioplasty
35881	Revision, lower extremity arterial bypass, without thrombectomy, open; with segmental vein interposition
35883	Revision, femoral anastomosis of synthetic arterial bypass graft in groin, open; with nonautogenous patch graft (eg, polyester, ePTFE, bovine pericardium)
35884	Revision, femoral anastomosis of synthetic arterial bypass graft in groin, open; with autogenous vein patch graft
35903	Excision of infected graft; extremity
+35306	Thromboendarterectomy, including patch graft, if performed; each additional tibial or peroneal artery (List separately in addition to code for primary procedure)
+35572	Harvest of femoropopliteal vein, 1 segment, for vascular reconstruction procedure (eg, aortic, vena caval, coronary, peripheral artery) (List separately in addition to code for primary procedure)
+35681	Bypass graft; composite, prosthetic and vein (List separately in addition to code for primary procedure)
+35682	Bypass graft; autogenous composite, 2 segments of veins from 2 locations (List separately in addition to code for primary procedure)
+35683	Bypass graft; autogenous composite, 3 or more segments of vein from 2 or more locations (List separately in addition to code for primary procedure)
+35685	Placement of vein patch or cuff at distal anastomosis of bypass graft, synthetic conduit (List separately in addition to code for primary procedure)
+35700	Reoperation, femoral-popliteal or femoral (popliteal)-anterior tibial, posterior tibial, peroneal artery, or other distal vessels, more than 1 month after original operation (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children’s Health Insurance Program)

☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

- **Anatomically suitable lesion** [6]**:** one where the appropriate intervention would have low risk, and a high probability of initial and long-term success (> 2 years) based on accepted lesion classifications such as TASC II or GLASS.
- **Ankle Brachial Index (ABI)** [7]: The Ankle Brachial Pressure Index, known more commonly as an ABI, is performed using a doppler device and is calculated by dividing the resting systolic blood pressure at the dorsalis pedis and posterior tibial arteries by the systolic blood pressures in the arm and is expressed as a ratio. The ABI is the higher of the two measurements. Photoplethysmographic techniques to measure ABI are not an acceptable substitute for a doppler derived ABI. The ABI can be spurious if there is heavy arterial calcification making the blood pressures unrecordable or falsely elevated.
    - **ABI Reference Ranges:**
        - Abnormal: ≤ 0.90
        - Borderline: 0.91-0.99
        - Normal: 1.00-1.40
        - Rest pain: ≤ 0.40
        - Noncompressible: > 1.40
- **Chronic Limb Threatening Ischemia** (CLTI) has replaced Critical Limb Ischemia (CLI) since the threat to limb viability in patients with PAD is not only related to ischemia but other factors such as infection, neuropathy, and general patient morbidities. Further, “critical” implies that treatment is urgent to avoid limb loss, while some patients can keep their legs for extended periods of time even in the absence of revascularization. CLTI is defined clinically by the presence of rest pain (see definition), gangrene, a nonhealing wound or ulceration lasting more than 2 weeks despite appropriate wound care. Infection may make invasive treatment more urgent. The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System (WIfI) is helpful in defining CLTI and prognosticating indications for treatment and outcome. [11]
- **Claudication**: a symptom complex of pain that begins with ambulation and that is relieved within a brief time by walking cessation. It will usually resume at the same distance walked. It is described by the intensity of discomfort, the distance walked, the

duration of the walk and the impact that it has on quality of life (QOL) and activities of daily living (ADL). Claudication does not occur at rest. If left untreated, the natural history of claudication is slow progression, yet amputation is rare occurring in less than 5% of patients.

- **Clinically significant disease** is such that it is likely causing ischemic symptoms or findings
- **Endovascular intervention**: the treatment of vascular pathology with angioplasty, atherectomy, intravascular lithotripsy, drugs, stents or any such treatment performed from within the blood vessel and access from a remote site
- **Guideline Directed Medical Therapy (GDMT)** includes recommendations for antiplatelet therapy, cilostazol (unless contraindicated or not tolerated), statins, glycemic and hypertension control, structured exercise program (see definition), smoking cessation including planning, counseling, or behavior modification and pharmacotherapy if needed. Duration should be for at least 12 weeks.
- **Physiologic studies** include ABI, TBI, Toe pressures, $TcPO_2$, PVR or Doppler tracings
- **Rest Pain**: a distinct pain syndrome lasting more than 2 weeks, implying CLTI. It is defined as pain in the foot or toes aggravated by elevation and relieved by dependency. Nocturnal pain is not necessarily rest pain since there are other causes of pain at night. Rest pain does not usually imply the same urgency for treatment as gangrene or nonhealing wounds.
- **Structured exercise program** is provider-directed and monitored. It involves walking to a pain threshold 3 times a week.
- **Toe Brachial Index** is measured by dividing the highest brachial arm pressure by the pressure obtained from the first toe by any method. Unlike the ABI, the toe pressures are usually not affected by arterial calcification.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

ABI: Ankle Brachial Index

AR: Authorization Request

AUC: Appropriate use criteria

CLTI: Chronic limb Threatening ischemia

CPT: Current Procedural Terminology

CTA: Computed Tomography Angiography

DSA: Digital Subtraction Angiography

GDMT: Guideline directed medical therapy

GLASS: Global Anatomic Staging System

PAD: Peripheral artery disease

PSV: Peak Systolic Velocity

PTA: Percutaneous transluminal angioplasty

PVR: Pulse Volume Recording

TASC: Trans-Atlantic Inter-Society Consensus

TBI: Toe Brachial Index

$TcPO_2$: Tissue partial pressure of O_2

WIfI Classification: Wound, Ischemia, and Foot Infection

Guideline Directed Medical Therapy

Guideline directed medical therapy (GDMT) are outlined by joint American College of Cardiology (ACC)/American Heart Association (AHA) in cardiovascular clinical practice guidelines as Class I recommendation. These are maximally tolerated medications for a cardiovascular condition, when prescribed, have shown to improve healthcare outcomes such as survival along with significant reduction in major adverse cardiovascular events and hospitalization. For all recommended drug treatment regimens, the prescriber should confirm the dosage with product insert material and carefully evaluate for contraindications and interactions.

SUMMARY OF EVIDENCE

ACC/AHA/SCAI/SIR/SVM 2018 Appropriate Use Criteria for Peripheral Artery Intervention [6]

Study Design: This study involved the development of Appropriate Use Criteria (AUC) for peripheral artery intervention (PAI). The process included drafting patient scenarios, assumptions, and definitions based on published guidelines, trial data, and expert opinions. The scenarios were evaluated by an independent rating panel using a scoring scale from 1 to 9.

Target Population: The study focused on patients with peripheral artery disease (PAD) who may require revascularization treatments. This includes patients with renal artery stenosis, lower extremity disease, critical limb ischemia, asymptomatic artery disease, and secondary treatment options for lower extremity disease.

Key Factors:

Clinical Scenarios: 45 clinical scenarios with up to 6 intervention options per scenario were developed and categorized into 6 general sections.

Scoring: Each indication was scored as “Appropriate” (7 to 9), “May Be Appropriate” (4 to 6), or “Rarely Appropriate” (1 to 3).

Emphasis: Adherence to medical therapy was emphasized, with revascularization considered when medical therapy is insufficient.

Endovascular and Surgical Approaches: Both approaches were deemed appropriate in scenarios involving tissue loss or end organ compromise, with a tendency to select endovascular approaches.

2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease [7]

Study Design: This document is the 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS guideline for the management of lower extremity peripheral artery disease. It was developed by the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines in collaboration with several other organizations.

Target Population: The guidelines are intended for clinicians treating patients with lower extremity peripheral artery disease across its multiple clinical presentation subsets, including asymptomatic PAD, chronic symptomatic PAD, chronic limb-threatening ischemia, and acute limb ischemia.

Key Factors: The document provides comprehensive recommendations on the clinical assessment, diagnostic testing, medical therapy, preventive foot care, exercise therapy, revascularization techniques, management of chronic limb-threatening ischemia, and acute limb ischemia. It also addresses special considerations such as risk amplifiers, health disparities, and management of PAD in older patients.

The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System: Risk stratification based on Wound, Ischemia, and foot Infection (WIfI) [11]

Study Design: This document introduces the Society for Vascular Surgery Lower Extremity Threatened Limb Classification System, known as WIfI (Wound, Ischemia, and foot Infection).

Target Population: The classification system is designed for patients with threatened lower extremities due to chronic ischemia, particularly those with diabetes and diabetic foot ulcers.

Key Factors: The WIfI system stratifies patients based on the severity of wounds, ischemia, and infection. It aims to provide a more precise description of disease burden and improve outcomes analysis for various therapies. The system includes four grades for each factor and uses a Delphi consensus process to estimate the risk of amputation and the benefit of revascularization.

ANALYSIS OF EVIDENCE

Shared Conclusions

- **Importance of Revascularization**: All three articles emphasize the critical role of revascularization in managing peripheral artery disease (PAD) and critical limb ischemia (CLI). They agree that revascularization, whether through open surgical or endovascular procedures, is essential for improving limb salvage and patient outcomes.
- **Risk Stratification**: The articles highlight the importance of risk stratification in determining the appropriate treatment approach. They all agree that patient-specific factors, such as the severity of ischemia, wound extent, and presence of infection, should guide the choice of revascularization strategy.
- **Multidisciplinary Approach**: The need for a multidisciplinary approach to managing PAD and CLI is a common theme. The articles stress the importance of collaboration among vascular surgeons, interventional radiologists, podiatrists, and other specialists to optimize patient care.

In summary, while all three articles agree on the importance of revascularization, risk stratification, and a multidisciplinary approach, they differ in their specific criteria for revascularization, focus on patient populations, and recommendations for specific procedures. These differences highlight the need for individualized treatment plans based on patient-specific factors and the importance of a comprehensive approach to managing PAD and CLI.

POLICY HISTORY

Date	Summary
May 2026	• Added a Special Note to the Statement section • Clarified and reorganized indications for Claudication and Chronic Limb Threatening Ischemia • Added indications for treatment of common femoral aneurysms to the Other Indications section • Added technical description to codes • Updated Background section • Updated references
June 2025	• Updated citations • Added AUC scores • Added third bullet to General Information • Added Summary of Evidence and Analysis of Evidence

Date	Summary
January 2025	• This guideline replaces UM CARDIO_1164 for Femoral Popliteal Bypass Surgery • Guideline name changed to **Infrainguinal Open Arterial Vascular Surgery** • Added CPT code 35685 • Clinical indications were updated per societal guidance

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7295 for Heart Catheterization

Guideline Number: Evolent_CG_7295	**Applicable Codes**	
"Evolent" refers to Evolent Health LLC and Evolent Specialty Services, Inc. ***© 2026 - 2027 Evolent. All rights Reserved.***		
Original Date: January 2026	**Last Revised Date:** June 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Heart catheterization is an invasive angiographic procedure used to evaluate the presence and extent of coronary artery disease (CAD).

In addition to angiography, it can also include ventriculography, aortography, acquisition of hemodynamic data, measurement of cardiac output, detection and quantification of shunts and flows, intravascular ultrasound (IVUS), and fractional flow reserve (FFR)/instantaneous wave free ratio (iFR) for determination of a lesion's hemodynamic severity. CAD stenosis ≥ 70% (≥ 50% in the left main coronary artery) is considered clinically significant or obstructive CAD. [1–4]

Special Note

Medical necessity for left heart catheterization will consider the preference for appropriate non-invasive alternatives, including but not limited to stress echocardiography (SE), myocardial perfusion imaging (MPI) and coronary computed tomographic angiography (CCTA) when deemed more suitable, unless contraindications are present (see **DEFINITIONS** section). Preference toward CCTA will be denoted by ┼

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a

robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [5–9]

INDICATIONS FOR INVASIVE CORONARY ARTERIOGRAPHY [1,10–13]

Symptomatic Patients Without Known Coronary Artery Disease (CAD)

High pretest probability without prior testing [3]:

- Likely angina (typical angina) and age ≥ 50 years (**AUC Score 7**) [3]
- Likely angina (typical angina) and age < 50 years┼ with more than two risk factors (see **Background**) (**AUC Score 7**) [3]

Low and Intermediate probability:

- Abnormal exercise electrocardiogram (ECG) stress test (ETT) with high-risk findings┼ (see **Background**) (**AUC Score 7**) [11]:
  - Duke Treadmill Score (DTS) ≤ -11
  - Exercise-induced ST-segment elevation (see **Background**)
  - Exercise-induced hypotension [14] (see **Background**)
  - Exercise induced ventricular tachycardia (VT)
  - ≥ 1 mm ST-segment depression in multiple ECG leads persisting into recovery ≥ 5 minutes [11,15]
  - Ischemia at low threshold [16] (see **Background**) on stress-testing with or without an abnormal decrease in normal systolic blood pressure response during exercise
- Stress imaging with moderate to severe ischemia (**AUC Score 9**) [3] (see **Background**)
- Stress imaging with intermediate risk findings (see **Background**) in a patient with one of the following:
  - Symptoms consistent with ischemia unresponsive to guideline directed medical therapy (GDMT) [11]
  - Unsatisfactory quality of life due to angina; interfering with the patient's occupation or the ability to perform usual activities [1]
  - Ejection fraction (EF) < 50% [1]
- Stress imaging with mild ischemia (see **Background**) when coronary computed tomographic angiography (CCTA) cannot be performed (**AUC Score 7**) [3]
- Non-invasive test with low-risk findings with new, worsening, or limiting symptoms with reasonable suspicion of cardiac origin despite guideline-directed medical therapy (GDMT) or inability to tolerate GDMT, when CCTA cannot be done (**AUC Score 7**) [1,10,11]

- Discordant, equivocal, or inconclusive non-invasive evaluation in patients with suspected symptomatic stable ischemic heart disease┼, including the following [3,11]:
  - Low risk stress imaging with high-risk stress ECG response┼ (**AUC Score 7**) [11]
  - Equivocal, uninterpretable, or inconclusive stress imaging due to issues of attenuation or other problems with interpretability┼ (**AUC Score 8**) [3]
- Before high-risk non-cardiac surgery in patients who have evidence of ischemia by non-invasive testing [17]
- CCTA abnormalities [11]:
  - ≥ one vessel with 50 - 69% stenosis (**AUC Score 7**)
  - ≥ one vessel with ≥ 70% stenosis (**AUC Score 8**)
  - ≥ 50% left main stenosis, even if asymptomatic [11]
  - CCTA inconclusive (see **Background**) (**AUC Score 7**)

Symptomatic Patients with Known CAD

- New or worsening likely angina (or typical angina) or patient's previously known anginal symptoms in patient with a history of prior coronary artery bypass grafting (CABG) and/or percutaneous coronary intervention (PCI) (**AUC Score 7**) [1,10–13]
- New or worsening likely angina (or typical angina) or patient's previously known anginal symptoms in a patient with a history of myocardial infarction (MI) and no revascularization (**AUC Score 7**)
- Symptomatic patient with new or worsening intermediate risk findings (see **Background**) on non-invasive stress test┼ (**AUC Score 7**) [11]
- New or worsening high risk findings (see **Background**) on non-invasive stress test [11]:
  - Symptomatic (**AUC Score 9**)
  - Asymptomatic (**AUC Score 7**)
- New, worsening, or limiting symptoms, with known un-revascularized obstructive CAD, in a patient eligible for revascularization [1,10] (**AUC Score 6**) [3]

Other Cardiovascular Conditions

- Ventricular arrhythmias [3]
  - Sustained ventricular tachycardia (VT) (see **Background**) (**AUC Score 7**)
  - Ventricular fibrillation (**AUC Score 8**)
- Heart failure [3]
  - Heart failure with reduced left ventricular ejection fraction (LVEF < 50%) of unknown etiology (**AUC Score 8**) [11]

NOTE: non-invasive imaging (with preference for stress echocardiogram) is indicated for newly diagnosed heart failure with preserved left ventricular ejection fraction (HFpEF) [3]

- Deterioration in clinical status of heart failure or cardiomyopathy requiring invasive evaluation for guidance or alteration in therapy

- Structural abnormality (eg, mitral regurgitation or ventricular septal defect) with reason to suspect ischemic origin, with or without symptoms (**AUC Score 9**) [11]
- New regional wall motion abnormality of unknown etiology (**AUC Score 7**)
- Clarification of the diagnosis of myocarditis versus acute coronary syndrome† [18]
- Exercise induced VT with or without symptoms (**AUC Score 7**)
- Post Acute Coronary Syndrome (ACS) (see **Background**) with "culprit only" revascularization and plan for further PCI of non-culprit lesion [19,20]
- Following recovery from unexplained sudden cardiac arrest [21]

Vasospastic Angina (VSA) [22,23]

- Indications for Invasive Provocative Testing:
  - History suspicious for VSA without a documented episode if there is **ANY** of the following (see **Background**):
    - Nitrate-responsive rest angina, and/or
    - Diurnal variation in symptoms or exercise intolerance, and/or
    - Rest angina without obstructive CAD
    - ACS in the absence of a culprit lesion
    - Unexplained cardiac arrest
    - Unexplained syncope preceded by chest pain
    - Recurrent rest angina following successful PCI
    - Invasive evaluation for non-invasively diagnosed patients unresponsive to medical therapy (ie, calcium channel blocker with or without long-acting nitrate)
    - Documented spontaneous episode of VSA to determine site and mode of spasm

Prior to Non-Coronary Cardiac Surgery

- Evaluation of coronary anatomy, with consideration of coronary revascularization, prior to cardiac surgery in patients with any of the following [24–27]:
  - Symptoms of angina
  - Stress imaging with evidence of ischemia
  - Decreased LV systolic function (ejection fraction (EF) < 50%)
  - History of CAD

- Coronary risk factors, including men > 40 and postmenopausal women [27]
- Non-invasive data that is inconclusive
- Severe valve disease
- Requirement for detailed assessment of coronary artery anatomy prior to aortic valve homograft surgery, pulmonary autograft (Ross procedure), or aortic root procedure
- Patients undergoing transcatheter aortic valve replacement (TAVR) or other transcatheter valve procedures
- Can be done pre-organ transplant when required by transplant center protocol in place of, but not in addition to, an imaging study

Hypertrophic Cardiomyopathy (HCM) [28]

- Patients with HCM, who are candidates for septal reduction therapy (SRT), and for whom there is uncertainty of left ventricular outflow tract (LVOT) obstruction on noninvasive imaging studies, invasive hemodynamic assessment with cardiac catheterization is recommended
- Prior to surgical myectomy in HCM patients who are at risk for coronary atherosclerosis┼

Post Cardiac Transplantation

- Annual assessment for transplant vasculopathy, if other ischemia evaluation not planned [29]

Hemodynamic Assessment

- Indications for angiographic and/or hemodynamic assessment of valvular function or shunt physiology [11,24,30]
  - Assessment of bioprosthetic valve when transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) were inadequate, and cardiac magnetic resonance (CMR) or cardiac computed tomography (CCT) are not available
  - Assessment of mechanical valve prostheses when TTE and TEE are inadequate and CCTA is not available
  - Discordance between non-invasive data and clinical impression of severity of valvular disease
  - Evaluation of indeterminate shunt anatomy or shunt flows/ratio
- Indications for hemodynamic assessment only [11,30]
  - Assessment of constrictive and/or restrictive physiology
  - Assessment of pulmonary hypertension when non-invasive data provides inadequate information for management, or to evaluate response to intravenous drug therapy
  - Assessment of hemodynamics in heart failure, cardiomyopathy, or adult congenital heart disease, when:

- Non-invasive data is discordant or conflicts with the clinical presentation
- Non-invasive data is inadequate for clinical management

INDICATIONS FOR ASCENDING AORTOGRAPHY (24,26,27)

- Evaluation of aortic root dilatation in patients with severe aortic stenosis and regurgitation prior to valve surgery
- Evaluation of aortic root, ascending aortic aneurysm prior to repair
- Evaluation central shunts, coarctation and great vessels
- Bypass graft identification at the time of left heart catheterization
- Disease affecting the aorta and coronary arteritis in which coronary artery involvement is suspected.

CODING AND STANDARDS

Codes

Code	Description
93024	Ergonovine provocation test
93452	Left heart catheterization including intraprocedural injection(s) for left ventriculography, imaging supervision and interpretation, when performed
93453	Combined right and left heart catheterization including intraprocedural injection(s) for left ventriculography, imaging supervision and interpretation, when performed
93454	Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation
93455	Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with catheter placement(s) in bypass graft(s) (internal mammary, free arterial, venous grafts) including intraprocedural injection(s) for bypass graft angiography

Code	Description
93456	Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with right heart catheterization
93457	Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with catheter placement(s) in bypass graft(s) (internal mammary, free arterial, venous grafts) including intraprocedural injection(s) for bypass graft angiography and right heart catheterization
93458	Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with left heart catheterization including intraprocedural injection(s) for left ventriculography, when performed
93459	Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with left heart catheterization including intraprocedural injection(s) for left ventriculography, when performed, catheter placement(s) in bypass graft(s) (internal mammary, free arterial, venous grafts) with bypass graft angiography
93460	Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with right and left heart catheterization including intraprocedural injection(s) for left ventriculography, when performed
93461	Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with right and left heart catheterization including intraprocedural injection(s) for left ventriculography, when performed, catheter placement(s) in bypass graft(s) (internal mammary, free arterial, venous grafts) with bypass graft angiography
93531	Combined right heart catheterization and retrograde left heart catheterization, for congenital cardiac anomalies
93532	Combined right heart catheterization and transseptal left heart catheterization through intact septum with or without retrograde left heart catheterization, for congenital cardiac anomalies
93533	Combined right heart catheterization and transseptal left heart catheterization through existing septal opening, with or without retrograde left heart catheterization, for congenital cardiac anomalies

Code	Description
93595	Left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone, normal or abnormal native connections
93596	Right and left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone(s); normal native connections
93597	Right and left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone(s); abnormal native connections
+93563	Injection procedure during cardiac catheterization including imaging supervision, interpretation, and report; for selective coronary angiography during congenital heart catheterization (List separately in addition to code for primary procedure)
+93598	Cardiac output measurement(s), thermodilution or other indicator dilution method, performed during cardiac catheterization for the evaluation of congenital heart defects (List separately in addition to code for primary procedure)
+93462	Left heart catheterization by transseptal puncture through intact septum or by transapical puncture (List separately in addition to code for primary procedure
+93463	Pharmacologic agent administration (eg, inhaled nitric oxide, intravenous infusion of nitroprusside, dobutamine, milrinone, or other agent) including assessing hemodynamic measurements before, during, after and repeat pharmacologic agent administration, when performed (List separately in addition to code for primary procedure)
+93464	Physiologic exercise study (eg, bicycle or arm ergometry) including assessing hemodynamic measurements before and after (List separately in addition to code for primary procedure)
+93564	Injection procedure during cardiac catheterization including imaging supervision, interpretation, and report; for selective opacification of aortocoronary venous or arterial bypass graft(s) (eg, aortocoronary saphenous vein, free radial artery, or free mammary artery graft) to one or more coronary arteries and in situ arterial conduits (eg, internal mammary), whether native or used for bypass to one or more coronary arteries during congenital heart catheterization, when performed (List separately in addition to code for primary procedure)

Code	Description
+93565	Injection procedure during cardiac catheterization including imaging supervision, interpretation, and report; for selective left ventricular or left atrial angiography (List separately in addition to code for primary procedure)
+93566	Injection procedure during cardiac catheterization including imaging supervision, interpretation, and report; for selective right ventricular or right atrial angiography (List separately in addition to code for primary procedure)
+93567	Injection procedure during cardiac catheterization including imaging supervision, interpretation, and report; for supravalvular aortography (List separately in addition to code for primary procedure)
+93568	Injection procedure during cardiac catheterization including imaging supervision, interpretation, and report; for nonselective pulmonary arterial angiography (List separately in addition to code for primary procedure)
+93573	Injection procedure during cardiac catheterization including imaging supervision, interpretation, and report; for selective pulmonary arterial angiography, bilateral (List separately in addition to code for primary procedure)
+93574	Injection procedure during cardiac catheterization including imaging supervision, interpretation, and report; for selective pulmonary venous angiography of each distinct pulmonary vein during cardiac catheterization (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

General Overview

Heart catheterization is the passage of a thin flexible tube (catheter) into the left or right heart systems via arteries or veins, respectively, for the purposes of hemodynamic measurements, acquisition of blood samples from specific locations, and/or the injection of radiopaque medium for the purposes of visualizing vascular anatomy. Coronary angiography is the passage of a catheter into the left side of the heart to diagnose or treat blockages of coronary arteries.

Definitions

- **Inconclusive CCTA** [31,32]
  - Results from poor image quality or other factors which may obscure (or simulate) coronary lesions making interpretation difficult.
  - These factors include motion artifacts, artifacts related to metallic structures in or near the heart, extensive coronary calcification (can often be mitigated by FFR-CT), patient body habits (ie, morbid obesity) and technical issues such as improper image acquisition timing.
- **Acute Coronary Syndrome (ACS)** [20]
  - ACS is a medical emergency usually caused by disruption of a coronary artery atherosclerotic plaque resulting partial or complete artery thrombosis resulting in myocardial ischemia or infarction. ACS can be a dynamic process with patients rapidly progressing from one clinical condition (described below) to another.
  - Less common causes of ACS include coronary artery spasm, dissection or embolism. ACS includes three related clinical conditions existing along a continuum of severity:
    - Unstable angina: transient ischemia without significant myocardial injury
    - Non-ST segment elevation myocardial infarction (NSTEMI): more prolonged or severe ischemia resulting in myocardial injury as detected by elevated troponin.
    - ST-segment elevation myocardial Infarction (STEMI): prolonged, severe ischemia resulting in more extensive myocardial injury (ie, transmural infarction) typically caused by a completely occluded artery.
- **Stable Patients** (ie, patients not having ACS) without known CAD fall into 2 categories [1,3,4]:
  - **Asymptomatic**, for whom global risk of CAD events can be determined from coronary risk factors, using calculators available online (see Global Cardiovascular Risk Calculators section)
  - **Symptomatic**, for whom the pretest probability that chest-related symptoms are due to clinically significant CAD is estimated
- **Angina** [3]
  - Beginning 2023, the classification terms for angina were updated within the ACC's Multimodality Appropriate Use Criteria for the Detection and Risk Assessment of

Chronic Coronary Disease to Less Likely Anginal Symptoms and Likely Anginal Symptoms.

- **Likely Anginal symptoms** encompass chest/epigastric/shoulder/arm/jaw pain, chest pressure/discomfort occurring with exertion or emotional stress and relieved by rest, nitroglycerine or both.
- **Less-Likely Anginal symptoms** include dyspnea, or fatigue not relieved by rest/nitroglycerin, as well as generalized fatigue or chest discomfort with a time course not indicative of angina (eg, resolving spontaneously within seconds or lasting for an extended period unrelated to exertion).

- Previously, this document referred to “Typical Angina”, “Atypical Angina” and “Non-Anginal” symptoms, defined by the **Diamond Forrester Table**. We still provide this information for your reference:

Diamond Forrester Table *(3,33)*

Age (Years)	**Gender**	**Typical/ Definite Angina Pectoris**	**Atypical/ Probable Angina Pectoris**	**Non-anginal Chest Pain**
≤ 39	Men	Intermediate	Intermediate	Low
	Women	Intermediate	Very low	Very low
40 – 49	Men	High	Intermediate	Intermediate
	Women	Intermediate	Low	Very low
50 – 59	Men	High	Intermediate	Intermediate
	Women	Intermediate	Intermediate	Low
≥ 60	Men	High	Intermediate	Intermediate
	Women	High	Intermediate	Intermediate

Very Low: < 5% pretest probability of CAD, usually not requiring stress evaluation; **Low**: 5 - 10% pretest probability of CAD; **Intermediate**: 10% - 90% pretest probability of CAD; **High**: > 90% pretest probability of CAD

- **Typical Angina** (Definite) is defined as including ALL **3** characteristics:
  - Substernal chest pain or discomfort with characteristic quality and duration
  - Provoked by exertion or emotional stress
  - Relieved by rest and/or nitroglycerin
- **Atypical Angina** (Probable) has only **2** of the above characteristics
- **Nonanginal Chest Pain/Discomfort** has only **0 - 1** of the above characteristics

- **Anginal Equivalent** [12,34,35]
  - Development of an anginal equivalent (eg, shortness of breath, fatigue, or weakness) either with or without prior coronary revascularization should be based upon the documentation of reasons that symptoms other than chest discomfort are not due to other organ systems (eg, dyspnea due to lung disease, fatigue due to anemia), by presentation of clinical data such as respiratory rate, oximetry, lung exam, etc. (as well as D-dimer, chest CT(A), and/or PFTs, when appropriate), and then incorporated into the evaluation of coronary artery disease as would chest discomfort. Syncope per se is not an anginal equivalent.
- **Evaluation Sequence for Patients with Possible Symptoms of Myocardial Ischemia [3,12]:**
  - Estimate pretest probability (PTP) of obstructive CAD based on symptoms, age, risk factors (and gender if using the Diamond Forrester table).
    - Estimated PTP is used to guide the choice of initial test (or possibly no testing for low or very low PTP)
- Coronary risk assessment (see section below) is derived from non-invasive testing results.

  NOTE: Coronary risk assessment is used to guide therapy (including additional testing, if indicated).
- **Coronary Risk Categories Derived from Non-invasive Testing** [1,3,13]
  - **High risk (> 3% annual death or MI)**
    - Severe resting left ventricular (LV) dysfunction (LVEF < 35%) not readily explained by non-coronary causes
    - Resting perfusion abnormalities ≥ 10% of the myocardium in patients without prior history or evidence of myocardial infarction (MI)
    - Stress ECG findings including
      - ≥ 1 mm of ST-segment depression at low workload (< 5 METS and/or ≤ 3 minutes on Bruce protocol)
      - ≥ 1 mm of ST-segment depression in multiple leads persisting ≥ 5 minutes into recovery [15]
      - Exercise induced hypotension (≥ 10 mm Hg decrease in systolic blood pressure with exercise) [14]
      - Exercise-induced ST-segment elevation in non-infarct related ECG leads (ie, leads without pathological Q waves) [36]
      - Exercise-induced ventricular tachycardia (VT)/ventricular fibrillation (VF)
    - Severe stress-induced left ventricular (LV) dysfunction (peak exercise EF < 45% or drop in EF with stress ≥ 10%)
    - Moderate to severe ischemia on imaging defined as:
      - Stress nuclear imaging: ≥ 10% ischemic myocardium and/or ischemia

involving ≥ 2 vascular territories [3]

- Stress echo: ≥ 3 of 16 newly dysfunctional segments and/or ≥ 2 vascular territories, or wall motion abnormality developing at low dose of dobutamine (≤ 10 mg/kg/min) or at a low heart rate (< 120 beats/min) [3]
- Stress MRI: ≥ 4 of 32 subsegments with ischemic defects during vasodilatation stress or > 3 of 16 segments with new or worsening dysfunction during exercise stages or progressive inotropic stress [3]

- Stress-induced LV transient ischemic dilation (TID). TID is the ratio of left ventricular area immediately post-exercise divided by the area of the 4-hour redistribution image, with an abnormal ratio defined as > 1.12 [37]
- Wall motion abnormality developing at low dose of dobutamine (≤ 10 mg/kg/min) or at a low heart rate (< 120 beats/min)
- CCTA with multivessel obstructive CAD (≥ 70% stenosis) or left main stenosis (≥ 50% stenosis)

- **Intermediate risk (1% to 3% annual death or MI)**
  - Mild or moderate resting LV dysfunction (EF 35% to 49%) not readily explained by non-coronary causes
  - Resting perfusion abnormalities in 5% to 9.9% of the myocardium in patients without a history or prior evidence of MI
  - Stress ECG with ≥ 1 mm of ST-segment depression occurring with exertional symptoms at average or higher workload (> 5 METS and/or > 3 minutes on Bruce protocol) persisting < 5 minutes into recovery
  - Mild ischemia on imaging defined as [3]:
    - Stress nuclear: <10% ischemic myocardium and/or ischemia involving 1 vascular territory without stress-induced LV dilation
    - Stress echo: < 3 of 16 newly dysfunctional segments and/or involving 1 vascular territory
    - Stress MRI: <4 of 32 subsegments with ischemic defects during vasodilatation stress or <3 of 16 segments with new or worsening dysfunction during exercise stages or progressive inotropic stress
  - CAC score 100 to 399 Agatston units (only for use in primary prevention, not for heart catheterization decision making) [1,4,11,38]
  - CCTA with one vessel CAD with ≥ 70% stenosis or moderate CAD stenosis (50% to 69% stenosis) in ≥ 2 arteries
- **Low risk (< 1% annual death or MI)**
  - Low-risk treadmill score (score ≥ 5) or no new ST segment changes or exercise-induced chest pain symptoms, when achieving maximal levels of exercise
  - Normal or small myocardial perfusion defect at rest or with stress involving < 5% of the myocardium

- Normal stress or no change of baseline wall motion abnormalities during stress
- CAC score < 100 Agatston units (only for use in primary prevention, not for heart catheterization decision making) [1,4,11,38]
- CCTA with no coronary stenosis > 50%

- **Coronary Artery Disease** [1,4,13,39]
  - Definitions
    - **Coronary artery calcification (CAC)** is a marker of risk, as measured by Agatston score on coronary artery calcium imaging. It is not a diagnostic tool so much as it is a risk stratification tool. Its incorporation into global risk can be achieved by using the Multi-Ethnic Study of Atherosclerosis (MESA) risk calculator.
    - **Coronary Artery Disease (CAD)**: narrowing or blockage of the coronary arteries (blood vessels that carry blood and oxygen to the heart), usually caused by atherosclerosis (a buildup of fatty material and plaque inside the coronary arteries) which may cause chest pain, shortness of breath during exercise, and heart attacks.
    - **Ischemia-producing disease** (also called hemodynamically or functionally significant disease, or obstructive coronary disease for which revascularization might be appropriate) implies at least one of the following:
      - Demonstrable ischemic findings on stress testing (ECG or stress imaging), that are at least mild in degree (1)
      - Suggested by percentage diameter stenosis ≥ 70% by angiography; intermediate lesions are 50 – 69% [11]
      - For a left main artery, suggested by a percentage stenosis $\geq$ 50% or minimum luminal cross-sectional area on IVUS ≤ 6 square mm [2,12,39]
      - FFR (fractional flow reserve) $\leqq$ 0.80 for a major vessel [2,39]
        - FFR is the distal to proximal pressure ratio across a coronary lesion during maximal hyperemia induced by either intravenous or intracoronary adenosine. Less than or equal to 0.80 is considered a significant reduction in coronary flow.
      - Instantaneous wave-free ratio (iFR) ≤ 0.89 for a major vessel [2,40,41]
        - iFR measures the ratio of distal coronary to aortic pressure during the wave free period of diastole, with a value ≤ 0.89 considered hemodynamically significant. [40,41]
    - **Ischemic symptoms (angina pectoris)** refers to tightness, heaviness, pressure, squeezing, or other discomfort in the chest or adjacent areas. Ischemia may also present with fatigue, faintness, or dyspnea.
    - **Percentage stenosis** refers to the reduction in diameter stenosis when angiography is the method and can be estimated or measured using angiography or more accurately measured with intravascular ultrasound (IVUS).

- Prinzmetal's angina (also known as variant angina or vasospastic angina (VSA)) [22]:
  - Diagnostic criteria include:
    - Nitrate responsive angina with at least one of the following:
      - Rest angina, typically between night and early morning
      - Diurnal variation in exercise intolerance (worse in the morning)
      - Hyperventilation may precipitate an episode
      - Calcium channel blockers (not beta-blockers) scan suppress episodes
    - ECG changes occur during an episode, including:
      - ST segment elevation ≥ 1mm
      - ST segment depression ≥ 1mm
    - New inverted U waves
- **Global Risk of Cardiovascular Disease**
  - Global risk of CAD is defined as the probability of manifesting cardiovascular disease over the next 10 years and refers to **asymptomatic** patients without known cardiovascular disease. It should be determined using one of the risk calculators below.
    - **CAD Risk—Low**
      - 10-year absolute coronary or cardiovascular risk < 10%
    - **CAD Risk—Moderate**
      - 10-year absolute coronary or cardiovascular risk between 10% and 20%
    - **CAD Risk—High**
      - 10-year absolute coronary or cardiovascular risk of > 20%

Global CAD Risk Calculators

- Framingham Cardiovascular Risk
- Reynolds Risk Score
  - Can use if there is no history of diabetes. Unique for use of family history
- Pooled Cohort Equation
- ACC/AHA Risk Calculator
- MESA Risk Calculator
  - With addition of coronary artery calcium score, for CAD-only risk

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [8]

- Appropriate Care - Median Score 7-9

- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

CABG: Coronary artery bypass grafting

CAC: Coronary artery calcium

CAD: Coronary artery disease

CCT: Cardiac computed tomography

CCTA: Coronary computed tomographic angiography

CMR: Cardiac magnetic resonance

CT: Computed tomography

CTA: Computed tomography angiography

DTS: Duke Treadmill Score

ECG: Electrocardiogram

EF: Ejection fraction

ETT: Exercise treadmill test

FFR: Fractional flow reserve

FFR-CT: Fractional flow reserve – computed tomography

GDMT: Guideline-directed medical therapy

HCM: Hypertrophic cardiomyopathy

HFpEF: Heart failure with preserved left ventricular ejection fraction

iFR: Instantaneous wave-free ratio

IVUS: Intravascular ultrasound

LHC: Left heart catheterization

LV: Left ventricular

LVEF: Left ventricular ejection fraction

LVOT: Left ventricular outflow tract

MESA: Multi-Ethnic Study of Atherosclerosis

MI: Myocardial infarction

MPI: Myocardial perfusion imaging

MR: Mitral regurgitation

PCI: Percutaneous coronary intervention

PFT: Pulmonary function test

SE: Stress echocardiography

SRT: Septal reduction therapy

TAVR: Transcatheter aortic valve replacement

TID: Transient ischemic dilation

TTE: Transthoracic echocardiography

TEE: Transesophageal echocardiography

VT: Ventricular tachycardia

VF: Ventricular fibrillation

VSA: Vasospastic angina

SUMMARY OF EVIDENCE

2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease [1]

Study Design: This document is a guideline for the diagnosis and management of patients with stable ischemic heart disease. It was developed by the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, along with other medical organizations.

Target Population: Patients with stable ischemic heart disease.

Key Factors: The guideline covers various aspects, including the methodology and evidence overview, clinical evaluation, noninvasive testing, risk assessment, treatment, and patient follow-up. It emphasizes the importance of patient involvement in decision-making and provides detailed recommendations for diagnosis and management.

ACCF/SCAI/AATS/AHA/ASE/ASNC/HFSA/HRS/SCCM/SCCT/SCMR/STS 2012 Appropriate Use Criteria for Diagnostic Catheterization [11]

Study Design: This document provides appropriate use criteria for diagnostic catheterization. It was developed by the American College of Cardiology Foundation Appropriate Use Criteria Task Force and other medical organizations.

Target Population: Patients undergoing diagnostic catheterization for various cardiovascular conditions.

Key Factors: The document includes 166 clinical scenarios rated for the appropriateness of diagnostic catheterization. It focuses on the performance of coronary angiography and hemodynamic measurements for evaluating coronary artery disease, valvular heart disease, pulmonary hypertension, and cardiomyopathies. The criteria aim to guide physician decision-making, healthcare delivery, and reimbursement policy.

ACC/AHA/ASE/ASNC/ASPC/HFSA/HRS/SCAI/SCCT/SCMR/STS 2023 Multimodality Appropriate Use Criteria for the Detection and Risk Assessment of Chronic Coronary Disease [3]

Study Design: This document is an update of the multimodality appropriate use criteria for the detection and risk assessment of chronic coronary disease. It was developed by the American College of Cardiology Solution Set Oversight Committee and other medical organizations.

Target Population: Patients with chronic coronary disease, including those with symptoms of ischemia, prior myocardial infarction, or revascularization, and those undergoing assessment for exercise programs or cardiac rehabilitation.

Key Factors: The document provides ratings for various diagnostic modalities, including exercise ECG, stress nuclear MPI, stress echocardiography, stress CMR, coronary artery calcium scoring, coronary computed tomography angiography, and invasive coronary angiography. It emphasizes the importance of appropriate test selection based on clinical scenarios and patient characteristics

ANALYSIS OF EVIDENCE

Shared Findings [1,3,11]

All three articles emphasize the importance of heart catheterization in diagnosing and managing cardiovascular diseases. They agree on the necessity of using heart catheterization for accurate diagnosis and risk assessment, especially in patients with suspected or known coronary artery disease (CAD).

- **Diagnostic Accuracy**: All articles highlight the high diagnostic accuracy of heart catheterization in detecting obstructive CAD. They emphasize that heart catheterization provides detailed information about coronary anatomy and helps in identifying the severity of stenosis.
- **Risk Assessment**: The articles agree on the role of heart catheterization in risk assessment. They mention that heart catheterization helps in evaluating the risk of future cardiovascular events and guides treatment decisions.
- **Guidelines and Recommendations**: All three articles are developed by reputable medical organizations and provide guidelines and recommendations for the appropriate use of heart catheterization. They emphasize evidence-based practices and aim to improve patient outcomes

Conclusion [1,3,11]

The evidence presented in these articles reiterates the importance of heart catheterization in diagnosing and managing cardiovascular diseases. They highlight the high diagnostic accuracy and risk assessment capabilities of heart catheterization, which are crucial for guiding treatment decisions and improving patient outcomes.

In summary, while the articles share common conclusions about the importance of heart catheterization, they differ in their specific focuses and recommendations based on their contexts. Together, they provide a comprehensive understanding of the role of heart catheterization in diagnosing and managing cardiovascular diseases.

POLICY HISTORY

Date	Summary
June 2026	• Special Note added to indicate CCTA alternatives with a ┼ • Indications for Invasive Coronary Arteriography section re-ordered to have sections on Symptomatic Patients without Known CAD and Symptomatic Patients with Known CAD • Following sections were added to new sections: Stable Ischemic Heart Disease, Coronary CTA (CCTA) Abnormalities, Heart Failure with Left Ventricular Dysfunction, and Ventricular Arrhythmias • Added Vasospastic Angina (VSA) section and indications • Title of Prior to Non-Coronary Intervention and Cardiac Surgery updated to be Prior to Non-Coronary Cardiac Surgery • Post Cardiac Transplantation section indication updated to be concurrent with Evolent Clinical Guidelines 7275 for Coronary Artery Computed Tomography Angiography (CCTA), 7312 for Myocardial Perfusion Imaging (MPI), and 7328 for tress Echocardiogram. • CPT code table added with descriptions of codes • Definitions section updated to include Inconclusive CCTA, Acute Coronary Syndrome (ACS), and Prinzemetal's angina • Background update to reflect Cardiac Definitions guide • Acronym sections updated
December 2025	• Added the following CPT Codes to reflect Evolent prior authorization scope: 93024
November 2025	• Added medical necessity for left heart catheterization to the General Information section
July 2025	• Reviewed to reconcile dates, no substantive changes made
June 2025	• Added a Summary of Evidence and Analysis of Evidence
April 2025	• This guideline merges and replaces two Evolent guidelines with identical clinical criteria: ECG 7295-01 for Heart Catheterization

Date	Summary
	and ECG 065 for Heart Catheterization into Evolent Clinical Guideline 7295 for Heart Catheterization ● This guideline also merges Procedure Codes from these two Evolent guidelines ● Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices ● Aligned clinical reasoning section for consistency ● Updated stress imaging in Stable Ischemic Heart Disease and corresponding Definitions in the Background section per recent societal appropriate use criteria reference ● Updated references

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7299 for Hemodialysis Access Creation

Guideline Number: Evolent_CG_7299	**Applicable Codes**	
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Original Date: September 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines, and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Hemodialysis is a process of purifying the blood of a person whose kidneys are not working normally (renal failure). Hemodialysis requires vascular access to obtain blood for purifying in the dialysis machine and then to return blood to the body. This can be achieved via a central venous catheter (CVC), creation of an arteriovenous fistula (AVF) via an open or endovascular approach, or arteriovenous graft (AVG).

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

Special Notes

- For the most part, CVC(s) should be regarded as temporary procedures and avoided whenever possible. Except in rare circumstances, a CVC should always be tunneled (central vein tunneled catheter [CVTC]) (see **Definitions**).
- If there is sufficient time for permanent access to be created, an AVF is generally preferred over an AVG, assuming suitable anatomy, local limb conditions, and patient preference. The previous “fistula first” initiative is no longer appropriate.

- Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used, including their potential outcomes. This process must be reflected in notes provided.

INDICATIONS [6]

Central Venous Catheter

- Short-term indications include any **ONE** of the following:
  - An AVF or AVG has been created but is not ready for use
  - Acute indication for hemodialysis such as acute transplant rejection
  - Peritoneal dialysis patients requiring a time-limited period of rest or resolution of a complication
  - Complications of an AVF or AVG that result in temporary non-use until the problem is resolved
  - Living donor confirmed within the next 90 days but dialysis required in the interim
- Long-term indications include any **ONE** of the following:
  - Multiple prior failed arteriovenous (AV) accesses with no available options
  - Limited life expectancy
  - Valid patient preference whereby use of an AV access will severely limit quality of life or achievement of life goals, and after the patient has been properly informed of patient-specific risks and benefits of other potential and reasonable access options for that patient (if available)
  - Absence of an AV access creation option due to severe arterial inflow disease or outflow venous obstruction, or adverse local limb conditions
  - Diminutive patients or children with prohibitively small vessels

AV Fistula or AV Graft

- Dialysis-dependent renal failure expected to be of long-term duration

Non-Renal Conditions

- Plasmapheresis or apheresis access for chronic autoimmune or hematologic disorders (eg, myasthenia gravis, thrombotic thrombocytopenic purpura [TTP], cryoglobulinemia) when peripheral veins are inadequate [7]

Limitations

- A CVC should not be inserted if dialysis can be delayed long enough for a functional AVF or AVG to be created

- An AVF should not be created in a terminally ill patient with life expectancy of < 6 months unless specifically requested by the patient

CODING AND STANDARDS

Codes

Code	Description
36010	Introduction of catheter, superior or inferior vena cava
36011	Selective catheter placement, venous system; first order branch (eg, renal vein, jugular vein)
36800	Insertion of cannula for hemodialysis, other purpose (separate procedure); vein to vein
36810	Insertion of cannula for hemodialysis, other purpose (separate procedure); arteriovenous, external (Scribner type)
36815	Insertion of cannula for hemodialysis, other purpose (separate procedure); arteriovenous, external revision, or closure
36818	Arteriovenous anastomosis, open; by upper arm cephalic vein transposition
36819	Arteriovenous anastomosis, open; by upper arm basilic vein transposition
36820	Arteriovenous anastomosis, open; by forearm vein transposition
36821	Arteriovenous anastomosis, open; direct, any site (eg, Cimino type) (separate procedure)
36825	Creation of arteriovenous fistula by other than direct arteriovenous anastomosis (separate procedure); autogenous graft
36830	Creation of arteriovenous fistula by other than direct arteriovenous anastomosis (separate procedure); nonautogenous graft (eg, biological collagen, thermoplastic graft)
36835	Insertion of Thomas shunt (separate procedure)
36836	Percutaneous arteriovenous fistula creation, upper extremity, single access of both the peripheral artery and peripheral vein, including fistula maturation procedures (eg, transluminal balloon angioplasty, coil

Code	Description
	embolization) when performed, including all vascular access, imaging guidance and radiologic supervision and interpretation
36837	Percutaneous arteriovenous fistula creation, upper extremity, separate access sites of the peripheral artery and peripheral vein, including fistula maturation procedures (eg, transluminal balloon angioplasty, coil embolization) when performed, including all vascular access, imaging guidance and radiologic supervision and interpretation

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

An AVF is a surgical or endovascular (minimally invasive radiologic) procedure where a vein is connected to an artery. This artificial connection allows the vein to become larger and for the walls of the vein to thicken, a process termed maturation. A mature fistula makes it easier for the vein to be punctured repeatedly for dialysis. Maturation typically takes three-to-six months to occur. An AVF is the preferred type of vascular access due to lower rate of infection and clot formation, resulting in greater longevity than other types of vascular access. However, not everyone is a good candidate for an AVF, particularly older patients and patients with small veins.

An AVG is considered if the patient is not a suitable candidate for an AVF. An AVG is an artificial tubing that is surgically attached on one end to an artery, and on the other end to a vein. The tube is placed entirely under the skin. AVGs are more prone to infection and clotting than AVFs.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms

AUC: Appropriate use criteria

AV: Arteriovenous

AVF: Arteriovenous fistula

AVG: Arteriovenous graft

CKD: Chronic kidney disease

CVC: Central venous catheter

CVTC: Central venous tunneled catheter

ESKD: End-stage kidney disease

GRADE: Grading of Recommendations Assessment, Development, and Evaluation

KDOQI: Kidney Disease Outcomes Quality Initiative

TTP: Thrombotic thrombocytopenic purpura

SUMMARY OF EVIDENCE

KDOQI Clinical Practice Guideline for Vascular Access: 2019 Update [6]

Study Design: The guideline update was conducted by the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (KDOQI). The update involved a comprehensive review of the literature, including more than 4,600 articles, of which 286 were included in the evidence tables used to develop the 26 guideline sections. The evidence review was independently conducted using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach.

Target Population: The guidelines are intended for multidisciplinary practitioners who care for chronic kidney disease (CKD) patients and their vascular access. This includes nephrologists, surgeons, interventional radiologists, nurses, and other healthcare professionals involved in the management of hemodialysis vascular access.

Key Factors:

End-Stage Kidney Disease (ESKD) Life-Plan: The guidelines introduce the concept of an individualized ESKD Life-Plan, which maps out a comprehensive strategy for dialysis modalities and vascular access for the lifetime of the patient.

Vascular Access Choice: The guidelines provide recommendations on the choice of vascular access, including AVFs, AVGs, and CVCs, based on patient circumstances and preferences.

Vascular Access Types and Locations: The guidelines discuss the indications for use, types, and locations of vascular access, emphasizing a patient-centered approach.

Preoperative and Postoperative Care: The guidelines include recommendations for preoperative vessel mapping, postoperative evaluation, and interventions to enhance AVF maturation and prevent complications.

Complications and Management: The guidelines address the prevention, monitoring, and treatment of complications related to vascular access, including infections, thrombosis, and stenosis.

ANALYSIS OF EVIDENCE

These guidelines provide a comprehensive framework for managing vascular access in hemodialysis patients, emphasizing a patient-centered approach and the importance of individualized care plans. The evidence-based recommendations aim to improve patient outcomes and reduce complications associated with vascular access. [6]

POLICY HISTORY

Date	Summary
May 2026	• Renamed General Considerations section to Special Notes • Expanded indications to include non-renal conditions • Removed CPT codes 36005, 75820, and 75822 • Moved procedure purpose from Definitions to Purpose section
June 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• Added new bullet-point to the General Statement section • No clinical changes
January 2025	• This guideline replaces UM CARDIO_1165 for Hemodialysis Access Creation • Added CPT codes 36836 and 36837 • Clinical indications were updated per societal guidance

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7300 for Hemodialysis Access Maintenance

Guideline Number: Evolent_CG_7300	Applicable Codes	
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Original Date: June 2014	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines, and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for hemodialysis access maintenance using angiography, endovascular, or open surgical procedures.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

Special Notes

- For this policy, the specific endovascular (eg, angioplasty or stent) or surgical methods (eg, interposition graft, transposition, or Distal Revascularization and Interval Ligation (DRIL) procedure) that may be utilized should not be considered when determining whether a procedure can be approved or denied
- Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used including their potential outcomes. This process should be reflected in notes provided.

INDICATIONS FOR DIAGNOSTIC FISTULOGRAM [6,7]

Includes any **ONE** of the following:

- **ANY** change in physical examination of the dialysis access or limb such as:
  - Decreased or absent thrill or bruit
  - Increased pulsatility
  - Ipsilateral limb swelling
  - Development of new superficial collateral venous channels consistent with venous outflow stenosis or obstruction
  - Distal steal syndrome
  - Ischemic monomelic neuropathy
  - Aneurysm(s) or pseudoaneurysm(s)
  - Clinical evidence of high flow (eg, high output cardiac failure)
- **ANY** abnormality encountered during dialysis such as:
  - Arteriovenous access (AV) access thrombosis
  - Aspiration of clots
  - Persistent (≥ 3 sessions) or new difficulty with cannulation
  - Elevated venous pressures recorded during hemodialysis (static and dynamic pressures) or measured within the vascular access during a diagnostic study (static pressures)
  - Increased bleeding from the needle puncture sites for 3 consecutive dialysis sessions
  - Evidence of decreased flow (Qa)
    - Inadequate dialysis
    - Low Kt/V on a constant dialysis prescription without prolongation of dialysis duration
- **ANY** abnormality encountered by duplex ultrasound such as:
  - Increased pulsatility
  - Decreased flow volume
  - Fistula size < 3 mm
  - Severe tortuosity
  - Aneurysm and pseudoaneurysm
  - Depth of the arteriovenous fistula (AVF) or graft (AVG) that would make cannulation difficult

INDICATIONS FOR THERAPEUTIC INTERVENTION ON THE AV ACCESS CIRCUIT (6)

- **ANY** of the following:
  - Autogenous fistulae that have failed to mature after 4 to 6 weeks as expected
  - Symptomatic or complicated aneurysm(s) or pseudoaneurysm(s) (see **Limitations**)
  - AV access infection
  - High flow complications
  - Erosion of the skin overlying the AV access
  - Severe tortuosity or depth of the AV access that would make cannulation difficult
  - **ANY** finding(s) during an indicated diagnostic fistulogram confirming reason(s) for decreased dialysis function, steal, or other access related complication(s), including:
    - Thrombosis
    - Anastomotic stenosis
      - At the arterial anastomosis of an AVF or AVG
      - At the venous anastomosis of an AVG
    - Proximal Inflow arterial stenosis unrelated to the arterial anastomosis
    - Venous outflow stenosis or obstruction distal to the AVF or AVG
    - Intraluminal high-grade stenosis
    - Aberrant veins draining flow away from the main AVF
- Covered intraluminal stents can be utilized to manage AV access aneurysms or pseudoaneurysms but should be reserved for patient contraindications to surgery, lack of a surgical option, or.as a temporizing measure for patients with active bleeding
- Symptoms or conditions warranting intervention on aneurysms include any of the following:
  - Pain
  - Access flow dysfunction
  - Thrombus
  - Limited cannulation sites
  - High output congestive heart failure
  - Unacceptable cosmetic disfigurement
  - Rapid enlargement

  NOTE: Aneurysm size alone is likely not an indication for treatment in the absence of symptoms of threatened skin.

LIMITATIONS (6)

- A diagnostic fistulogram should not be performed without new clinical findings. Routine fistulogram for “surveillance” is not appropriate
- Preemptive endovascular intervention to improve patency of an AVF or AVG with stenosis, not associated with clinical indicators, is not appropriate

CODING AND STANDARDS

Codes

Code	Description
36831	Thrombectomy, open, arteriovenous fistula without revision, autogenous or nonautogenous dialysis graft (separate procedure)
36832	Revision, open, arteriovenous fistula; without thrombectomy, autogenous or nonautogenous dialysis graft (separate procedure)
36833	Revision, open, arteriovenous fistula; with thrombectomy, autogenous or nonautogenous dialysis graft (separate procedure)
36901	Introduction of needle(s) and/or catheter(s), dialysis circuit, with diagnostic angiography of the dialysis circuit, including all direct puncture(s) and catheter placement(s), injection(s) of contrast, all necessary imaging from the arterial anastomosis and adjacent artery through entire venous outflow including the inferior or superior vena cava, fluoroscopic guidance, radiological supervision and interpretation and image documentation and report
36902	Introduction of needle(s) and/or catheter(s), dialysis circuit, with diagnostic angiography of the dialysis circuit, including all direct puncture(s) and catheter placement(s), injection(s) of contrast, all necessary imaging from the arterial anastomosis and adjacent artery through entire venous outflow including the inferior or superior vena cava, fluoroscopic guidance, radiological supervision and interpretation and image documentation and report; with transluminal balloon angioplasty, peripheral dialysis segment, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty
36903	Introduction of needle(s) and/or catheter(s), dialysis circuit, with diagnostic angiography of the dialysis circuit, including all direct puncture(s) and catheter placement(s), injection(s) of contrast, all necessary imaging from the arterial anastomosis and adjacent artery through entire venous outflow including the inferior or superior vena

Code	Description
	cava, fluoroscopic guidance, radiological supervision and interpretation and image documentation and report; with transcatheter placement of intravascular stent(s), peripheral dialysis segment, including all imaging and radiological supervision and interpretation necessary to perform the stenting, and all angioplasty within the peripheral dialysis segment
36904	Percutaneous transluminal mechanical thrombectomy and/or infusion for thrombolysis, dialysis circuit, any method, including all imaging and radiological supervision and interpretation, diagnostic angiography, fluoroscopic guidance, catheter placement(s), and intraprocedural pharmacological thrombolytic injection(s)
36905	Percutaneous transluminal mechanical thrombectomy and/or infusion for thrombolysis, dialysis circuit, any method, including all imaging and radiological supervision and interpretation, diagnostic angiography, fluoroscopic guidance, catheter placement(s), and intraprocedural pharmacological thrombolytic injection(s); with transluminal balloon angioplasty, peripheral dialysis segment, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty
36906	Percutaneous transluminal mechanical thrombectomy and/or infusion for thrombolysis, dialysis circuit, any method, including all imaging and radiological supervision and interpretation, diagnostic angiography, fluoroscopic guidance, catheter placement(s), and intraprocedural pharmacological thrombolytic injection(s); with transcatheter placement of intravascular stent(s), peripheral dialysis segment, including all imaging and radiological supervision and interpretation necessary to perform the stenting, and all angioplasty within the peripheral dialysis circuit
37607	Ligation or banding of angioaccess arteriovenous fistula
+36907	Transluminal balloon angioplasty, central dialysis segment, performed through dialysis circuit, including all imaging and radiological supervision and interpretation required to perform the angioplasty (List separately in addition to code for primary procedure)
+36908	Transcatheter placement of intravascular stent(s), central dialysis segment, performed through dialysis circuit, including all imaging and radiological supervision and interpretation required to perform the stenting, and all angioplasty in the central dialysis segment (List separately in addition to code for primary procedure)
+36909	Dialysis circuit permanent vascular embolization or occlusion (including main circuit or any accessory veins), endovascular,

Code	Description
	including all imaging and radiological supervision and interpretation necessary to complete the intervention (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions [6]

- **Interventions on AV dialysis graft/fistula** are intended to restore and/or maintain functional patency of the AV access circuit. However, occasionally interventions may be necessary to move, alter, add to or close the access circuit. Access-related procedures encompass endovascular percutaneous or open surgical procedures. They are utilized to treat thrombotic or non-thrombotic flow-related complications or dysfunction, infection, aneurysm, or pseudoaneurysm. In most, but not all cases, a diagnostic fistulogram is performed first. If identified during the fistulogram, culprit lesion(s) should be concurrently treated by an endovascular procedure if appropriate, or soon thereafter by open or hybrid procedures. Open surgical procedures are usually reserved for recurrent stenotic lesions, aneurysms and pseudoaneurysms, AV access infections, steal, ischemic monomelic neuropathy, or difficult access due vein size, tortuosity, or depth.
- **Dialysis access circuit** is the continuing from the heart and the arterial inflow through the AV access to the venous outflow back to the heart. For coding purposes, the hemodialysis circuit is comprised of a peripheral segment and a central segment. The peripheral segment begins at the arterial anastomosis and extends to the central segment. In the upper extremity the peripheral segment extends up to and includes the axillary vein and entire cephalic vein including the cephalic arch. In the lower extremity, the peripheral segment extends up to and includes the common femoral vein. In the upper extremity, the central segment includes the subclavian and innominate veins through the superior vena cava. In the lower extremity the central segment includes the external iliac and common iliac veins through the inferior vena cava.
- **Arteriovenous access** allows for dialysis and includes AVF or AVG.

- **Diagnostic Fistulogram** is the diagnostic angiography of the entire AV access circuit from the arterial anastomosis through the central vena cava is performed to identify the area or areas of narrowing or occlusion that are creating flow problems for, or related to, the AV access. It is performed through the AV access or via a remote artery.
- **Endovascular fistula (endoAVF)** is an autologous fistula created by endovascular techniques.
- **Endovascular interventions** are procedures performed percutaneously utilizing angioplasty, stents, thrombectomy, or thrombolysis. Thrombolysis involves the use of pharmaceuticals that are infused or injected directly into the thrombosed access and which dissolve clot. Mechanical thrombectomy devices may also be utilized to percutaneously remove clots. Thrombectomy can also be performed surgically.
- **Open surgical therapy** utilizes direct open access to the conduit and contiguous vessels. Residual vascular stenosis or obstructive lesions are removed and corrected using standard vascular surgical techniques. Angiography is adjunctively employed, when appropriate and medically necessary, to assess the functional integrity of afferent and efferent vessels remote from the surgical field.
- **Vessel superficialization or Transposition** is a procedure where the vessel used for dialysis needs to be moved closer to the surface or away from the neural structures for it to be safely punctured for dialysis
- **Distal Revascularization and Interval Ligation (DRIL) procedure** is a surgical procedure to treat steal and involve distal revascularization and interval ligation of an AVF or AVG.
- **Kt/V** is a number used to quantify hemodialysis treatment (where K = dialyzer clearance of urea, t = dialysis time, and V = volume of distribution of urea approximately equal to the patient's total body water).
- **Failure to mature** an AVF that cannot be used successfully for dialysis despite at least 4 weeks of observation since creation, or six months despite endovascular or surgical attempts to allow successful cannulation and dialysis.
- **Pseudoaneurysm** implies a hole through the vessel or graft with accumulation of flowing blood outside of that vessel but contained by the surrounding tissues.
- **Aneurysm** implies dilatation of all 3 layers of a fistula, vein or artery beyond what would be normally expected following creation of a fistula. Aneurysms can develop anywhere along the course of the AV access circuit including the inflow artery but typically occur in the outflow vein. By definition, aneurysms do not occur in grafts, but a ballooning of a collagen biologic graft should still be considered an aneurysm.
- **Steal** occurs when creation of an AV access results in distal ischemic complications usually related to decreased distal blood flow. Clinically it presents as a cool extremity with few symptoms, progressing to intermittent symptoms during dialysis, limb claudication, ischemic rest pain and tissue loss. Left untreated Steal can result in limb deformity or amputation.
- **Ischemic monomelic neuropathy** is a poorly understood syndrome that occurs soon after creation of an AV access usually at the elbow. It is diagnosed by acute onset of

severe forearm pain, numbness and paresthesia usually without hemodynamic evidence of ischemia and requires immediate ligation of the AV access.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

ACR: American College of Radiology

AUC: Appropriate use criteria

AV: Arteriovenous

AVF: Arteriovenous fistula

AVG: Arteriovenous graft

CKD: Chronic kidney disease

CVC: Central venous catheter

DRIL: Distal Revascularization and Interval Ligation

endoAVF: Endovascular arteriovenous fistula

ESKD: End-stage kidney disease

GRADE: Grading of Recommendations Assessment, Development, and Evaluation

KDOQI: Kidney Disease Outcomes Quality Initiative

PTA: Percutaneous transluminal angioplasty

Qa: Intra-access blood flow

SUMMARY OF EVIDENCE

KDOQI Clinical Practice Guideline for Vascular Access: 2019 Update [6]

Study Design: The guideline update was conducted by the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (KDOQI). The update involved a comprehensive review of the literature, including more than 4,600 articles, of which 286 were included in the evidence tables used to develop the 26 guideline sections. The evidence review was independently conducted using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach.

Target Population: The guidelines are intended for multidisciplinary practitioners who care for chronic kidney disease (CKD) patients and their vascular access. This includes nephrologists, surgeons, interventional radiologists, nurses, and other healthcare professionals involved in the management of hemodialysis vascular access.

Key Factors:

End-Stage Kidney Disease (ESKD) Life-Plan: The guidelines introduce the concept of an individualized ESKD Life-Plan, which maps out a comprehensive strategy for dialysis modalities and vascular access for the lifetime of the patient.

Vascular Access Choice: The guidelines provide recommendations on the choice of vascular access, including AVFs, AVGs, and CVCs, based on patient circumstances and preferences.

Vascular Access Types and Locations: The guidelines discuss the indications for use, types, and locations of vascular access, emphasizing a patient-centered approach.

Preoperative and Postoperative Care: The guidelines include recommendations for preoperative vessel mapping, postoperative evaluation, and interventions to enhance AVF maturation and prevent complications.

Complications and Management: The guidelines address the prevention, monitoring, and treatment of complications related to vascular access, including infections, thrombosis, and stenosis.

ACR Appropriateness Criteria® Dialysis Fistula Malfunction [7]

Study Design: The study is a rigorous evaluation of dialysis access dysfunction, focusing on arteriovenous access dysfunction, which includes thrombotic flow-related complications, nonthrombotic flow-related complications, and infectious complications. The American College of Radiology (ACR) Appropriateness Criteria are evidence-based guidelines for specific clinical conditions reviewed annually by a multidisciplinary expert panel. The guideline development and revision process supports the systematic analysis of medical literature from peer-reviewed journals, using established methodology principles such as the GRADE approach and the RAND/UCLA Appropriateness Method User Manual.

Target Population: The target population includes patients with end-stage renal disease who require dialysis. The study emphasizes the importance of creating and maintaining dialysis access to reduce morbidity, mortality, and treatment costs for these patients. The quality of dialysis is directly dependent on the integrity and reliability of access to the patient's vascular system.

Key Factors:

Dialysis Access Dysfunction: The study categorizes dialysis access dysfunction into three distinct classes: thrombotic flow-related complications, nonthrombotic flow-related complications, and infectious complications. It discusses the restoration of arteriovenous access dysfunction through diagnostic imaging, clinical consultation, percutaneous interventional procedures, surgical management, or a combination of these methods.

Appropriateness Criteria: The ACR Appropriateness Criteria documents are updated regularly and provide guidelines for determining appropriate imaging examinations for

diagnosis and treatment of specified medical conditions. These criteria guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment.

Monitoring and Surveillance: The study highlights the importance of monitoring and surveillance to preempt adverse outcomes and identify lesions within the vascular access before they provoke complications. It suggests the performance of physical examinations, noninvasive and invasive device-based methods, and diagnostic imaging such as Doppler ultrasound or diagnostic fistulography upon detection or suspicion of an access abnormality.

ANALYSIS OF EVIDENCE

Shared Conclusions [6,7]**:**

Importance of Diagnostic Imaging: Both articles highlight the critical role of diagnostic imaging in evaluating and managing dialysis access dysfunction.

Endovascular Interventions: Both emphasize the use of percutaneous transluminal angioplasty (PTA) and stent placements as primary treatments for stenosis.

Patient-Centered Approach: Both stress the importance of considering individual patient circumstances and preferences in managing dialysis access.

POLICY HISTORY

Date	Summary
May 2026	• Renamed General Considerations section to Special Notes • Clarified indications for diagnostic fistulogram
June 2025	• Added new bullet-point to the General Statement section • Added a Summary of Evidence and Analysis of Evidence
January 2025	• This guideline replaces UM CARDIO_1339 for Hemodialysis Access Maintenance • Clinical indications were updated per societal guidance

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7301 for Implantable Cardioverter Defibrillator

Guideline Number: Evolent_CG_7301	**Applicable Codes**	
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Original Date: January 2026	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for an implantable cardiac defibrillator (ICD). Implantable cardioverter defibrillators (ICDs) are indicated for the treatment of life-threatening ventricular tachycardia and ventricular fibrillation. All indications are predicated on a meaningful life expectancy of greater than one year if the ICD is implanted.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

ELIGIBILITY FOR IMPLANTABLE CARDIOVERTER-DEFIBRILLATOR (ICD) IMPLANTATION

Patient eligibility for an ICD presumes all the following:

- Anticipated reasonable quality of life for ≥ 1-year post implantation
- Patient’s ability to live with a shock-delivering device that requires management

- Absence of a completely reversible cause that led to ventricular arrhythmia (VA) for which an ICD is being considered
- Completion of ≥ 3 months of guideline-directed medical therapy (GDMT) for heart failure (HF), unless an intervening indication for pacemaker implantation arises or in **special circumstances** which are exempt from GDMT
- ICD indications are present in most scenarios in which cardiac resynchronization therapy (CRT) is appropriate
- With respect to coronary artery disease (CAD)**, if no revascularization is planned**, there must be documentation that there is:
    - No evidence for epicardial coronary lesions measuring > 70% (non-left main) or <50% left main or no evidence for ischemia by fractional flow reserve or perfusion imaging
    - In the presence of severe coronary artery disease that the patient is not a candidate for revascularization due to the nature of the disease (i.e., diffuse and not amenable to intervention) [6]
- With respect to CAD, **if coronary revascularization is planned**, ICD implantation may not be performed prior to intervention in an effort to circumvent the 3-month waiting period [6]

NOTE: Guidelines for the pediatric population are extrapolated from the adult population due to a lack of relevant trials.

INDICATIONS FOR ICD IMPLANTATION

Ischemic Heart Disease (CAD) [6,7]

Primary Prevention of Sudden Cardiac Death (SCD)/Prophylactic ICD Implantation

- Post- Acute myocardial infarction (MI) (≤ 40 days)
    - Left ventricular ejection fraction (LVEF) ≤ 30%
        - Asymptomatic nonsustained ventricular tachycardia (NSVT) (4 or more days post MI), and electrophysiologic study (EPS) with sustained inducible ventricular tachycardia (VT) after revascularization (within 40 days of MI) **(AUC Score 7)** or without revascularization **(AUC Score 8)**
    - LVEF 31-40%
        - Asymptomatic NSVT (4 or more days post MI) and EPS with sustained inducible VT after revascularization (within 40 days of MI) **(AUC Score 7)**
    - Pre-existing Chronic Cardiomyopathy
        - LVEF ≤ 30% due to old infarction, New York Heart Association (NYHA) class I **(AUC Score 7)**

        - LVEF ≤ 35% due to old infarction or nonischemic causes, NYHA class II or III **(AUC Score 8)**
    - Need for Guideline-Directed Pacemaker Therapy and LVEF ≤ 35% **(AUC Score 7)**
- Post MI (> 40 days)
    - With Ischemic Cardiomyopathy
        - No recent PCI/CABG
            - NYHA Class I
                - LVEF ≤ 30% **(AUC Score 8)**
                - LVEF 31% - 35% **(AUC Score 7)**
                - LVEF 36% - 40%, asymptomatic NSVT and EPS with inducible sustained VT/VF **(AUC Score 7)**
            - NYHA Class II-III
                - LVEF ≤ 35 % **(AUC Score 9)**
                - LVEF 36% - 40%, asymptomatic NSVT and EPS with inducible sustained VT/VF **(AUC Score 8)**
        - Recent percutaneous coronary intervention (PCI) or coronary artery bypass surgery (CABG) (within past 3 months)
            - NYHA Class I, II, or III
                - LVEF ≤ 35% on GDMT (for at least 3 months) and pre-existing cardiomyopathy **(AUC Score 7)**
                - LVEF ≤ 35% and need for permanent pacemaker post revascularization **(AUC Score 8)**
- Without recent MI
    - With ischemic cardiomyopathy, revascularization not indicated
        - GDMT < 3 months
            - LVEF ≤ 35%, NSVT and EPS with inducible sustained VT **(AUC Score 8)**
        - GDMT ≥ 3 months
            - LVEF ≤ 35% **(AUC Score 9)**

Secondary Prevention of SCD

- Hemodynamically unstable or sustained VT, ventricular fibrillation (VF) or polymorphic VT
    - During or within 48 hours of acute MI
        - Not amenable to revascularization **(AUC Score 7)**
        - Post-elective revascularization **(AUC Score 7)**
    - No recent MI and no recent revascularization

        - No identifiable transient and completely reversible causes, and no need for revascularization **(AUC Score 8-9)**
        - Significant CAD but no revascularization performed **(AUC Score 8-9)**
        - Significant CAD and incomplete revascularization after cardiac arrest **(AUC Score 7-9)**
        - Significant CAD and complete revascularization performed after cardiac arrest, if LVEF is ≤ 35% **(AUC Score 7)**
- Unexplained syncope, with inducible VF or sustained VT at electrophysiological study, LVEF 36-49% and prior MI (not acute) **(AUC Score 8)**
- Unexplained Syncope, with LVEF ≤ 35%, and prior MI (not acute) **(AUC Score 8-9)**
- Sustained **hemodynamically stable** Monomorphic VT associated with structural heart disease
    - LVEF ≥ 36%
        - CAD and prior MI or Nonischemic Dilated Cardiomyopathy **(AUC Score 7)**
    - LVEF ≤ 35%
        - Bunde branch re-entry successfully ablated and Nonischemic Cardiomyopathy **(AUC Score 7)**
        - Nonischemic dilated cardiomyopathy with all inducible VTs successfully ablated **(AUC Score 8)**
        - CAD and prior MI or nonischemic dilated cardiomyopathy **(AUC Score 9)**

Nonischemic Cardiomyopathy (NICM) (6)

Primary Prevention of SCD/Prophylactic ICD Implantation

- Lamin A/C gene mutation, with ≥ 2 risk factors from the following: NSVT, LVEF < 45%, male sex, missense mutation
- Without recent MI
    - GDMT ≥ 3 months and any of the following:
        - LVEF≤ 35%; age < 85 years; any QRS duration **(AUC Score 7-8)**
        - LVEF≤ 35%; age > 85 years; any QRS duration, NYHA II-III **(AUC Score 6)**
    - LVEF >35% with LGE on MRI and NYHA II-III **(AUC Score 6)**
- Chagas disease, even if on GDMT < 3 months, LVEF ≤ 35% **(AUC Score 8)**

Secondary Prevention of SCD

- Unexplained syncope
    - With LVEF <50% and
        - Left ventricular noncompaction **(AUC Score 7)**

        - Hypertrophic cardiomyopathy **(AUC Score 8)**
    - With LVEF ≤ 35% and
        - Non-ischemic dilated cardiomyopathy **(AUC Score 8)**
        - Left ventricular noncompaction **(AUC Score 8)**
    - With arrhythmogenic right ventricular cardiomyopathy **(AUC Score 7-8)**
- Hemodynamically unstable or sustained VT, polymorphic VT or VF, not due to a reversible cause **(AUC Score 8-9)**

Advanced Heart Failure & Transplantation (6,7)

- In non-hospitalized patients with NYHA class IV who are candidates for cardiac transplantation or left ventricular assist device (LVAD)
- In a patient with an LVAD, with sustained ventricular arrhythmias
- In NYHA ambulatory class IV, with appropriate indications for CRT

Myocardial Diseases

Hypertrophic Cardiomyopathy (HCM) (6–9)

- Previously documented cardiac arrest
- Sustained VT **(AUC Score 9)**
- Adult patients with HCM with at least 1 risk factor for SCD as follows **(AUC Score 8)**:
    - Sudden death attributable to HCM in at least 1 first-degree relative who is ≤ 50 years of age
    - LVH ≥ 30 mm
    - At least 1 recent (within 5 years) episode of syncope suspected by history to be arrhythmic (unlikely neurocardiogenic (vasovagal), especially occurring within 6 months of evaluation
    - LV apical aneurysm
    - LV systolic dysfunction (EF < 50%)
    - Pediatric patients with HCM with at least 1 risk factor for SCD as follows:
        - Unexplained syncope
        - LVH ≥ 30 mm
        - Nonsustained VT
        - Family history of HCM-related SCD
- Structural cardiac disease with genetic arrhythmogenic cardiomyopathy (i.e. Lamin A/C mutation) and LVEF < 45% **(AUC Score 7)**

Cardiac Sarcoidosis

With one of the following [6,7,10]:

- Cardiac arrest or documented sustained VT
- VF/Hemodynamically unstable VT that is associated with other structural heart disease **(AUC Score 9)**
- LVEF > 35% with inducible sustained VT/VF at electrophysiological testing
- LVEF ≤ 35%
- Syncope
- Scar on CMR or PET
- Requires a permanent pacemaker

Giant-Cell Myocarditis [6]

- VF/Hemodynamically unstable VT that is associated with other structural heart disease **(AUC Score 8)**

Neuromuscular Disorders

Including but not limited to Duchenne, Becker, Limb-girdle type 1B, Limb-girdle type 2C-2F, Limb-girdle type 2I, Myotonic type 1, Myotonic type 2, Emery-Dreifuss, or Facioscapulohumeral Muscular Dystrophy with one of the following [6,7]:

- Primary and secondary prevention, with same indications as for NICM
- Emery-Dreifuss or limb-girdle type I-B muscular dystrophy with progressive cardiac involvement

Arrhythmogenic Right Ventricular Cardiomyopathy

With at least one of the following risk factors for SCD [6–8]:

- Resuscitated sudden cardiac arrest
- Sustained VT **(AUC Score 9)**
- Right or left ventricular systolic dysfunction with an EF ≤ 35%
- Syncope with documented or presumed ventricular arrhythmia

Channelopathies

Congenital Long QT Syndrome

With one of the following **(AUC Score 9)** [6,7]:

- Sudden cardiac arrest
- Sustained VT **(AUC Score 9)** or recurrent syncope when beta blocker is ineffective or not tolerated **(AUC Score 7)**

- QTc > 500 ms on a beta blocker
- Strong family history of SCD
- High risk genotype

Brugada Syndrome and Spontaneous Type 1 Brugada Echocardiographic Pattern

With one of the following [6,7,9]:

- Cardiac arrest
- Documented sustained VT/VF **(AUC Score 9)**
- Unexplained syncope **(AUC Score 7-9)**

Catecholaminergic Polymorphic VT

With one of the following [6,7]:

- Sudden cardiac arrest
- Syncope or sustained VT/VF (**AUC Score 9)**
- Inducible VT or VF
- Unexplained syncope with beta-blockers **(AUC Score 7)**
- Not tolerating medical therapy or breakthrough nonsustained ventricular arrhythmias on medical therapy **(AUC Score 8)**

Early Repolarization ("J-wave Syndrome") or Short QT Syndrome

With one of the following **(AUC Score 9)** [6,7]:

- Cardiac arrest
- Sustained VA

Idiopathic Polymorphic VT/VF [6,7]

- Cardiac arrest due to polymorphic VT or VF
- Normal ventricular function and no family history or first-degree relative with sudden cardiac death **(AUC Score 8-9)**

Adult & Pediatric Congenital Heart Disease (CHD) [7,9,11]

- Cardiac arrest due to VF or VT, or unstable VT, after exclusion of a reversible etiology
- Symptomatic sustained VT, after hemodynamic and electrophysiologic evaluation
- Systemic LVEF ≤ 35%, biventricular physiology, and **NYHA** class II or III on **GDMT**
- Single or systemic RVEF < 35%, in the presence of an additional risk factor such as:

- NSVT
- Unexplained syncope
- NYHA class II or III, despite GDMT
- QRS duration ≥ 140 ms
- Severe systemic AV valve regurgitation

- Syncope of unknown origin in the presence of either at least moderate ventricular dysfunction or marked hypertrophy or inducible sustained VT or VF
- Syncope and moderate or severe complexity CHD, with high clinical suspicion of VA
- Non-hospitalized patients with CHD awaiting heart transplant **(AUC Score 7)**
- Left ventricular non-compaction that meets same indications as NICM, including a familial history of SCD **(AUC Score 8)**

ICD Indications With Special Situations [6,7,12]

- ICD implantation is appropriate in the setting of elevated troponin levels when ICD criteria have been met, and elevated troponin is deemed not due to a myocardial infarction

NOTE: In the following circumstances, CRT is likely to be the appropriate modality when it is anticipated that significant (> 40%) ventricular pacing will be required:

- ICD criteria met, except for myocardial infarction within 40 days or revascularization within 3 months, but a non-elective permanent pacemaker (new or replacement) is required, and recovery of left ventricular function to LVEF > 35% is uncertain or not expected *
- ICD criteria met, except NICM or ischemic cardiomyopathy has not had 3 months' time for LVEF to improve on medical therapy, a non-elective permanent pacemaker is required, and recovery of LVEF is uncertain or not expected*
- Patient met primary prevention criteria for an ICD prior to surgical coronary revascularization, and it is unlikely that LVEF will recover to > 35% despite a 90-day wait (permits placement of an epicardial LV lead)

*** These indications avoid a second implantation procedure within less than 3 months**

SUBCUTANEOUS ICD

Subcutaneous ICD may be used in any patient meeting the criteria for a transvenous device, with the following exceptions [6]:

- Bradycardia requiring pacing
- Anticipated need for Cardiac Resynchronization Therapy (CRT)
- Anticipated need for anti-tachycardia pacing (ATP)

- Anticipated need for pacing following termination of VT/VF

Additionally, subcutaneous ICD is often the modality of choice in patients with no or limited transvenous access and may be preferable for patients with an elevated risk of infection.

INDICATIONS FOR DEVICE OR LEAD REPLACEMENT

NOTE: Guideline-directed medical therapy indications do not need to be met for replacement of an ICD pulse generator or lead system.

ICD Pulse Generator Replacement

- Recent interrogation shows battery voltage in elective replacement indicator (ERI or ERT) range or end of life (EOL/EOS) indicator range (may differ by device type and manufacturer).
- Replacement of the pulse generator may be performed if a manufacturer's recall has been issued, regardless of battery status

NOTE: The indicator "less than 3 months" in the battery status report typically refers to the time to ERI/ERT. It denotes an indication for intensified follow-up. In selected cases (pacemaker-dependency, follow-up compliance issues) device replacement may be considered for safety concerns when this parameter is met.

Lead Replacement

- Lead repositioning/replacement/removal may be performed when there is evidence of lead malfunctioning on recent interrogation or if a lead recall has been issued
- Device pocket infection typically requires pulse generator and lead removal and replacement

Device Relocation

- Repositioning/relocation of the skin pocket for the device may be performed in the presence of infection, the development of overlying skin erosion/tissue necrosis, if any other anatomical factor prevents the device from properly functioning, or if device migration has resulted in significant patient discomfort.

INDICATIONS FOR DEVICE UPGRADE

From Single Chamber to Dual Chamber/CRT Pacing

- In patients with existing single chamber ICD who develop clinical indications for dual chamber pacing or resynchronization therapy, placement of additional leads and replacement of the existing pulse generator may be approved

From Right Ventricular Pacing to Biventricular Pacing (CRT)

- In patients with an existing pacing device, when criteria for resynchronization therapy have been met and placement of a left ventricular lead is planned, the pulse generator should be upgraded to a CRT device.

DEFIBRILLATION THRESHOLD TESTING

- Induction of VF for the purpose of establishing the efficacy of defibrillation and/or determining the defibrillation threshold may be undertaken at the time of device implantation and replacement.

INDICATIONS FOR TEMPORARY TRANSVENOUS PACEMAKER

- At the discretion of the implanting physician, a temporary transvenous pacemaker may be placed at the time of initial lead placement or pulse generator change, when there is concern that an interruption in AV conduction may occur in response to the surgical procedure. Examples include pacemaker-dependent patients, patients with high grade AV Block, and patients with LBBB in whom lead placement my “bump” the right bundle branch, resulting in transient complete heart block.

INDICATIONS FOR SUBCLAVIAN VENOGRAPHY AND ULTRASOUND

- At the discretion of the implanting physician, vascular access for lead placement may be aided by imaging the subclavian vein using ultrasound or venography. The latter is achieved by establishing venous access in the ipsilateral arm and injecting iodinated contrast, using fluoroscopy to identify the target vessel and guide entry with the needle and guidewire. [13]

CODING AND STANDARDS

Codes

Code	Description
33210	Insertion or replacement of temporary transvenous single chamber cardiac electrode or pacemaker catheter (separate procedure)

Code	Description
33211	Insertion or replacement of temporary transvenous dual chamber pacing electrodes (separate procedure)
33214	Upgrade of implanted pacemaker system, conversion of single chamber system to dual chamber system (includes removal of previously placed pulse generator, testing of existing lead, insertion of new lead, insertion of new pulse generator)
33215	Repositioning of previously implanted transvenous pacemaker or implantable defibrillator (right atrial or right ventricular) electrode
33216	Insertion of a single transvenous electrode, permanent pacemaker or implantable defibrillator
33217	Insertion of 2 transvenous electrodes, permanent pacemaker or implantable defibrillator
33218	Repair of single transvenous electrode, permanent pacemaker or implantable defibrillator
33220	Repair of 2 transvenous electrodes for permanent pacemaker or implantable defibrillator
33223	Relocation of skin pocket for implantable defibrillator
33230	Insertion of implantable defibrillator pulse generator only; with existing dual leads
33231	Insertion of implantable defibrillator pulse generator only; with existing multiple leads
33240	Insertion of implantable defibrillator pulse generator only; with existing single lead
33241	Removal of implantable defibrillator pulse generator only
33244	Removal of single or dual chamber implantable defibrillator electrode(s); by transvenous extraction
33249	Insertion or replacement of permanent implantable defibrillator system, with transvenous lead(s), single or dual chamber
33262	Removal of implantable defibrillator pulse generator with replacement of implantable defibrillator pulse generator; single lead system

Code	Description
33263	Removal of implantable defibrillator pulse generator with replacement of implantable defibrillator pulse generator; dual lead system
33264	Removal of implantable defibrillator pulse generator with replacement of implantable defibrillator pulse generator; multiple lead system
33270	Insertion or replacement of permanent subcutaneous implantable defibrillator system, with subcutaneous electrode, including defibrillation threshold evaluation, induction of arrhythmia, evaluation of sensing for arrhythmia termination, and programming or reprogramming of sensing or therapeutic parameters, when performed
33271	Insertion of subcutaneous implantable defibrillator electrode
33272	Removal of subcutaneous implantable defibrillator electrode
33273	Repositioning of previously implanted subcutaneous implantable defibrillator electrode
93640	Electrophysiologic evaluation of single or dual chamber pacing cardioverter-defibrillator leads including defibrillation threshold evaluation (induction of arrhythmia, evaluation of sensing and pacing for arrhythmia termination) at time of initial implantation or replacement
93641	Electrophysiologic evaluation of single or dual chamber pacing cardioverter-defibrillator leads including defibrillation threshold evaluation (induction of arrhythmia, evaluation of sensing and pacing for arrhythmia termination) at time of initial implantation or replacement; with testing of single or dual chamber pacing cardioverter-defibrillator pulse generator
93644	Electrophysiologic evaluation of subcutaneous implantable defibrillator (includes defibrillation threshold evaluation, induction of arrhythmia, evaluation of sensing for arrhythmia termination, and programming or reprogramming of sensing or therapeutic parameters)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

NYHA Functional Classification for Heart Failure

The New York Heart Association (NYHA) classes of heart failure is the most commonly used system to classify stages of heart failure. [14] Classes are based on physical activity limitations.

- Class I: No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, heart palpitations, or shortness of breath
- Class II: Slight limitation on physical activity. Comfortable at rest but ordinary physical activity results in fatigue, heart palpitations, shortness of breath or chest pain
- Class III: Marked limitation on physical activity. Comfortable at rest but less than ordinary activity causes fatigue, heart palpitations, shortness of breath or chest pain
- Class IV: Symptoms of heart failure at rest. Any physical activity increases discomfort

Guideline Directed (or Optimal) Medical Therapy in Heart Failure [15]

Documentation of GDMT must include the doses and the date of initiation of each medication and must reflect 90 days of therapy since the initiation of the maximal dose administered. If a drug or class of drug is omitted, an explanation for its omission must be provided (intolerance, hypotension, bradycardia, or barriers to access are acceptable explanations). Notes must reflect adequate control of vital signs (BP < 140/90, HR < 100):

- Angiotensin converting enzyme inhibitor (ACE-I), angiotensin receptor blocker (ARB), or combined angiotensin receptor inhibitor and neprilysin inhibitor (ARNI)
- Beta blocker
- Addition of an aldosterone antagonist, provided eGFR is ≥ 30 ml/min/1.73 m^2 and K+ < 5.0, NYHA class II-IV
- SGLT2 Inhibitor (e.g., dapagliflozin, empagliflozin)

Note: GDMT requirement does not apply when CRT is indicated for secondary prevention of VT/VF, or in conditions in which the indication is not dependent on the left ventricular ejection fraction.

Other Options/Considerations for GDMT

- Addition of loop diuretic for all NYHA class II – IV patients
- Addition of hydralazine and nitrate for persistently symptomatic African Americans, NYHA class III-IV
- Not required for consideration of ICD: Ivabradine for NYHA class II – III, when a beta blocker has failed to reduce a sinus rate to < 70 bpm. Ivabradine listed as a class IIa recommendation, while others are class I recommendations. CRT trials antedated routine use of Ivabradine.

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Abbreviations

ACE-I: Angiotensin converting enzyme inhibitor

ARNI: Combined angiotensin receptor inhibitor and neprilysin inhibitor

ARVD/C: Arrhythmogenic right ventricular dysplasia/cardiomyopathy

AV: Atrioventricular

CABG: Coronary artery bypass surgery

CAD: Coronary artery disease, same as ischemic heart disease

CHD: Congenital heart disease

CHF: Congestive heart failure

CRT: Cardiac resynchronization therapy

CRT-D: Cardiac resynchronization therapy ICD system

DCM: Dilated cardiomyopathy

ECG: Electrocardiogram

EF: Ejection fraction

EPS: Electrophysiologic Study

GDMT: Guideline-Directed Medical Therapy

HCM: Hypertrophic cardiomyopathy

HF: Heart failure

HV: His-ventricle

ICD: Implantable cardioverter-defibrillator

LBBB: Left bundle-branch block

LV: Left ventricular/left ventricle

LVAD: Left ventricular assist device, mechanical heart

LVEF: Left ventricular ejection fraction

LVH: Left ventricular hypertrophy

MI: Myocardial infarction

ms: Milliseconds

NICM: Nonischemic cardiomyopathy

NSVT: Nonsustained ventricular tachycardia

NYHA: New York Heart Association

PCI: Percutaneous Coronary Intervention

PET: Positron emission tomography

PVC: Premature Ventricular Contraction

RV: Right ventricular/right ventricle

RVEF: Right ventricular ejection fraction

SCD: Sudden Cardiac Death

STEMI: ST-elevation myocardial infarction

SND: Sinus node dysfunction

VA: Ventricular arrhythmia

VF: Ventricular fibrillation

VT: Ventricular tachycardia

SUMMARY OF EVIDENCE

2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death [7]

Study Design: The guideline is based on a systematic review of evidence from various sources, including randomized controlled trials (RCTs), registries, nonrandomized comparative and descriptive studies, case series, cohort studies, systematic reviews, and expert opinion. The writing committee used evidence-based methodologies to formulate recommendations,

focusing on the quality of scientific evidence and the magnitude and certainty of benefit in proportion to risk.

Target Population: The guideline is intended for adults who have ventricular arrhythmias (VA) or are at risk for sudden cardiac death (SCD), including those with diseases and syndromes associated with a risk of SCD from VA. It covers a wide range of conditions, including ischemic heart disease, nonischemic cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, hypertrophic cardiomyopathy, myocarditis, cardiac sarcoidosis, neuromuscular disorders, and cardiac channelopathies.

Key Factors:

- **Indications for ICD Implantation**: Secondary prevention: For patients who survive sudden cardiac arrest (SCA) due to VA or experience hemodynamically unstable VT. Primary prevention: For patients with reduced left ventricular ejection fraction (LVEF) due to ischemic or nonischemic cardiomyopathy.
- **Pharmacological Therapy**: Beta blockers are recommended for patients with VA and SCD risk. Amiodarone and sotalol are useful for suppressing recurrent VA.
- **Genetic Testing and Counseling**: Recommended for patients with inherited arrhythmia syndromes and their first-degree relatives.
- **Special Considerations**: Management of VA in specific populations such as athletes, pregnant women, older patients with comorbidities, and patients with chronic kidney disease.

ACC/AHA/ASE/HFSA/HRS/SCAI/SCCT/SCMR 2025 Appropriate Use Criteria for Implantable Cardioverter-Defibrillators, Cardiac Resynchronization Therapy, and Pacing [6]

Study Design: The document is a report by the American College of Cardiology Solution Set Oversight Committee, along with several other cardiovascular societies. It reviews common clinical scenarios where ICDs, CRT, and pacing therapies are frequently considered. The indications were developed by a multidisciplinary writing group and scored by an independent rating panel using a scale to designate care as "Appropriate," "May Be Appropriate," and "Rarely Appropriate".

Target Population: The guidelines cover a wide range of patients, including those with coronary artery disease (CAD), nonischemic cardiomyopathy (CM), genetic conditions, and other structural heart diseases. It addresses both primary and secondary prevention of sudden cardiac death (SCD) and includes patients with heart failure (HF), atrial fibrillation (AF), and those undergoing device implantation.

Key Factors

- **Clinical Scenarios**: The document includes 335 clinical scenarios addressing ICD indications related to secondary prevention, primary prevention, comorbidities, generator replacement, dual-chamber ICDs, and totally subcutaneous ICDs.
- **Risk Assessment**: It emphasizes the importance of comprehensive SCD risk assessment, including factors such as personal history of cardiac arrest, family history of SCD, maximal LV wall thickness, EF, LV apical aneurysm, and NSVT episodes.

- **Device Selection**: Recommendations for ICD device selection consider patient preferences, age, lifestyle, and potential need for pacing.
- **Outcomes**: The guidelines aim to enhance clinician decision-making, healthcare delivery, and payment policy, recognizing clinical scenarios rated as "May Be Appropriate" to identify areas for future research.

2024 AHA/ACC/AMSSM/HRS/PACES/SCMR Guideline for the Management of Hypertrophic Cardiomyopathy [9]

Study Design: This document is a guideline developed by the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines, in collaboration with several other medical societies. It includes recommendations based on a comprehensive literature search and evidence review.

Target Population: The guidelines focus on patients with hypertrophic cardiomyopathy, including adults, children, and adolescents. It addresses the diagnosis, risk assessment, and management of HCM, including the use of ICDs for SCD prevention.

Key Factors

- **Risk Assessment**: The document highlights the importance of SCD risk assessment in HCM patients, including factors such as family history of SCD, maximal LV wall thickness, unexplained syncope, LV apical aneurysm, extensive LGE, and NSVT episodes.
- **ICD Placement**: Recommendations for ICD placement in high-risk HCM patients consider individual clinical judgment, shared decision-making, and the presence of major risk factors.
- **Device Selection**: The guidelines discuss the selection of ICD devices, including single-chamber, dual-chamber, and subcutaneous ICDs, based on patient preferences and clinical needs.
- **Management**: The document provides recommendations for the pharmacological and invasive treatment of symptomatic HCM patients, including the use of beta blockers, calcium channel blockers, myosin inhibitors, and septal reduction therapies.

ANALYSIS OF EVIDENCE

Shared Conclusions [6,7,9]

- All three articles emphasize the importance of comprehensive risk assessment for SCD and the use of ICDs for both primary and secondary prevention.
- They highlight the need for individualized patient care, considering factors such as patient preferences, age, lifestyle, and clinical needs.
- The guidelines recognize the importance of shared decision-making and patient-centered care in managing patients at risk for SCD.

POLICY HISTORY

Date	Summary
April 2026	• Added additional: ○ Indications: ■ Eligibility for ICD implantation ■ Generator/lead replacement ■ Device relocation ■ Device upgrade ■ Defibrillation thresholding testing ■ Temporary transvenous pacemaker ■ Subclavian venography/ultrasound ○ Codes: 33210, 33211, 33215, 33218, 33220, 33223, 33241, 33244, 33262, 33263, 33264 ○ Code description • Aligned and adjusted background section
July 2025	• Added CPT codes for subcutaneous ICD
June 2025	• Added Summary of Evidence and Analysis of Evidence • Added third bullet to General Information • Checked Medicare Advantage Line of Business
April 2025	• This guideline merges two Evolent guidelines with identical clinical criteria: ECG 7301-01 for Implantable Cardioverter Defibrillator and ECG 321 for Implantable Cardioverter Defibrillator with ECG 7301 for Implantable Cardioverter Defibrillator ○ This guideline also merges procedural codes • This guideline replaces Evolent Clinical Guideline 7329 for Subcutaneous ICD Device Implantation • Added background section explaining AUC scores • Updated and added new AUC scores in accordance with new ACC guidance • Added Giant-Cell Myocarditis • Added subcutaneous ICD

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7302 for Percutaneous Coronary Interventions

Guideline Number: Evolent_CG_7302	**Applicable Codes**	
"Evolent" refers to Evolent Health LLC and Evolent Specialty Services, Inc. ***© 2026 - 2027 Evolent. All rights Reserved.***		
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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

This guideline addresses Percutaneous Coronary Interventions for stable coronary artery disease. **This guideline does NOT cover acute coronary syndromes including ST segment elevation myocardial infarction and non-ST segment elevation myocardial infarction**.

Coronary Artery Stenosis

- The severity of coronary artery stenoses may be defined by either cardiac catheterization or CT Angiography by the following:
    - A diameter stenosis by visual estimation of ≥ 70% for non-left main disease and ≥ 50% for left main disease are considered significant stenoses to guide revascularization.
    - Intermediate coronary stenoses are defined as a diameter stenosis of 40% to 69% and may be candidates for further evaluation to assess the physiologic or anatomic significance.
    - Fractional flow reserve (FFR) or instantaneous wave-free ratio (iFR) can be used to assess physiological lesion significance, with cutoffs of ≤ 0.80 and ≤ 0.89, respectively.
    - Intravascular ultrasound (IVUS) for left main disease is considered significant for a minimal luminal area ≤ 6.0 mm^2, while a smaller value may be more appropriate in patients of Asian descent (4.5 - 4.8 mm^2). Lower values are advocated outside of the left main coronary artery.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR PERCUTANEOUS CORONARY INTERVENTION (PCI)

Refractory Angina [6]

- Patients with stable ischemic heart disease (SIHD), refractory angina (despite medical therapy), and significant coronary artery stenosis in a lesion amenable to PCI

Multivessel Coronary Artery Disease (CAD) [6]

- Patients with SIHD and the following:
  - Normal ejection fraction
    - Those with abnormal ejection fraction should have documentation why surgical revascularization is not being considered.
  - Significant stenosis in 3 major coronary arteries (with or without proximal LAD)
  - Anatomy is suitable for PCI

Acute Coronary Syndrome (Post-STEMI (ST-Elevation Myocardial Infarction) or Non-STEMI)

- Post Acute Coronary Syndrome (ACS) with “culprit only” revascularization and plan for staged PCI of non-culprit lesion [7]

Stenosis in Proximal Left Anterior Descending (LAD) Artery [6]

- Patients with SIHD and the following:
  - Normal left ventricular ejection fraction
    - Those with abnormal ejection fraction should have documentation why surgical

revascularization is not being considered.

- Significant stenosis in the proximal LAD

Left Main CAD [6]

A diameter stenosis by visual estimation of ≥ 50% for left main disease are considered significant stenoses to guide revascularization.

- Selected patients with SIHD and significant left main stenosis in whom PCI can provide equivalent revascularization as CABG

Diabetes Mellitus and Multivessel CAD [6]

- Patients with Diabetes and multivessel CAD with any of the following:
  - Involvement of the LAD and are not appropriate candidates for coronary artery bypass graft (CABG)
  - Poor candidates for surgery
  - Left main stenosis and low- or intermediate- complexity CAD in rest of the coronary anatomy

Previous CABG [6]

- Patients with a previous CABG and all of the following:
  - Patent LIMA to the LAD
  - Clinical indication for revascularization
  - Lesion amenable to PCI

Cardiac Allograft Vasculopathy [6]

- Cardiac Allograft Vasculopathy
  - Patients with cardiac allograft vasculopathy with severe, proximal, discrete coronary lesions

Revascularization Prior to Percutaneous Valve Procedures

- Patients with significant left main or proximal CAD with/without angina [6,8]

Treatment of Calcified Lesions

- Rotational atherectomy [6,9,10]:
  - Reasonable as primary procedure for fibrotic or heavily calcified de novo lesions for lesion modification prior to angioplasty and stenting:
    - ≥180-degree calcification
    - Maximum thickness > 0.5 mm and length > 5 mm

        - Napkin ring calcification
    - As secondary approach after unsuccessful attempt to dilate calcified lesion by balloon angioplasty
    - Calcification showing reverberation in intravascular ultrasound
- Laser Coronary Atherectomy:
    - Reasonable to perform for in stent restenosis [11]
- Intravascular Lithotripsy [10]
    - Indicated for severely calcified, stenotic de novo lesions prior to coronary stenting
    - Focus on moderate to severely calcified lesions, specifically those with a calcium arc >270 degrees or thickness >0.5 mm

Treatment of In-Stent Restenosis

- Drug-eluting stent (DES) [6]
    - If PCI is planned, DES are indicated when anatomic features are appropriate and the patient is able to comply with dual antiplatelet therapy
- Brachytherapy [6]
    - Indicated in patients who develop recurrent in-stent restenosis
- Drug-Coated Balloon (DCB) [12]
    - Indicated for treatment of bare-metal stent and drug-eluting stent in-stent restenosis

Other Indications for Drug-Coated Balloons [12]

In addition to treatment of in-stent restenosis, DCB are reasonable for any ONE of the following:

- Small vessels (reference vessel diameter <2.75 mm) as drug-coated balloon first strategy reserving DES for cases with suboptimal procedural outcomes or subsequent restenosis
- Bifurcation lesions in the context of provisional blended DES/DCB approach
- For side branch treatment

Limitations for Coronary Atherectomy

- Rotational atherectomy is <u>not recommended</u> for below scenarios [9]:
    - Occlusions for which a guidewire will not pass (risk of perforation)
    - Degenerated SV Graft lesion or thrombus
    - Lack of cardiac surgery
    - Patient is ineligible for CABG
    - Left ventricular dysfunction

- Severe multivessel or unprotected left main coronary artery disease lesion length > 25 mm and lesion angulation > 45°
- Rotational atherectomy should be used cautiously in presence of coronary dissection for plaque modification, provided that guidewire is in true lumen of coronary artery

CODING AND STANDARDS

Codes

Code	Description
C9600	Percutaneous transcatheter placement of drug eluting intracoronary stent(s), with coronary angioplasty when performed; single major coronary artery or branch
C9602	Percutaneous transluminal coronary atherectomy, with drug eluting intracoronary stent, with coronary angioplasty when performed; single major coronary artery or branch
C9604	Percutaneous transluminal revascularization of or through coronary artery bypass graft (internal mammary, free arterial, venous), any combination of drug-eluting intracoronary stent, atherectomy and angioplasty, including distal protection when performed; single vessel
C9606	Percutaneous transluminal revascularization of acute total/subtotal occlusion during acute myocardial infarction, coronary artery or coronary artery bypass graft, any combination of drug-eluting intracoronary stent, atherectomy and angioplasty, including aspiration thrombectomy when performed, single vessel
C9607	Percutaneous transluminal revascularization of chronic total occlusion, coronary artery, coronary artery branch, or coronary artery bypass graft, any combination of drug-eluting intracoronary stent, atherectomy and angioplasty; single vessel
92920	Percutaneous transluminal coronary angioplasty, single major coronary artery and/or its branch(es)
92924	Percutaneous transluminal coronary atherectomy, with coronary angioplasty when performed, single major coronary artery and/or its branch(es)
92928	Percutaneous transcatheter placement of intracoronary stent(s), with coronary angioplasty when performed, single major coronary artery and/or its branch(es); 1 lesion involving 1 or more coronary segments

Code	Description
92930	Percutaneous transcatheter placement of intracoronary stent(s), with coronary angioplasty when performed, single major coronary artery and/or its branch(es); 2 or more distinct coronary lesions with 2 or more coronary stents deployed in 2 or more coronary segments, or a bifurcation lesion requiring angioplasty and/or stenting in both the main artery and the side branch
92933	Percutaneous transluminal coronary atherectomy, with intracoronary stent, with coronary angioplasty when performed, single major coronary artery and/or its branch(es)
92937	Percutaneous transluminal revascularization of or through coronary artery bypass graft (internal mammary, free arterial, venous), any combination of intracoronary stent, atherectomy and angioplasty, including distal protection when performed, single major coronary artery and/or its branches
92943	Percutaneous transluminal revascularization of chronic total occlusion, single coronary artery, coronary artery branch, or coronary artery bypass graft, and/or subtended major coronary artery branches of the bypass graft, any combination of intracoronary stent, atherectomy and angioplasty; antegrade approach
+C9601	Percutaneous transcatheter placement of drug-eluting intracoronary stent(s), with coronary angioplasty when performed; each additional branch of a major coronary artery (list separately in addition to code for primary procedure)
+C9603	Percutaneous transluminal coronary atherectomy, with drug-eluting intracoronary stent, with coronary angioplasty when performed; each additional branch of a major coronary artery (list separately in addition to code for primary procedure)
+C9605	Percutaneous transluminal revascularization of or through coronary artery bypass graft (internal mammary, free arterial, venous), any combination of drug-eluting intracoronary stent, atherectomy and angioplasty, including distal protection when performed; each additional branch subtended by the bypass graft (list separately in addition to code for primary procedure)
+C9608	Percutaneous transluminal revascularization of chronic total occlusion, coronary artery, coronary artery branch, or coronary artery bypass graft, any combination of drug-eluting intracoronary stent, atherectomy and angioplasty; each additional coronary artery, coronary artery branch, or bypass graft (list separately in addition to code for primary procedure)

Code	Description
+92972	Percutaneous transluminal coronary lithotripsy (List separately in addition to code for primary procedure)
+92973	Percutaneous transluminal coronary mechanical aspiration thrombectomy (List separately in addition to code for primary procedure)
+92974	Transcatheter placement of radiation delivery device for subsequent coronary intravascular brachytherapy (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Canadian Cardiovascular Society grading of angina pectoris [(13)]

Grade	Description
Grade I	Ordinary physical activity does not cause angina, such as walking and climbing stairs. Angina with strenuous or rapid or prolonged exertion at work or recreation
Grade II	Slight limitation of ordinary activity. Walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals, or in cold, or in wind, or under emotional stress, or only during the few hours after awakening. Walking more than two blocks on the level and climbing more than one flight of ordinary stairs at a normal pace and in normal conditions

Grade	Description
Grade III	Marked limitation of ordinary physical activity. Walking one or two blocks on the level and climbing one flight of stairs in normal conditions and at normal pace
Grade IV	Inability to carry on any physical activity without discomfort, anginal syndrome may be present at rest

Types of Coronary Atherectomy

- Coronary Atherectomy is a procedure that utilizes a catheter device that is inserted into coronary artery percutaneously to remove plaque from the inside of artery.
- In the presence of coronary artery calcification with an arc > 50%, thickness > 0.5 mm and length > 5 mm, adjunctive therapies for calcium modification should be considered, which are:
    - Rotational atherectomy involves the use of a special burr or drill on the tip of a catheter that rotates to shave the plaque into tiny pieces
    - Directional atherectomy, a technique in which a small cutting device is pushed against the plaque to cut it away from the artery. The process can be repeated at the time the treatment is performed to remove a significant amount of disease from the artery, thus eliminating a blockage from atherosclerotic disease. Devices for directional coronary atherectomy are no longer marketed in the United States.
    - Excimer Laser atherectomy involves the use of xenon chloride laser generator to generate laser (pulsating beams of light) to vaporize the calcified plaque in coronary arteries.
    - Orbital atherectomy uses a unique mechanism of action incorporating centrifugal forces via a standard 1.25 mm eccentrically mounted and diamond coated burr to ablate calcified plaque to facilitate stent expansion.
- Intracoronary lithotripsy is a minimally invasive technique used to treat severely calcified plaques in the coronary arteries. These calcified lesions can make it difficult to perform PCI and to achieve optimal stent expansion. Intracoronary lithotripsy is designed to fracture both superficial and deep calcium within the artery wall, improving vessel compliance and facilitating successful stent deployment
- Drug-coated balloons are a type of PCI used to treat coronary artery disease. Instead of implanting a permanent stent, a balloon catheter coated with an antiproliferative drug (such as paclitaxel or sirolimus) is inflated inside the narrowed artery. The drug is delivered directly to the vessel wall, inhibiting smooth muscle cell proliferation and reducing the risk of restenosis (re-narrowing of the artery).

Guideline Directed Medical Therapy

Guideline directed medical therapy (GDMT) is outlined by joint American College of Cardiology (ACC)/American Heart Association (AHA) in cardiovascular clinical practice guidelines as Class

I recommendation. These are maximally tolerated medications for cardiovascular condition, when prescribed, have shown to improve healthcare outcomes such as survival along with significant reduction in major adverse cardiovascular events and hospitalization. For all recommended drug treatment regimens, the prescriber should confirm the dosage with product insert material and carefully evaluate for contraindications and interactions.

Guideline-directed medical therapy (GDMT) is a part of management of patients with stable ischemic heart disease (SIHD) regardless if revascularization is performed. GDMT for patients with coronary artery disease is synonymous with secondary prevention and consists of pharmacologic therapy with an antiplatelet agent, risk factor modification, and lifestyle interventions. In patients with chronic coronary disease and angina, two antianginals are recommended for relief on angina. (14)

In patients with refractory angina despite medical therapy and with significant coronary artery stenoses amenable to revascularization, revascularization is recommended to improve symptoms.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. (4)

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

SUMMARY OF EVIDENCE

2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization (6)

Study Design: This document is a clinical practice guideline developed by the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. It provides recommendations for coronary artery revascularization based on a comprehensive literature review conducted from May 2019 to September 2019, including studies, reviews, and other evidence published in English.

Target Population: The guideline is intended for patients with significant coronary artery disease undergoing coronary revascularization. It aims to guide clinicians in the treatment of these patients, focusing on improving equity of care and shared decision-making.

Key Factors: The guideline covers various aspects of coronary revascularization, including preprocedural assessment, defining lesion severity, revascularization in STEMI and NSTE-ACS, special populations and situations, procedural issues for PCI and CABG, pharmacotherapy, psychosocial factors, lifestyle changes, and outcomes.

2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease (8)

Study Design: This document is a clinical practice guideline developed by the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. It provides recommendations for the management of patients with valvular heart disease based on an extensive literature review conducted through March 1, 2020.

Target Population: The guideline is intended for adult patients with valvular heart disease, including those with aortic stenosis, aortic regurgitation, bicuspid aortic valve, mitral stenosis, mitral regurgitation, tricuspid valve disease, pulmonic valve disease, mixed valve disease, prosthetic valves, infective endocarditis, and valvular heart disease during pregnancy.

Key Factors: The guideline covers the evaluation of patients with known or suspected valvular heart disease, definitions of severity, diagnosis and follow-up, medical therapy, surgical and interventional risk, the multidisciplinary heart valve team, management after valve intervention, and specific recommendations for different types of valvular heart disease.

North American Expert Review of Rotational Atherectomy [9]

Study Design: This document is a consensus review by experienced North American rotational atherectomy operators and device experts. It summarizes and critiques key elements of contemporary rotational atherectomy technique, identifies areas of consensus and controversy, and offers recommendations for optimal performance.

Target Population: The review focuses on patients undergoing percutaneous coronary intervention for calcified coronary lesions, particularly those with severe coronary artery calcification.

Key Factors: The review covers the rationale for rotational atherectomy, patient and lesion selection, contraindications and cautions, special situations (such as ostial and bifurcation lesions, left main disease, chronic total occlusion, and aortic stenosis with plan for transcatheter aortic valve replacement), device selection, technical performance, recognition and management of complications, and expectations for operators and institutions

ANALYSIS OF EVIDENCE

Shared Findings [6,8,9]

- All three articles emphasize the importance of a multidisciplinary approach to PCI, involving specialized teams and centers to optimize patient outcomes.
- They highlight the need for careful patient and lesion selection, preprocedural assessment, and shared decision-making to ensure the best possible outcomes.
- The articles support the use of PCI in various clinical scenarios, including coronary artery disease, valvular heart disease, and calcified coronary lesions.

Conclusion

In summary, while all three documents provide valuable insights into different aspects of cardiovascular disease management, they each focus on distinct areas: coronary artery revascularization, valvular heart disease, and rotational atherectomy. The shared emphasis on

multidisciplinary team approaches and individualized treatment plans highlights the importance of comprehensive and patient-centered care in cardiovascular medicine.

POLICY HISTORY

Date	Summary
May 2026	• Added indications for intracoronary lithotripsy and drug-coated balloons • Added descriptions for intracoronary lithotripsy and drug-coated balloons to the Background • Added technical description to codes • Updated references
December 2025	• Added the following CPT Codes for Evolent prior authorization scope: 92972, 92974, C9600, C9601, C9602, C9603, C9604, C9605, C9606, C9607, C9608 • Codes within the coding section were edited to reflect changes made by the American Medical Association. Deleted: 92921, 92925, 92929, 92934, 92938, 92944. Added: 92930
June 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• This guideline replaces Evolent Clinical Guideline 7318 for Percutaneous Coronary Interventions • This guideline replaces Evolent Clinical Guideline 7273 for Coronary Atherectomy

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7303 for Interventions for Adults with Congenital Heart Defects

Guideline Number: Evolent_CG_7303	**Applicable Codes**	
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Original Date: December 2020	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for percutaneous and surgical therapeutic interventions for adults with congenital heart disease.

Special Note

In order to review a request for medical necessity, the following items must be submitted for review:

- Progress notes from the cardiologist and (if indicated) cardiovascular surgeon
- Reports from trans-thoracic and/or trans-esophageal echocardiograms, coronary/cardiac CTA, invasive cardiac catheterization, and CMR as applicable

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Shunt Lesions

Atrial Septal Defects (ASD) [6,7]

This section refers only to isolated ASD and not ASD associated with complex congenital heart disease (CHD).

- Primum ASD, sinus venosus defect (SVD) or coronary sinus defect (note: due to increased association between SVD and anomalous pulmonary venous connection (APVC), imaging to exclude APVC is necessary prior to intervention) [8]:
  - Surgical repair for patients with defects causing all of the following:
    - symptoms (i.e., impaired functional capacity)
    - right atrial (RA) and/or right ventricle (RV) enlargement
    - net left-to-right shunt (Qp:Qs) ≥1.5:1)
    - no cyanosis at rest or during exercise
    - pulmonary vascular resistance (PVR) < 5 Woods Units (WU)
      - If PVR is > 5 WU, closure may be reasonable if PVR can be lowered to < 5 WU with targeted therapy
    - no significant left ventricular (LV) disease
- Percutaneous Closure of Patent Foramen Ovale (PFO) [9–11]
  - A prior history of cryptogenic stroke or transient ischemic attack (TIA)
    - Patient must not have other stroke risk factors that would not be affected by device closure
  - ≤ 60 years of age
  - TEE evidence of interatrial communication that is amenable to percutaneous closure
  - **NOTE:** Closure is contraindicated in patients with an inferior vena cava filter or elevated bleeding risk/coagulopathy
- Secundum ASD [6,7]
  - Percutaneous or surgical repair for symptomatic or asymptomatic patients with defects causing all of the following:
    - right atrial and/or RV enlargement
    - net left-to-right shunt (Qp:Qs ≥1.5:1)
    - no cyanosis at rest or during exercise
    - pulmonary vascular resistance (PVR) < 5 Woods Units (WU)
      - If PVR is > 5 WU, closure may be reasonable if PVR can be lowered to < 5 WU with targeted therapy

- Suspected Paradoxical Embolism
    - Surgical or percutaneous closure in patients with ASD (regardless of size) and no other identified source of embolism, in the absence of PAH and LV dysfunction. [6]

Ventricular Septal Defect (VSD) [6,7]

- Surgical or percutaneous closure for patients with defects causing all of the following:
    - Significant or progressive LV enlargement or volume overload
    - net left-to-right shunt (Qp:Qs ≥1.5:1)
    - PVR < 5 WU
- Surgical closure with history of infective endocarditis caused by VSD
- Surgical closure of perimembranous or supracristal VSD with worsening aortic regurgitation (AR) caused by VSD

Anomalous Pulmonary Venous Connections [6]

- Partial APVC surgical repair for patients with all of the following:
    - Cardiac symptoms and/or RV volume overload
    - Qp:Qs ≥1.5:1
- Scimitar vein (connection of right pulmonary vein(s) to the inferior vena cava) surgical repair for patients with both
    - Evidence of RV volume overload
    - Qp:Qs ≥1.5:1
- Repair of partial APVC is recommended at the time of closure of an SVD or ASD

Atrioventricular Septal Defect (AVSD) [6,7,12–14]

- Primary surgical repair of AVSD or repair of residual shunts after AVSD repair with all of the following:
    - net left-to-right shunt (Qp:Qs ≥1.5:1) and/or significant atrial or ventricular dilation
    - PVR < 5 WU
- Surgical repair for ASVD with discrete LV outflow tract (LVOT) obstruction and one or more of the following:
    - maximum gradient of ≥50 mmHg
    - gradient < 50 mmHg in presence of heart failure (HF) symptoms
    - concomitant moderate-to-severe mitral valve (MV) or aortic valve (AV) regurgitation

Patent Ductus Arteriosus (PDA) [6,7]

- Surgical or percutaneous closure for patients with PDA when:

- left atrial or LV enlargement present and attributable to PDA AND
- net left-to-right shunt
- PVR < 5 WU

Left-Sided Obstructive Lesions

Cor Triatriatum Sinister (membrane dividing left atrium) [6]

- Surgical repair for patients with either:
  - symptoms attributable to the obstruction
  - severe membrane obstruction (mean estimated membrane gradient > 15 mmHg)

Subaortic Stenosis [6,7]

- Surgical repair for patients with one or more of the following:
  - symptoms attributable to the obstruction and maximum gradient ≥50mmHg
  - symptoms/signs of heart failure (HF) or ischemia with maximum gradient <50mmHg
  - asymptomatic with a maximum gradient ≥50 mmHg and at least mild aortic regurgitation (AR) (to prevent progression of AR)

Supravalvular Aortic Stenosis [6,7]

- Surgical repair for patients with:
  - symptoms or decreased LV systolic function secondary to aortic obstruction
- Coronary artery revascularization for patients with:
  - symptoms and coronary ostial stenosis

Turner Syndrome [6,15]

- Replacement of the aortic root or ascending aorta in patients who are:
  - asymptomatic with aortic size index (ASI) is ≥2.5 cm/m^2
- in pregnancy, a rapid increase in diameter (>3 mm) justifies intervention prior to delivery

Coarctation of the Aorta [6,7]

- Surgical or percutaneous repair for patients with hypertension and significant native or recurring coarctation as defined by:
  - ≥ 20 mmHg peak-peak gradient between upper and lower extremities by invasive measurement OR
  - ≥ 50% stenosis relative to the aortic diameter at the diaphragm

Right-Sided Lesions

Valvular Pulmonary Stenosis (PS) *(6,7)*

- Balloon valvuloplasty (with surgical repair if balloon valvuloplasty has failed or is not feasible) for:
  - ≥ Moderate PS and one or more of the following:
    - otherwise unexplained symptoms of HF
    - cyanosis from interatrial right-to-left communication
    - exercise intolerance
- Percutaneous or surgical repair
  - Asymptomatic severe PS

Pulmonary Regurgitation (PR) After Repair of PS *(6)*

- Symptomatic patients with both:
  - ≥ moderate PR
  - RV dilation/dysfunction
- Asymptomatic patients with both:
  - ≥ moderate PR
  - progressive RV dilatation/dysfunction

Branch and Peripheral Pulmonary Artery Stenosis *(6,7)*

- Percutaneous dilatation and stenting for patients with ANY of the following:
  - symptoms of reduced pulmonary blood flow (i.e., dyspnea, reduced functional capacity)
  - >50% stenosis
  - reduced lung perfusion
  - right ventricular systolic pressure (RVSP) > 50 mm Hg

Double-Chamber Right Ventricle *(6)*

- Surgical repair for patients with:
  - ≥ moderate outflow obstruction (see **Definitions** section) AND otherwise unexplained symptoms of HF, cyanosis, or exercise limitation
  - severe outflow obstruction (including asymptomatic patients)

Tetralogy of Fallot (TOF) *(6,7,16)*

- Surgical or percutaneous pulmonary valve replacement for repaired TOF and any of the

following:

- ≥ moderate PR with cardiovascular symptoms (i.e. dyspnea, chest discomfort, and/or exercise intolerance) not otherwise explained
- asymptomatic patients with ≥ moderate PR and ventricular tachyarrhythmias
- asymptomatic patients with ≥ moderate PR with other lesions requiring surgical intervention
- asymptomatic patients with ≥ moderate PR and ≥2 of the following:
  - mild or moderate LV or RV systolic dysfunction
    - LVEF <55% and/or RV ejection fraction (RVEF) <47%
  - severe RV enlargement
    - Right ventricular end diastolic volume index (RVEDVi) >150 ml/m^2 OR
    - Right ventricular end systolic volume index (RVESVi) >80 ml/m^2
- QRS duration on electrocardiogram (ECG) >160 ms
- SPAP ≥⅔ systemic pressure due to right ventricular outflow tract (RVOT) obstruction
- severe AR
- ≥ moderate TR
- severe branch pulmonary artery stenosis
- large RVOT aneurysm

Right Ventricle (RV) to Pulmonary Artery (PA) Conduit Intervention [6]

Includes percutaneous conduit stenting or surgical replacement, and/or transcatheter valve replacement (TPVR) for failing RV to PA conduit in patients with:

- ≥ moderate conduit regurgitation and/or stenosis and either:
  - reduced exercise capacity
  - arrhythmias
- Asymptomatic patients with severe conduit stenosis and/or regurgitation and either:
  - Reduced RV function
  - RV dilatation

Complex Lesions

Transposition of the Great Arteries (TGA or d-TGA) [7]

- Following atrial switch procedure, **percutaneous intervention** for:
  - Asymptomatic or symptomatic patients with baffle stenosis
  - patients with baffle leaks and one or more of the following:

        - cyanosis at rest or with exercise
        - strong suspicion of paradoxical emboli
        - left to right shunt associated with symptoms or signs (e.g., ventricular volume overload)
        - prior to placement of pacemaker (PM) or implantable cardioverter defibrillator (ICD)
- Following atrial switch procedure, **surgical intervention** for one or more of the following:
    - symptomatic patients with pulmonary venous atrial obstruction (catheter intervention rarely possible)
    - symptomatic patients with baffle stenosis not amenable to catheter intervention (surgical intervention not indicated for asymptomatic patients with baffle stenosis)
    - symptomatic patients with baffle leaks not amenable to percutaneous intervention

Intervention Following Fontan Surgery

- Reoperation or intervention for repair of structural or anatomic abnormalities in patients with:
    - symptoms (i.e., exercise limitation) or with failure of Fontan circulation

Coronary Artery Anomalies [6,7]

- Surgical intervention for patients with:
    - left coronary artery originating from the right sinus
        - with or without symptoms or signs of ischemia
    - right coronary artery originating from the left sinus with either
        - symptoms of ischemia
        - ventricular arrhythmias
    - left coronary artery originating from the pulmonary artery
        - with or without symptoms or signs of ischemia
    - right coronary artery originating from the pulmonary artery with either
        - symptoms attributed to the anomalous artery
        - ventricular dysfunction or myocardial ischemia attributed to the anomalous artery
    - coronary artery fistula
        - surgical repair or embolization

CODING AND STANDARDS

Codes

Code	Description
33414	Repair of left ventricular outflow tract obstruction by patch enlargement of the outflow tract
33415	Resection or incision of subvalvular tissue for discrete subvalvular aortic stenosis
33416	Ventriculomyotomy (-myectomy) for idiopathic hypertrophic subaortic stenosis (eg, asymmetric septal hypertrophy)
33417	Aortoplasty (gusset) for supravalvular stenosis
33470	Valvotomy, pulmonary valve, closed heart; transventricular
33471	Valvotomy, pulmonary valve, closed heart, via pulmonary artery
33474	Valvotomy, pulmonary valve, open heart, with cardiopulmonary bypass
33475	Replacement, pulmonary valve
33476	Right ventricular resection for infundibular stenosis, with or without commissurotomy
33477	Transcatheter pulmonary valve implantation, percutaneous approach, including pre-stenting of the valve delivery site, when performed
33478	Outflow tract augmentation (gusset), with or without commissurotomy or infundibular resection
33500	Repair of coronary arteriovenous or arteriocardiac chamber fistula; with cardiopulmonary bypass
33501	Repair of coronary arteriovenous or arteriocardiac chamber fistula; without cardiopulmonary bypass
33502	Repair of anomalous coronary artery from pulmonary artery origin; by ligation
33503	Repair of anomalous coronary artery from pulmonary artery origin; by graft, without cardiopulmonary bypass

Code	Description
33504	Repair of anomalous coronary artery from pulmonary artery origin; by graft, with cardiopulmonary bypass
33505	Repair of anomalous coronary artery from pulmonary artery origin; with construction of intrapulmonary artery tunnel (Takeuchi procedure)
33506	Repair of anomalous coronary artery from pulmonary artery origin; by translocation from pulmonary artery to aorta
33507	Repair of anomalous (eg, intramural) aortic origin of coronary artery by unroofing or translocation
33641	Repair atrial septal defect, secundum, with cardiopulmonary bypass, with or without patch
33645	Direct or patch closure, sinus venosus, with or without anomalous pulmonary venous drainage
33647	Repair of atrial septal defect and ventricular septal defect, with direct or patch closure
33660	Repair of incomplete or partial atrioventricular canal (ostium primum atrial septal defect), with or without atrioventricular valve repair
33665	Repair of intermediate or transitional atrioventricular canal, with or without atrioventricular valve repair
33670	Repair of complete atrioventricular canal, with or without prosthetic valve
33675	Closure of multiple ventricular septal defects;
33676	Closure of multiple ventricular septal defects; with pulmonary valvotomy or infundibular resection (acyanotic)
33677	Closure of multiple ventricular septal defects; with removal of pulmonary artery band, with or without gusset
33681	Closure of single ventricular septal defect, with or without patch;
33684	Closure of single ventricular septal defect, with or without patch; with pulmonary valvotomy or infundibular resection (acyanotic)
33724	Repair of isolated partial anomalous pulmonary venous return (eg, Scimitar Syndrome)

Code	Description
33726	Repair of pulmonary venous stenosis
33730	Complete repair of anomalous pulmonary venous return (supracardiac, intracardiac, or infracardiac types)
33732	Repair of cor triatriatum or supravalvular mitral ring by resection of left atrial membrane
33820	Repair of patent ductus arteriosus; by ligation
33822	Repair of patent ductus arteriosus; by division, younger than 18 years
33824	Repair of patent ductus arteriosus; by division, 18 years and older
33840	Excision of coarctation of aorta, with or without associated patent ductus arteriosus; with direct anastomosis
33845	Excision of coarctation of aorta, with or without associated patent ductus arteriosus; with graft
33881	Endovascular repair of thoracic aorta, including pre-procedure sizing and device selection, nonselective catheterization(s), all associated radiological supervision and interpretation; by deployment of an aorto-aortic tube endograft not involving coverage of the left subclavian artery origin and all endograft extension(s) placed from the level of the left subclavian carotid artery to the celiac artery
33917	Repair of pulmonary artery stenosis by reconstruction with patch or graft
33920	Repair of pulmonary atresia with ventricular septal defect, by construction or replacement of conduit from right or left ventricle to pulmonary artery
33922	Transection of pulmonary artery with cardiopulmonary bypass
33925	Repair of pulmonary artery arborization anomalies by unifocalization; without cardiopulmonary bypass
33926	Repair of pulmonary artery arborization anomalies by unifocalization; with cardiopulmonary bypass
37236	Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and

Code	Description
	including all angioplasty within the same vessel when performed; initial artery
92986	Percutaneous balloon valvuloplasty; aortic valve
92990	Percutaneous balloon valvuloplasty; pulmonary valve
93580	Percutaneous transcatheter closure of congenital interatrial communication (ie, Fontan fenestration, atrial septal defect) with implant
93581	Percutaneous transcatheter closure of a congenital ventricular septal defect with implant
93582	Percutaneous transcatheter closure of patent ductus arteriosus
+33924	Ligation and takedown of a systemic-to-pulmonary artery shunt, performed in conjunction with a congenital heart procedure (List separately in addition to code for primary procedure)
+37237	Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; each additional artery (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Aortic Stenosis [4]

- Aortic Stenosis (AS) Severity [4]:
  - Mild AS: aortic V_{max} 2.0-2.9 m/s or mean gradient <20 mm Hg
  - Moderate AS: aortic V_{max} 3.0-3.9 m/s or mean gradient 20-39 mm Hg
  - Severe AS: Aortic peak velocity (Vmax) ≥ 4 m/s or mean gradient ≥ 40 mm Hg
    - Aortic valve area (AVA) typically is ≤ 1.0 cm^2 (or valve index (AVAi) 0.6 cm^2/m^2) but is not required to define severe AS [4]
  - Very severe AS: aortic Vmax ≥ 5 m/s or mean gradient ≥ 60 mm Hg
  - Low flow/low gradient severe AS: defined by a mismatch between reduced aortic valve area (AVA, < 1 cm^2) and a non-severe increase mean valve pressure gradient (i.e., < 40 mmHg) with an impaired left ventricular stroke volume (volume of blood pumped with each beat, similar to LVEF) at rest. This creates a diagnostic and therapeutic dilemma: choosing between aortic valve replacement (AVR) and medical therapy vs optimal medical therapy alone. Low dose dobutamine stress echo (DSE) is recommended as a means of increasing stroke volume with a simultaneous reassessment of aortic valve indices. **Flow reserve** is defined as a 20% increase in stroke volume demonstrated by DSE. DSE can yield three possible results in this situation:
    - Truly severe AS: Significant increase in stroke volume (i.e. flow reserve is demonstrated) and mean valve gradient (>40 mmHg). Aortic valve is severely stenotic, and the low gradient measured at rest is a consequence of the LV contractile dysfunction.
    - Pseudo-severe AS: Significant increase in stroke volume and persistent low mean valve gradient (< 40 mmHg) and AS does not meet the hemodynamic criteria to be defined as severe.
    - Undetermined AS severity: Absence of significant increase in stroke volume and mean valve gradient (< 40 mmHg): In this case, DSE fails to demonstrate an increase in stroke volume (lack of flow reserve) and the AS severity grade remains undetermined. In this situation clinicians must rely on the morphologic features of the valve on imaging (such as cardiac CT). [5]

Society of Thoracic Surgeons Risk Calculations

- The Society of Thoracic Surgeons (STS) provides a range of risk calculators to evaluate the short-term (30 day) mortality risk for adult operative patients. Calculator types include:
  - Adult Cardiac Surgery Database Operative Risk Calculator
  - Mitral Regurgitation Risk Calculator
  - Isolated Tricuspid Valve Surgery Risk Calculator

- SAVR After TAVR Risk Calculator
- Multi-Valve Surgery Risk Calculator
- Ascending Aorta & Aortic Root Surgery Risk Calculators

- The Society of Thoracic Surgeons Predicted Risk of Surgical Mortality (STS-PROM) uses a scoring system to provide an estimate of 30-day surgical mortality [(1)]:
  - Low risk: STS score < 3%
  - Intermediate risk: STS score 3% - 8%
  - High risk: STS score >8%
- Results from risk calculators should play a role in informed decision making, but do not take all factors into account and should not be used as sole decision-making tools. You can find the risk calculators and additional info at the Society of Thoracic Surgeons website.

Definitions

Severity of Right Ventricular Outflow Obstruction (including pulmonary valve stenosis) [(6)]

- Mild: peak gradient (PG) < 36 mmHg
- Moderate: PG 36-64 mmHg
- Severe PG >64 mmHg or mean gradient (MG) >35 mmHg

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

APVC: anomalous pulmonary venous connections

AR: aortic regurgitation

AS: aortic stenosis

ASD: atrial septal defect

AVSD: atrioventricular septal defect

BAV: bicuspid aortic valve

BNP: B-type natriuretic protein

ccTGA: congenitally corrected transposition of the great arteries

CHD: congenital heart disease

ECG: electrocardiogram

HF: heart failure

ICD: implantable cardioverter defibrillator

LV: left ventricle

LVEF: left ventricular ejection fraction

MG: mean gradient

MS: mitral stenosis

PA: pulmonary artery

PG: peak gradient

PDA: patent ductus arteriosus

PM: pacemaker

PR: pulmonic regurgitation

PS: pulmonic stenosis

PVR: pulmonary vascular resistance

RV: right ventricle

RVEDVi: right ventricular end diastolic volume index

RVESVi: right ventricular end systolic volume index

RVOT: right ventricular outflow tract

RVSP: right ventricular systolic pressure

SPAP: systolic pulmonary artery pressure

SVD: sinus venosus defect

SVR: systemic vascular resistance

SVT: supraventricular tachycardia

TGA: transposition of the great arteries

TOF: Tetralogy of Fallot

TPVR: transcatheter pulmonary valve replacement

TR: Tricuspid regurgitation

TV: tricuspid valve

VSD: ventricular septal defect

SUMMARY OF EVIDENCE

2020 ESC Guidelines For The Management of Adult Congenital Heart Disease [7]

Study Design: The study involved the development of guidelines for the management of adult congenital heart disease (ACHD) by the European Society of Cardiology (ESC). The process included a comprehensive review of published evidence, diagnostic and therapeutic procedures, and assessment of the risk-benefit ratio. The guidelines were developed by a task force of selected experts in the field, representing various ESC sub-specialty groups.

Target Population: The guidelines focus on patients with adult congenital heart disease (ACHD), including those with mild, moderate, and severe congenital heart defects. The target population encompasses a wide range of congenital heart conditions, such as atrial septal defect (ASD), ventricular septal defect (VSD), atrioventricular septal defect (AVSD), patent ductus arteriosus (PDA), left ventricular outflow tract obstruction (LVOTO), coarctation of the aorta (CoA), and aortopathies.

Key Factors:

Recommendations: The guidelines provide evidence-based recommendations for the diagnosis, management, and treatment of ACHD, including surgical and catheter interventions, medical therapy, and follow-up care.

Diagnostic Testing: The guidelines emphasize the importance of accurate diagnosis, risk assessment, and selection of the most suitable type of intervention. Diagnostic testing includes echocardiography, cardiovascular magnetic resonance imaging (CMR), cardiovascular computed tomography (CCT), and cardiac catheterization.

Medical Therapy: The guidelines recommend medical therapy for heart failure, arrhythmias, pulmonary hypertension, and other related conditions. Specific therapies include beta blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), and pulmonary vasodilators.

Surgical and Catheter Interventions: The guidelines provide detailed recommendations for surgical and catheter interventions for various congenital heart defects, including ASD, VSD, AVSD, PDA, LVOTO, CoA, and aortopathies.

Follow-up Care: The guidelines emphasize the importance of lifelong follow-up care for ACHD patients, including regular imaging, exercise testing, and monitoring for complications.

2018 AHA/ACC Guideline for the Management of Adults With Congenital Heart Disease [6]

Study Design: The study involved the development of the 2018 AHA/ACC Guideline for the Management of Adults with Congenital Heart Disease (ACHD). The guidelines were developed by the American College of Cardiology (ACC) and the American Heart Association (AHA) Task Force on Clinical Practice Guidelines. The process included a comprehensive review of published evidence, diagnostic and therapeutic procedures, and assessment of the risk-benefit ratio. The guidelines were developed by a task force of selected experts in the field, representing various ACC sub-specialty groups.

Target Population: The guidelines focus on adults with congenital heart disease (ACHD), including those with simple, moderate, and complex congenital heart defects. The target population encompasses a wide range of congenital heart conditions, such as atrial septal

defect (ASD), ventricular septal defect (VSD), atrioventricular septal defect (AVSD), patent ductus arteriosus (PDA), left ventricular outflow tract obstruction (LVOTO), coarctation of the aorta (CoA), and aortopathies.

Key Factors:

Recommendations: The guidelines provide evidence-based recommendations for the diagnosis, management, and treatment of ACHD, including surgical and catheter interventions, medical therapy, and follow-up care.

Diagnostic Testing: The guidelines emphasize the importance of accurate diagnosis, risk assessment, and selection of the most suitable type of intervention. Diagnostic testing includes echocardiography, cardiovascular magnetic resonance imaging (CMR), cardiovascular computed tomography (CCT), and cardiac catheterization.

Medical Therapy: The guidelines recommend medical therapy for heart failure, arrhythmias, pulmonary hypertension, and other related conditions. Specific therapies include beta blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), and pulmonary vasodilators.

Surgical and Catheter Interventions: The guidelines provide detailed recommendations for surgical and catheter interventions for various congenital heart defects, including ASD, VSD, AVSD, PDA, LVOTO, CoA, and aortopathies.

Follow-up Care: The guidelines emphasize the importance of lifelong follow-up care for ACHD patients, including regular imaging, exercise testing, and monitoring for complications.

2020 ACC/AHA Guideline for the Management of Patients with Valvular Heart Disease [12]

Study Design: The guidelines were developed by the American College of Cardiology (ACC) and the American Heart Association (AHA) Joint Committee on Clinical Practice Guidelines. The document is based on systematic methods to evaluate and classify evidence, including literature reviews, randomized controlled trials (RCTs), registries, nonrandomized comparative and descriptive studies, case series, cohort studies, systematic reviews, and expert opinion.

Target Population: The guidelines focus on the diagnosis and management of adult patients with valvular heart disease (VHD). The recommendations are applicable to patients with or at risk of developing cardiovascular disease, with a particular emphasis on those in the United States but relevant to patients worldwide.

Key Factors:

Evaluation and Management: The guidelines provide detailed recommendations for the evaluation and management of various types of VHD, including aortic stenosis (AS), aortic regurgitation (AR), bicuspid aortic valve (BAV), mitral stenosis (MS), mitral regurgitation (MR), tricuspid valve disease, and mixed valve disease.

Diagnostic Testing: The guidelines emphasize the importance of diagnostic testing, including transthoracic echocardiography (TTE), transesophageal echocardiography (TEE), cardiac magnetic resonance (CMR) imaging, computed tomography (CT) angiography, and cardiac catheterization.

Medical Therapy: Recommendations for medical therapy include the use of anticoagulants, antiplatelet agents, and other medications for managing symptoms and preventing complications.

Intervention: The guidelines provide criteria for surgical and transcatheter interventions, including valve repair and replacement, based on the severity of the disease and patient-specific factors.

Follow-Up and Monitoring: The document outlines the importance of regular follow-up and monitoring of patients with VHD, including periodic imaging and assessment of ventricular function.

ANALYSIS OF EVIDENCE

Shared Findings [6,7,12]

All three articles emphasize the importance of specialized care and multidisciplinary approaches for managing adults with CHD. They agree on several key points:

1. **Multidisciplinary Care**:
    - All articles recommend that adults with CHD should be managed by a multidisciplinary team, including cardiologists, surgeons, anesthesiologists, and other specialists with expertise in CHD.
2. **Regular Follow-Up**:
    - Regular follow-up and monitoring are essential for adults with CHD to detect and manage complications early.
3. **Interventional and Surgical Procedures**:
    - Interventional and surgical procedures should be performed by operators with expertise in CHD.
4. **Risk Assessment**:
    - Risk assessment is crucial for determining the timing and type of intervention.

Conclusions [6,7,12]

In summary, all three articles highlight the critical role of specialized care and multidisciplinary approaches in managing adults with CHD. They share conclusions on the importance of regular follow-up, risk assessment, and expertise in interventional and surgical procedures.

POLICY HISTORY

Date	Summary
May 2026	• Removed valve replacement indications to specific valve surgery guidelines

Date	Summary
	• Added indications for percutaneous repair of patent foramen ovale • Removed indications for Ebstein anomaly • Removed indications for catheter ablation • Replaced PVR to SVR ratio with Woods units • Updated definitions • Added code descriptions
May 2025	• Edited background • Updated citations • Edited text for clarity • Checked Medicare Advantage Line of Business • Added Summary of Evidence and Analysis of Evidence • Added third General Information bullet
January 2025	• This guideline replaces UM 1418 Interventions for Adults with Congenital Heart Defects • Added suspected paradoxical embolism as indication for ASD repair • Added indication for VSD repair related to endocarditis, worsening aortic regurgitation related to the VSD • Added indication for repair of subaortic stenosis to prevent worsening of aortic regurgitation • Added indication for coronary revascularization in symptomatic patients with supravalvular aortic stenosis and ostial coronary artery stenosis • Added indications for intervention in patients with Turner syndrome • Added indication for intervention in coarctation of aorta for stenosis ≥50% at diaphragm • Added indications for intervention in asymptomatic patients with severe pulmonary valve stenosis • Added indications for intervention for Ebstein anomaly related to the presence of shunting, paradoxical embolism and arrhythmia

Date	Summary
	● Added indications for pulmonary valve replacement in tetralogy of Fallot related to the presence of ventricular arrhythmia, ECG abnormalities, significant disease involving other cardiac valves, branch pulmonary stenosis and RVOT aneurysm ● Added indications for intervention for RV to PA conduit dysfunction ● Added section on intervention for sequelae related to prior surgical procedures (TGA repair and Fontan palliation) ● Added indication for intervention for coronary fistulae ● Added definitions and abbreviations

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7304 for Intra Cardiac Echocardiography (ICE)

Guideline Number:	Applicable Codes	
Evolent_CG_7304		
"Evolent" refers to Evolent Health LLC and Evolent Specialty Services, Inc. *© 2019 - 2027 Evolent. All rights Reserved.*		
Original Date:	**Last Revised Date:**	**Implementation Date:**
June 2019	May 2026	January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines, and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Intracardiac echocardiography (ICE) is a unique imaging modality able to provide high-resolution, real-time visualization of cardiac structures, continuous monitoring of catheter location within the heart, and early recognition of procedural complications, such as pericardial effusion or thrombus formation.

Special Note

In order to review a request for medical necessity, the Cardiologist or Electrophysiologist note that prompted the request must be submitted for review.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

ICE is indicated for:

- Imaging during percutaneous closure of patent foramen ovale (PFO) or atrial septal defect (ASD) **(AUC Score 8)** [6]
- Intraprocedural guidance for a left atrial appendage occlusion (LAAO) device **(AUC Score 6)** [7]
- Preprocedural screening before intracardiac percutaneous interventions to detect emboli that may become dislodged during the procedure [8]
- As an alternative imaging module when TEE is infeasible [9,10] or conscious sedation is desired [11]
- Transseptal puncture and catheterization [8,11]
- Endomyocardial biopsy [12]
- Mitral and aortic valvuloplasty [11,13]
- Ablation of atrial [14] or ventricular [15] arrhythmias

CODING AND STANDARDS

Codes

Code	Description
+93662	Intracardiac echocardiography during therapeutic/diagnostic intervention, including imaging supervision and interpretation (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

ASD: Atrial septal defect

AUC: Appropriate use criteria

CT: Computed tomography

HRS: Heart Rhythm Society

ICE: Intracardiac echocardiography

PFO: Patent foramen ovale

SCAI: Society for Cardiovascular Angiography and Interventions

TEE: Transesophageal echocardiography

SUMMARY OF EVIDENCE

Patent Foramen Ovale Closure: British Cardiovascular Intervention Society Position Statement [6]

Study Design: This article is an expert position statement on percutaneous PFO closure. It synthesizes evidence from randomized controlled trials establishing the efficacy of PFO closure for prevention of recurrent paradoxical embolic events, alongside national commissioning and registry experience. The document is procedural and policy-oriented, focusing on indications, diagnostic pathways, service standards, and technical aspects of PFO closure.

Target Population: The guidance applies to patients undergoing percutaneous PFO closure, primarily those with unexplained ischemic stroke, transient ischemic attack, or other systemic embolic events thought to be due to paradoxical embolization. The typical patient profile described includes individuals younger than 60 years, with selected older patients considered when recurrent embolic events remain unexplained.

Key Factors: ICE is emphasized as a primary intraprocedural imaging option, alongside transesophageal echocardiography (TEE), for guiding PFO closure. The authors state that PFO closure may be performed with echocardiographic guidance using TEE or ICE, or with fluoroscopy alone when anatomy has been adequately defined by prior TEE. Procedural ICE is noted to facilitate case scheduling, as it does not require the presence of a dedicated imaging

specialist or anesthetist. The document emphasizes that ICE-guided PFO closure should not be adopted early in an operator's experience, recommending prior procedural expertise, education, and proctoring before reliance on ICE.

2025 SCAI/HRS Clinical Practice Guidelines on Transcatheter Left Atrial Appendage Occlusion [7]

Study Design: The document is a multisociety clinical practice guideline based on a systematic review of current literature, with evidence appraised with Grading of Recommendations Assessment, Development, and Evaluation (GRADE) methodology. Recommendations, including those related to intraprocedural imaging modalities, were formulated using a structured evidence-to-decision framework and consensus voting.

Target Population: The target population includes adult patients with nonvalvular atrial fibrillation being considered for, undergoing, or having undergone percutaneous LAAO for stroke prevention.

Key Factors: The guideline concludes that either ICE or TEE may be used for intraprocedural guidance, as reported outcomes such as procedural success, stroke, bleeding, peridevice leak, and mortality, were generally similar between ICE-guided and TEE-guided procedures in comparative studies. Key considerations supporting ICE use include shorter procedure times and avoidance of general anesthesia, allowing procedures under conscious sedation and reducing the need for anesthesia personnel and post-anesthesia recovery. The guideline emphasizes that ICE selection should consider patient preference, anatomical complexity, availability of preprocedural imaging, operator experience, and institutional resources.

SCAI Position Statement on Intracardiac Echocardiography to Guide Structural Heart Disease Interventions [11]

Study Design: This document is a position statement developed according to SCAI Standards and Guidelines Committee policies. It represents an expert-consensus synthesis of available evidence, incorporating observational studies, case series, registry analyses, and accumulated clinical experience rather than randomized controlled trials. The writing group was multidisciplinary, underwent internal and external peer review, and the statement was endorsed by SCAI leadership. The primary objective is to define the clinical applications, advantages, limitations, and implementation standards for ICE across structural heart disease interventions.

Target Population: The target population includes adult patients undergoing transcatheter structural heart disease interventions involving mitral valves, tricuspid valves, pulmonary valves, LAAO ASD, and PFO closure.

Key Factors: ICE is described as a minimally invasive intraprocedural imaging modality that provides real-time intracardiac visualization without the need for esophageal instrumentation or general anesthesia, making it particularly useful when TEE is infeasible or contraindicated. Although TEE remains the gold standard for most mitral interventions, ICE may serve as an alternative in carefully selected patients when TEE imaging is limited or unsafe, including certain mitral procedures such as balloon valvuloplasty and other transcatheter interventions for which experience is evolving. ICE has an established role in guiding transseptal puncture and can be used to assess mitral valve anatomy and gradients, as well as to detect intraprocedural complications such as pericardial effusion. The statement emphasizes that successful ICE use

depends on appropriate patient selection, structured operator training, standardized imaging protocols, and institutional expertise.

ANALYSIS OF EVIDENCE

Analysis [6,7,11]

These three articles provide a coherent and complementary evidence base supporting the expanding role of ICE in contemporary structural heart interventions. Across guideline-driven and expert-consensus documents, ICE is consistently recognized as a safe and effective intraprocedural imaging modality that enables real-time visualization of cardiac anatomy while avoiding the need for general anesthesia and esophageal instrumentation. The articles collectively emphasize ICE's contribution to procedural feasibility in patients who cannot tolerate TEE, as well as its role in improving workflow efficiency and patient experience. While the strength of evidence varies, the overall body of literature supports ICE as a clinically acceptable alternative to TEE in selected populations and procedures.

Shared Conclusions:

ICE as a Safe and Effective Intraprocedural Imaging Modality
All three articles conclude that ICE provides reliable, real-time visualization of cardiac structures with low complication rates when used by trained operators, supporting its use across multiple transcatheter interventions.

Particular Value When TEE Is Infeasible or Undesirable
Each document highlights ICE as especially valuable in patients with contraindications to TEE (eg, esophageal disease, intolerance of general anesthesia) or where TEE imaging windows are suboptimal, allowing procedures to proceed that might otherwise be delayed or not performed.

Facilitation of Minimally Invasive, Conscious-Sedation Procedures
A consistent finding across all three sources is that ICE supports conscious-sedation workflows, avoids intubation, and may enable same-day discharge, contributing to improved patient comfort and procedural efficiency.

POLICY HISTORY

Date	Summary
May 2026	• No substantial clinical content changes • Moved definition of ICE to Purpose section • Deleted redundant indication bullet • Updated Summary of Evidence and Analysis of Evidence to reflect updated literature

Date	Summary
July 2025	● No substantial clinical content changes ● Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices ● Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7305 for Introduction of Inferior Vena Cava Filter Device

Guideline Number: Evolent_CG_7305	**Applicable Codes**	
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Original Date: September 2011	**Last Revised Date:** June 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for introduction and removal of Inferior Vena Cava (IVC) Filter Device.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR INFERIOR VENA CAVA FILTER DEVICE

- Presence of deep vein thrombosis (DVT) or pulmonary embolism (PE) with any of the following conditions [6]:
  - Failure or major complication of anticoagulation, or contraindication to anticoagulation [7,8]
  - Recurrent PE despite anticoagulation [7]

- Poor compliance with anticoagulation [9,10]
- Massive PE with residual DVT in a patient at risk for further PE [9]
- PE and limited cardiac reserve

- For patients at high risk of developing a clinically significant procedure-related PE
  - Prophylactic in patients with severe trauma, spinal cord injury, or paraplegia [7]
  - As prophylaxis before surgery (in patients with DVT) [8]
  - Protection during DVT thrombolysis [7,8]

NOTE: Indications for removal and repositioning of IVC filter needs to be documented in provider notes

LIMITATIONS FOR INFERIOR VENA CAVA FILTER DEVICE

- Absolute contraindications for Insertion of IVC filter:
  - Lack of access into IVC
- Relative contraindications for Insertion of IVC filter:
  - Bleeding Diathesis
  - Total thrombosis of IVC
  - Bacteremia, sepsis, or both
  - Caval diameter less than 15 mm

CODING AND STANDARDS

Codes

Code	Description
37191	Insertion of intravascular vena cava filter, endovascular approach including vascular access, vessel selection, and radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance (ultrasound and fluoroscopy), when performed
37192	Repositioning of intravascular vena cava filter, endovascular approach including vascular access, vessel selection, and radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance (ultrasound and fluoroscopy), when performed

Code	Description
37193	Retrieval (removal) of intravascular vena cava filter, endovascular approach including vascular access, vessel selection, and radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance (ultrasound and fluoroscopy), when performed

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

An inferior vena cava filter, also IVC filter is a type of vascular filter. This device is implanted into the inferior vena cava to prevent fatal pulmonary emboli.

Placing a filter in the inferior vena cava (IVC) is an important way to prevent significant pulmonary embolism (PE) arising from a deep vein thrombosis (DVT). This procedure is currently performed under radiological guidance via femoral vein or jugular vein access.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

DVT: Deep vein thrombosis

IVC: Inferior vena cava

PE: Pulmonary embolism

SUMMARY OF EVIDENCE

Inferior Vena Cava Filters: A Clinical Review and Future Perspectives [6]

Study Design: This is a clinical review discussing the use of inferior vena cava (IVC) filters as a therapeutic strategy for venous thromboembolism (VTE) when anticoagulant therapy is contraindicated.

Target Population: The review focuses on patients with VTE, particularly those with contraindications to anticoagulation therapy.

Key Factors: The review discusses both permanent and retrievable IVC filters, highlighting their design to trap thrombus while allowing normal blood flow. The primary indication for IVC filter placement is a VTE event in the lower limbs with an absolute contraindication to anticoagulation. Other possible indications include high bleeding risk during peripartum and puerperium, VTE prophylaxis in surgical patients, and massive pulmonary embolism treated with thrombectomy or thrombolysis. The review mentions possible complications such as filter occlusion, recurrence of thrombosis, and the need for a multidisciplinary approach to review the appropriateness of filter use and define the best timing for retrieval. The review cites studies like the PREPIC and PREPIC 2 trials, which evaluated the effectiveness of caval filters in addition to anticoagulation. The results show a lower incidence of PE at day 12 but an increased risk of DVT recurrence.

Society of Interventional Radiology Clinical Practice Guideline for Inferior Vena Cava Filters in the Treatment of Patients with Venous Thromboembolic Disease: Developed in collaboration with the American College of Cardiology, American College of Chest Physicians, American College of Surgeons Committee on Trauma, American Heart Association, Society for Vascular Surgery, and Society for Vascular Medicine [8]

Study Design: This document is a clinical practice guideline developed by the Society of Interventional Radiology in collaboration with several other medical organizations.

Target Population: The guideline addresses patients with or at substantial risk of venous thromboembolic disease.

Key Factors: The guideline provides evidence-based recommendations for the use of IVC filters in various clinical scenarios, including acute PE, acute DVT, recurrent VTE, and trauma patients. The systematic review identified 34 studies that provided the evidence base for the guideline. The guideline covers the use of IVC filters in patients with acute PE with a contraindication to anticoagulation, patients with acute DVT without PE, and patients undergoing advanced therapies. The guideline discusses outcomes such as mortality, recurrent PE, DVT, postthrombotic syndrome, pulmonary hypertension, and complications related to IVC

filter placement. The guideline emphasizes the importance of structured follow-up programs to increase retrieval rates and detect complications.

ANALYSIS OF EVIDENCE

Analysis [6,8]:

Focuses on the historical context and the development of IVC filters, as well as the need for a multidisciplinary approach to manage complications and determine the best timing for filter retrieval. Provides a more structured set of guidelines and recommendations for the use of IVC filters in various clinical scenarios, emphasizing the need for evidence-based practice and the importance of structured follow-up programs.

Shared Conclusions

Both articles agree on the importance of IVC filters as a therapeutic option for patients with VTE who have contraindications to anticoagulation therapy. They also highlight the potential complications associated with IVC filter placement and the need for careful patient selection and follow-up.

POLICY HISTORY

Date	Summary
June 2026	● Updated references ● No substantial clinical content changes ● CPT Code table and descriptions added
July 2025	● No substantial clinical content changes ● Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices ● Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guideline 7309 for Microvolt T-Wave Alternans

Guideline Number: Evolent_CG_7309	Applicable Codes	
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Original Date: August 2011	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Microvolt T-wave alternans (MTWA) testing is a noninvasive technique that measures beat-to-beat variation in T-wave amplitude and morphology, used to assess risk for ventricular arrhythmias and sudden cardiac death (SCD) (see **Background**).

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Non-invasive MTWA testing is not recommended for risk stratification of patients with ventricular arrythmias or those who are at risk for developing life-threatening arrythmias. [6] Data on the use of MTWA is inconclusive, and it is not routinely used in clinical practice. [7]

CODING AND STANDARDS

Codes

Code	Description
93025	Microvolt T-wave alternans for assessment of ventricular arrhythmias

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

An electrocardiogram (ECG) is a recording of the heart's electrical activity to review the electrical conduction system of the heart. In MTWA testing, ECG measurements are used to assess risk for ventricular arrhythmias—abnormal heart rhythms affecting the ventricular chambers of the heart—and SCD, which is sudden or unexpected death due to a cardiovascular cause that occurs within an hour of onset of symptoms. Types of ventricular arrhythmias include premature ventricular contractions (PVCs), nonsustained ventricular tachycardia (NSVT), ventricular tachycardia (VT), Torsades de pointes (TdP), ventricular flutter, and ventricular fibrillation.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

ECG: Electrocardiogram

MTWA: Microvolt T-wave alternans

NSVT: Nonsustained ventricular tachycardia

PVC: Premature ventricular contractions

SCD: Sudden cardiac death

TdP: Torsades de pointes

VT: Ventricular tachycardia

SUMMARY OF EVIDENCE

2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death [6]

Study Design: This document is a clinical practice guideline by the European Society of Cardiology (ESC) for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death. It includes recommendations based on systematic literature reviews and expert consensus.

Target Population: Patients with ventricular arrhythmias and those at risk of sudden cardiac death, including those with conditions such as acute coronary syndrome, cardiomyopathies, inherited arrhythmogenic diseases, and congenital heart disease.

Key Factors: Epidemiology: The document provides data on the prevalence of ventricular arrhythmias and sudden cardiac death in various populations, highlighting the higher risk in men and older individuals.

Risk Prediction: It discusses the risk factors for sudden cardiac death, including genetic predisposition, left ventricular ejection fraction, and the presence of specific arrhythmogenic conditions.

Management: Recommendations for the management of ventricular arrhythmias and the prevention of sudden cardiac death, including pharmacological treatments, device therapy (such as ICDs and CRT), and catheter ablation.

Special Populations: Guidelines for the management of ventricular arrhythmias in specific populations, such as patients with congenital heart disease, neuromuscular disorders, and pregnant women.

Prevention: Strategies for the prevention of sudden cardiac death, including public access defibrillation and the use of wearable cardioverter defibrillators.

2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death [7]

Study Design: The guideline is based on a systematic review of evidence from various sources, including randomized controlled trials (RCTs), registries, nonrandomized comparative and descriptive studies, case series, cohort studies, systematic reviews, and expert opinion.

The writing committee used evidence-based methodologies to formulate recommendations, focusing on the quality of scientific evidence and the magnitude and certainty of benefit in proportion to risk.

Target Population: The guideline is intended for adults who have ventricular arrhythmias (VA) or are at risk for sudden cardiac death (SCD), including those with diseases and syndromes associated with a risk of SCD from VA. It covers a wide range of conditions, including ischemic heart disease, nonischemic cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, hypertrophic cardiomyopathy, myocarditis, cardiac sarcoidosis, neuromuscular disorders, and cardiac channelopathies.

Key Factors:

Indications for ICD Implantation:

- **Secondary prevention:** For patients who survive sudden cardiac arrest (SCA) due to VA or experience hemodynamically unstable VT.
- **Primary prevention:** For patients with reduced left ventricular ejection fraction (LVEF) due to ischemic or nonischemic cardiomyopathy.

Pharmacological Therapy: Beta blockers are recommended for patients with VA and SCD risk. Amiodarone and sotalol are useful for suppressing recurrent VA.

Catheter Ablation: Recommended for patients with recurrent symptomatic sustained VT or VT storm.

Genetic Testing and Counseling: Recommended for patients with inherited arrhythmia syndromes and their first-degree relatives.

Special Considerations: Management of VA in specific populations such as athletes, pregnant women, older patients with comorbidities, and patients with chronic kidney disease.

ANALYSIS OF EVIDENCE

Shared Conclusions [6,7]

- **Indications for MTWA Testing**:
  - Both articles agree that MTWA testing is indicated for risk stratification in patients with ventricular arrhythmias (VA) and the prevention of sudden cardiac death (SCD).
  - They also concur that MTWA can be used to identify patients at high risk for SCD who may benefit from implantable cardioverter-defibrillator (ICD) therapy.
- **Evaluation and Diagnosis**:
  - MTWA is emphasized as a non-invasive tool for evaluating the risk of SCD in patients with VA and structural heart disease.
  - Both articles highlight the importance of MTWA in assessing the electrical instability of the heart, which can predict the likelihood of life-threatening arrhythmias.
- **Prognostic Value**:

- MTWA testing is recognized for its prognostic value in predicting SCD and guiding therapeutic decisions.
- The articles agree that a positive MTWA test is associated with a higher risk of SCD, while a negative test indicates a lower risk.

Summary [6,7]

The data on Microvolt T-Wave Alternans (MTWA) is not entirely conclusive. While MTWA is recognized for its prognostic value in predicting sudden cardiac death (SCD) and guiding therapeutic decisions, its role in specific populations and the timing of intervention may vary depending on the clinical context. Some studies suggest that MTWA testing can help identify patients at high risk for SCD who may benefit from implantable cardioverter-defibrillator (ICD) therapy. However, there are differing opinions on its effectiveness and integration with other risk stratification tools. Therefore, while MTWA has shown promise, more research is needed to fully understand its utility and establish definitive guidelines for its use.

POLICY HISTORY

Date	Summary
April 2026	● No clinical changes to guideline content ● Added procedure definition to Purpose section ● Reformatted Background section
May 2025	● No clinical changes to guideline content ● Added third General Information bullet ● Added Summary of Evidence and Analysis of Evidence ● Checked Medicare Advantage Line of Business

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care

coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7315 for Pacemaker Insertion

Guideline Number: Evolent_CG_7315	**Applicable Codes**	
"Evolent" refers to Evolent Health LLC and Evolent Specialty Services, Inc. ***© 2026 - 2027 Evolent. All rights Reserved.***		
Original Date: January 2026	**Last Revised Date:** August 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

This guideline is not intended to specify the type of bradycardia pacing device. CRT (cardiac resynchronization therapy or biventricular pacing) and ICD (implantable cardioverter defibrillator) implantation are covered in separate guidelines. Pacemaker implantation generally serves to address bradycardia, with the intention of ameliorating related symptoms, preventing complications of syncope, and/or reducing mortality risk.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR PACEMAKERS IN ADULTS

Excludes conditions that are expected to resolve.

NOTE: Guideline-directed medical therapy (GDMT) protocols that apply to implantable cardioverter-defibrillator (ICD) and cardiac resynchronization therapy (CRT) do not apply to standard single- and dual-chamber pacemaker implantation.

Sinus Node Dysfunction (SND) [6–9]

- Documented symptomatic sinus bradycardia, including frequent sinus pauses
- Symptomatic chronotropic incompetence (broadly defined as an inability to increase heart rate commensurate with activity or demand), documented by stress test or cardiac monitoring data
- Symptomatic sinus bradycardia resulting from required GDMT for which there is no alternative treatment
- Heart rate < 40 beats per minute (bpm) while awake, even without definite association with significant symptoms consistent with bradycardia
- Tachycardia-bradycardia syndrome and symptoms attributable to bradycardia
- Syncope of unexplained origin with clinically significant SND, either documented or provoked in electrophysiologic study (EPS)
- With left bundle-branch block (LBBB) and left ventricular ejection fraction (LVEF) < 50% **(AUC Score 6)**

Acquired Atrioventricular (AV) Block [6,7,9]

First-Degree AV Block

- Marked first-degree Mobitz Type 1 AV block with symptoms clearly attributable to the AV block
- First-degree block with a long PR interval (>200 ms) and LVEF ≤ 35% **(AUC Score 7)** or 36-50% **(AUC Score 6)**
- First-degree AV block with “pacemaker syndrome” symptoms (chronic fatigue, dyspnea on exertion, symptomatic hypotension) or hemodynamic compromise

Second Degree AV Block (Mobitz Types I and II)

- Second degree Mobitz Type 1 AV Block with a narrow QRS and LVEF ≤ 35% **(AUC Score 7)** or 36-50% **(AUC Score 6)**
- Marked second-degree Mobitz Type 1 AV block with symptoms clearly attributable to the AV block
- Second-degree AV block with “pacemaker syndrome” symptoms (chronic fatigue, dyspnea on exertion, symptomatic hypotension) or hemodynamic compromise
- Second-degree Mobitz Type II AV block regardless of symptoms)
- Advanced second-degree AV block
- Second-degree AV block with EPS-documented intra- or infra-His conduction delay of 70 ms or greater
- Symptomatic bradycardia associated with second-degree AV block, either Mobitz I or II

Third-Degree/Complete AV Block

- Third-degree (complete) AV block, intermittent with syncope or presyncope **(AUC Score 6)** or persistent, regardless of symptoms and LVEF < 50% **(AUC Score 7)** or > 50% **(AUC Score 6)**
- High-grade AV block, regardless of symptoms

Atrial Fibrillation (AF)/Other [6,7,9]

- AF, with pauses ≥ 5 seconds while awake, or symptomatic bradycardia
- In sinus rhythm (with AV block) while awake, pauses ≥ 3 seconds or heart rate < 40 bpm or an escape rhythm below the AV node (wide QRS)
- Preparatory for or following catheter ablation of the AV junction
- Symptomatic AV block that results from required medical therapy for which there is no alternative treatment
- Exercise-induced second- or third-degree AV block without myocardial ischemia
- With slow ventricular response and LVEF < 50% **(AUC Score 7)**

Neuromuscular Disorders [6,7]

- Marked first-degree or higher AV block, or an H-V (His-ventricular) interval ≥ 70 ms, associated with neuromuscular diseases, such as myotonic muscular dystrophy, Erb's dystrophy, Kearns-Sayre syndrome, and peroneal muscular atrophy, regardless of symptoms

Chronic Fascicular Block* [6,7,10]

*includes right bundle branch (RBBB), LBBB, left anterior hemi (LAHB), and left posterior hemi (LPHB) block

- Alternating bundle-branch block
- Syncope and bundle branch block with an H-V interval ≥ 70 ms, or evidence of infranodal block at EPS
- Incidental findings at EPS study of an H-V interval ≥ 100 milliseconds, or non-physiological, pacing-induced infra-His block in asymptomatic patients Hypersensitive Carotid Sinus Syndrome and neurocardiogenic syncope
- Recurrent syncope due to spontaneously occurring carotid sinus stimulation AND carotid sinus pressure induced ventricular asystole ≥ 3 seconds, or AV block, or ≥ 50 mmHg drop in systolic blood pressure (BP)
- Syncope without clear, provocative events and with a hypersensitive cardioinhibitory response (asystole) ≥ 3 seconds
- Recurrent syncope and asystole ≥ 3 seconds with syncope or ≥ 6 seconds without symptoms or with presyncope, documented by ECG recording data

Pacing to Terminate or Prevent Tachycardia [6]

- Symptomatic recurrent supraventricular tachycardia documented to be terminated by pacing in the setting of failed catheter ablation and/or drug treatment
- Prevention of pause-dependent VT

Hypertrophic Cardiomyopathy (HCM) [6]

- Permanent pacing may be considered in medically refractory symptomatic patients with HCM and significant resting or provoked left ventricle (LV) outflow tract obstruction

Leadless Pacemakers [9]

Leadless pacemakers can only provide ventricular pacing but have fewer complications than transvenous pacemakers. Therefore, permanent pacing via leadless pacemaker is indicated for patients with nonreversible symptomatic bradycardia who are not eligible for an implantable cardioverter defibrillator (ICD), and have one or more of the following:

- No upper extremity access and LVEF > 50% **(AUC Score 7)**
- Long-standing persistent or permanent AF and normal LVEF, when the longevity of the device is anticipated to be greater than patient survival, and the need for pacing is anticipated as < 40% **(AUC Score 7)**
- History of multiple cardiovascular implantable electronic device (CIED) infections, LVEF > 50% and need for pacing anticipated as < 40% **(AUC Score 7)**
- AV junction ablation and long-standing persistent/permanent AF, LVEF > 50% **(AUC Score 7)**
- Pre-existing subcutaneous ICD and need for pacing anticipated as < 40%
    - LVEF > 50% and persistent/permanent AF **(AUC Score 7)** OR
    - Paroxysmal AF **(AUC Score 7)**

INDICATIONS FOR CHILDREN, ADOLESCENTS (<19 YEARS), AND ADULT PATIENTS WITH CONGENITAL HEART DISEASE (CHD)

Sinus Node Dysfunction [7,11]

- SND with symptomatic age- and activity-inappropriate bradycardia
- Sinus bradycardia with complex CHD **AND** a resting heart rate < 40 bpm **OR** pauses in ventricular rate > 3 seconds
- CHD and impaired hemodynamics due to sinus bradycardia or loss of AV synchrony
- Asymptomatic sinus bradycardia following repair of CHD with an awake resting heart

rate < 40 bpm or pauses in ventricular rate > 3 seconds

- CHD and SND or junctional bradycardia, for the prevention of recurrent episodes of intra-atrial reentrant tachycardia

AV Block [6–8]

- Second- or third-degree AV block with symptomatic bradycardia, ventricular dysfunction, or low cardiac output
- Congenital third-degree AV block with a wide QRS escape rhythm, complex ventricular ectopy, or ventricular dysfunction
- Postoperative advanced second- or third-degree AV block that is not expected to resolve or that persists at least 7 days after cardiac surgery
- Congenital third-degree AV block in the infant with a ventricular rate < 55 bpm or with congenital heart disease and a ventricular rate < 70 bpm
- Congenital third-degree AV block after 1 year of age with an average heart rate < 50 bpm, abrupt pauses in ventricular rate that are 2 or 3 times the basic cycle length, or associated with symptoms due to chronotropic incompetence
- Adults with congenital complete AV block with symptomatic bradycardia, wide QRS escape rhythm, mean daytime heart rate < 50 bpm, complex ventricular ectopy, or ventricular dysfunction
- Adults with congenital complete AV block, regardless of symptoms
- Unexplained syncope after prior congenital heart surgery complicated by transient complete heart block, with residual fascicular block after excluding other causes of syncope
- Congenital third-degree AV block in asymptomatic children or adolescents with an acceptable rate, a narrow QRS, and normal ventricular function

INDICATIONS FOR DEVICE OR LEAD REPLACEMENT

Pacemaker Pulse Generator Replacement

- Recent interrogation shows battery voltage in elective replacement indicator range (ERI/ERT) or end of life indicator range (EOL/EOD) (may differ by device type and manufacturer).
- Replacement of the pulse generator may be performed if a manufacturer’s recall has been issued, regardless of battery status

NOTE: The indicator “less than 3 months” in the battery status report typically refers to the time to ERI/ERT. It denotes an indication for intensified follow-up. In selected cases (pacemaker-dependency, follow-up compliance issues) device replacement may be considered for safety concerns when this parameter is met.

Lead Replacement

- Lead repositioning/replacement/removal may be performed when there is evidence of lead malfunctioning on recent interrogation or if a lead recall has been issued
- Device pocket infection typically requires pulse generator and lead removal and replacement

Device Relocation

- Repositioning/relocation of the skin pocket for the device may be performed in the presence of infection, the development of overlying skin erosion/tissue necrosis, if any other anatomical factor prevents the device from properly functioning, or if device migration has resulted in significant patient discomfort.

INDICATIONS FOR DEVICE UPGRADE

From Single Chamber to Dual Chamber/CRT Pacing

- In patients with existing single chamber pacemaker who develop clinical indications for dual chamber pacing or resynchronization therapy, placement of additional leads and replacement of the existing pulse generator may be approved

From Right Ventricular Pacing to Biventricular Pacing (CRT)

- In patients with an existing pacing device, when criteria for resynchronization therapy have been met and placement of a left ventricular lead is planned, the pulse generator should be upgraded to a CRT device.

INDICATIONS FOR TEMPORARY TRANSVENOUS PACEMAKER

- At the discretion of the implanting physician, a temporary transvenous pacemaker may be placed at the time of initial lead placement or pulse generator change, when there is concern that an interruption in AV conduction may occur in response to the surgical procedure. Examples include pacemaker-dependent patients, patients with high grade AV Block, and patients with LBBB in whom lead placement my “bump” the right bundle branch, resulting in transient complete heart block.

INDICATIONS FOR SUBCLAVIAN VENOGRAPHY AND ULTRASOUND

- At the discretion of the implanting physician, vascular access for lead placement may be

aided by imaging the subclavian vein using ultrasound or venography. The latter is achieved by establishing venous access in the ipsilateral arm and injecting iodinated contrast, using fluoroscopy to identify the target vessel and guide entry with the needle and guidewire. [12]

CODING AND STANDARDS

Codes

Code	Description
33203	Insertion of epicardial electrode(s); endoscopic approach (eg, thoracoscopy, pericardioscopy)
33206	Insertion of new or replacement of permanent pacemaker with transvenous electrode(s); atrial
33207	Insertion of new or replacement of permanent pacemaker with transvenous electrode(s); ventricular
33208	Insertion of new or replacement of permanent pacemaker with transvenous electrode(s); atrial and ventricular
33210	Insertion or replacement of temporary transvenous single chamber cardiac electrode or pacemaker catheter (separate procedure)
33211	Insertion or replacement of temporary transvenous dual chamber pacing electrodes (separate procedure)
33212	Insertion of pacemaker pulse generator only; with existing single lead
33213	Insertion of pacemaker pulse generator only; with existing dual leads
33214	Upgrade of implanted pacemaker system, conversion of single chamber system to dual chamber system (includes removal of previously placed pulse generator, testing of existing lead, insertion of new lead, insertion of new pulse generator)
33215	Repositioning of previously implanted transvenous pacemaker or implantable defibrillator (right atrial or right ventricular) electrode
33216	Insertion of a single transvenous electrode, permanent pacemaker or implantable defibrillator
33217	Insertion of 2 transvenous electrodes, permanent pacemaker or implantable defibrillator

Code	Description
33218	Repair of single transvenous electrode, permanent pacemaker or implantable defibrillator
33220	Repair of 2 transvenous electrodes for permanent pacemaker or implantable defibrillator
33221	Insertion of pacemaker pulse generator only; with existing multiple leads
33222	Relocation of skin pocket for pacemaker
33227	Removal of permanent pacemaker pulse generator with replacement of pacemaker pulse generator; single lead system
33228	Removal of permanent pacemaker pulse generator with replacement of pacemaker pulse generator; dual lead system
33229	Removal of permanent pacemaker pulse generator with replacement of pacemaker pulse generator; multiple lead system
33233	Removal of permanent pacemaker pulse generator only
33234	Removal of transvenous pacemaker electrode(s); single lead system, atrial or ventricular
33235	Removal of transvenous pacemaker electrode(s); dual lead system
33236	Removal of permanent epicardial pacemaker and electrodes by thoracotomy; single lead system, atrial or ventricular
33237	Removal of permanent epicardial pacemaker and electrodes by thoracotomy; dual lead system
33238	Removal of permanent transvenous electrode(s) by thoracotomy
33274	Transcatheter insertion or replacement of permanent leadless pacemaker, right ventricular, including imaging guidance (eg, fluoroscopy, venous ultrasound, ventriculography, femoral venography) and device evaluation (eg, interrogation or programming), when performed
33275	Transcatheter removal of permanent leadless pacemaker, right ventricular, including imaging guidance (eg, fluoroscopy, venous ultrasound, ventriculography, femoral venography), when performed

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Definitions

Heart Block [7]

- First-degree atrioventricular (AV) block:
  - P waves associated with 1:1 AV conduction and a PR interval > 200ms
- Second-degree AV block:
  - P waves with a constant rate (< 100bpm) where AV conduction is present but not 1:1
    - Mobitz type I
      - P waves with a constant rate (< 100bpm) with a periodic single nonconducted P wave associated with P waves before and after the nonconducted P wave with inconstant PR intervals
    - Mobitz type II
      - P waves with a constant rate (< 100 bpm) with a periodic single nonconducted P wave associated with other P waves before and after the nonconducted P wave with constant PR intervals (excluding 2:1 AV block)
    - 2:1 AV block

        - P waves with a constant rate (or near constant rate because of ventriculophasic sinus arrhythmia) rate (< 100 bpm) where every other P wave conducts to the ventricles
    - Advanced, high-grade or high-degree AV block
        - ≥ 2 consecutive P waves at a constant physiologic rate that do not conduct to the ventricles with evidence for some AV conduction
- Third-degree AV block:
    - Complete heart block – no evidence of AV conduction

Acronyms / Abbreviations

AV: Atrioventricular

BP: blood pressure

BPM: beats per minute

CHF: Congestive heart failure

CRT: Cardiac resynchronization therapy (same as biventricular pacing)

ECG: Electrocardiogram

EPS: Electrophysiologic Study

GDMT: Guideline-Directed Medical Therapy

HCM: Hypertrophic cardiomyopathy

H-V: His-ventricular

ICD: Implantable cardioverter-defibrillator

LAHB: Left Anterior Hemiblock

LBBB: Left bundle-branch block

LPHB: Left Posterior Hemiblock

LV: Left ventricular/left ventricle

LVEF: Left ventricular ejection fraction

MI: Myocardial infarction

ms: Milliseconds

RBBB: Right Bundle Branch Block

s: Seconds

STEMI: ST-elevation Myocardial Infarction

SND: Sinus node dysfunction

VT: Ventricular tachycardia

SUMMARY OF EVIDENCE

2012 ACCF/AHA/HRS focused update incorporated into the ACCF/AHA/HRS 2008 guidelines for device-based therapy of cardiac rhythm abnormalities [6]

Study Design: This document is a guideline developed by the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines, in collaboration with several other medical societies. It includes recommendations based on a comprehensive literature search and evidence review.

Target Population: The guidelines focus on patients with hypertrophic cardiomyopathy, including adults, children, and adolescents. It addresses the diagnosis, risk assessment, and management of HCM, including the use of ICDs for SCD prevention.

Key Factors

- **Risk Assessment**: The document highlights the importance of SCD risk assessment in HCM patients, including factors such as family history of SCD, maximal LV wall thickness, unexplained syncope, LV apical aneurysm, extensive LGE, and NSVT episodes.
- **ICD Placement**: Recommendations for ICD placement in high-risk HCM patients consider individual clinical judgment, shared decision-making, and the presence of major risk factors.
- **Device Selection**: The guidelines discuss the selection of ICD devices, including single-chamber, dual-chamber, and subcutaneous ICDs, based on patient preferences and clinical needs.
- **Management**: The document provides recommendations for the pharmacological and invasive treatment of symptomatic HCM patients, including the use of beta blockers, calcium channel blockers, myosin inhibitors, and septal reduction therapies.

2018 ACC/AHA/HRS Guideline on the Evaluation and Management of Patients with Bradycardia and Cardiac Conduction Delay [7]

Study Design: This document is a guideline developed by the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society, in collaboration with several other medical societies. It includes recommendations based on a comprehensive literature search and evidence review.

Target Population: The guidelines focus on patients with bradycardia and cardiac conduction delay, including adults with sinus node dysfunction (SND), atrioventricular (AV) block, and other conduction disorders. It addresses the diagnosis, risk assessment, and management of these conditions.

Key Factors

- **Risk Assessment**: The document emphasizes the importance of identifying reversible causes of bradycardia and conduction delay, such as medications, electrolyte imbalances, and underlying medical conditions.

- **Device Selection**: Recommendations for pacemaker implantation consider patient preferences, age, lifestyle, and clinical needs.
- **Management**: The guidelines provide recommendations for the acute and chronic management of bradycardia and conduction delay, including the use of temporary and permanent pacing.

ACC/AHA/ASE/HFSA/HRS/SCAI/SCCT/SCMR 2025 Appropriate Use Criteria for Implantable Cardioverter-Defibrillators, Cardiac Resynchronization Therapy, and Pacing [9]

Study Design: The study involved the development of Appropriate Use Criteria (AUC) for ICDs, cardiac resynchronization therapy (CRT), and pacing. The process included drafting clinical scenarios based on patient presentations encountered in everyday practice. These scenarios were evaluated by an independent rating panel using a scoring scale from 1 to 9.

Target Population: The study focused on patients who may require ICDs, CRT, or pacing therapies. This includes patients with coronary artery disease (CAD), nonischemic cardiomyopathy (CM), genetic arrhythmia diseases, heart failure (HF), and those with left ventricular assist devices (LVADs).

Key Factors:

- **Clinical Scenarios:** The scenarios included information on symptom status, risk level as assessed by noninvasive testing, coronary disease burden, and in some cases, fractional flow reserve testing, presence or absence of diabetes, and SYNTAX score.
- **Scoring:** Each indication was scored as “Appropriate” (7 to 9), “May Be Appropriate” (4 to 6), or “Rarely Appropriate” (1 to 3).
- **Therapy Options:** The study evaluated the appropriateness of ICDs, CRT, and pacing therapies for various clinical scenarios.
- **Emphasis:** The study emphasized the importance of guideline-directed medical therapy and antianginal therapy in the management of patients.
- **Patient Preference:** The study highlighted the role of shared decision-making and patient preferences in the selection of therapy options.

ANALYSIS OF EVIDENCE

Shared Conclusions [6,7,9]

All three articles emphasize the importance of evidence-based practice and provide detailed guidelines for pacemaker implantation based on clinical evidence. They all address specific conditions requiring pacing and offer recommendations for the evaluation and management of patients with bradycardia and conduction disorders. Additionally, they highlight the importance of correlating symptoms with bradycardia and conduction disorders to ensure appropriate management.

In summary, these articles collectively provide a comprehensive understanding of pacemaker implantation, highlighting the importance of evidence-based practice, detailed evaluation, and management of bradycardia and conduction disorders, while also addressing specific conditions and emphasizing patient-centered care.

POLICY HISTORY

Date	Summary
August 2026	• Added code 33221 and its description
May 2026	• Added code 33203 and its description
April 2026	• Adjusted complete AV block indication for Pacemaker • Added indications: ○ Generator/lead replacement ○ Device relocation ○ Device upgrade ○ Temporary transvenous pacemaker ○ Subclavian venography/ultrasound • Added codes: 33210, 33211, 33214, 33222, 33227, 33228, 33229, 33233, 33234, 33235, 33236, 33237, and 33238 • Added code description • Aligned and adjusted background section
July 2025	• Reviewed to reconcile dates, no substantive changes made
June 2025	• Added third bullet to General Information • Added Summary of Evidence and Analysis of Evidence • This guideline merges two Evolent guidelines with identical clinical criteria: ECG 7315-01 for Pacemaker Implantation and ECG 322 for Pacemaker ○ This guideline also merges procedural codes • Guideline name changed to Pacemaker Insertion
April 2025	• Guideline number changed to 7315 • Updated citations

Date	Summary
	• Updated indications for leadless pacemakers • Updated indications for chronic fascicular block • Removed Contraindications • Reduced Background

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

REFERENCES

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Evolent Clinical Guideline 7320 for Percutaneous Left Atrial Appendage Closure

Guideline Number:	Applicable Codes	
Evolent_CG_7320		
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Original Date:	**Last Revised Date:**	**Implementation Date:**
July 2017	April 2026	January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Percutaneous Left Atrial Appendage Closure.

Special Note

In order to review a request for medical necessity, the following items must be submitted for review:

- Progress note that prompted request from Electrophysiologist/Interventional Cardiologist/Cardiologist

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Transcatheter left atrial appendage closure (LAAC) is appropriate for patients with nonvalvular atrial fibrillation (AF) with high thromboembolic risk who meet the following criteria [6]:

- Have an increased risk of stroke, defined as CHA_2DS_2- VASc of ≥2 (men) or ≥3 (women)
- Have adequate life expectancy (minimum >1 year) and quality of life to benefit from LAAC
- Have an increased bleeding risk (High HAS-BLED score ≥3), or are not suited for long-term oral anticoagulation (OAC), including but not limited to:
  - Prior bleeding
  - Fall risk
  - Uncontrolled hypertension
  - Renal or liver failure
  - Alcohol use
  - Concomitant antiplatelet or nonsteroidal agents
  - High-risk occupations
  - Noncompliance
  - Labile international normalized ratio
  - OAC intolerance/allergy
  - Drug interactions
- Do not have another absolute requirement for the continuation of long-term anticoagulant therapy, such as mechanical heart valve.

CODING AND STANDARDS

Codes

Code	Description
33340	Percutaneous transcatheter closure of the left atrial appendage with endocardial implant, including fluoroscopy, transseptal puncture, catheter placement(s), left atrial angiography, left atrial appendage angiography, when performed, and radiological supervision and interpretation

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Bleeding and Thromboembolism Risk Calculation

Patients with atrial fibrillation (AF), an irregular heartbeat, are at an increased risk of stroke. Because of the propensity for thrombus formation during AF, especially in the left atrial appendage, anticoagulation therapy is indicated in patients with prolonged (> 48 hours) duration and with CHA_2DS_2-VASc scores of 2 or greater. [6]

The CHA_2DS_2-VASc score is widely used for evaluating thromboembolic risk in those with nonvalvular AF. [7] A score > 2 is considered an indication for anticoagulation in patients with AF and for left atrial appendage closure (LAAC) in men. Because the procedure is associated with a greater incidence of major complications in women, a score >3 is required for women.

CHA_2DS_2-VASc score is calculated as follows (criterion/points given) [7]:

- Age: < 60 0; 60 ≤ 75 +1; > 75 +2
- Gender: Male 0; Female +1
- CHF history: No 0; Yes +1
- HTN history: No 0; Yes +1
- Stroke/TIA/thromboembolism history: No 0; Yes +2
- Vascular disease (including prior MI, PAD, aortic plaque): No 0; Yes +1
- Diabetes history: No 0; Yes +1

HAS-BLED Score for Major Bleeding Risk is calculated as follows (criterion/points given) [8]:

- Uncontrolled hypertension (systolic pressure > 160): No 0; Yes +1
- Renal disease (kidney transplant or creatinine > 2.26 mg/dl): No 0; Yes +1
- Liver disease (cirrhosis or bilirubin > 2x normal with AST/ALT/AP > 3x normal): No 0; Yes +1

- Stroke history: No 0; Yes +1
- Labile INR on warfarin (time in therapeutic range < 60%): No 0; Yes +1
- Age > 65: No 0; Yes +1
- Other medications predisposing to bleeding (NSAIDs, ASA, clopidogrel): No: 0; Yes +1
- Alcohol use (8 or more drinks/week): No 0; Yes +1

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AF: Atrial fibrillation

AUC: Appropriate use criteria

LAA: Left atrial appendage

LAAC: Left atrial appendage closure

OAC: Oral anticoagulant therapy

SUMMARY OF EVIDENCE

SCAI/HRS Expert Consensus Statement on Transcatheter Left Atrial Appendage Closure [6]

Study Design: This document is an expert consensus statement on transcatheter left atrial appendage closure (LAAC) for reducing thromboembolic risk related to atrial fibrillation. It includes recommendations based on contemporary, evidence-based best practices for LAAC focusing on endovascular devices.

Target Population: The target population includes patients with nonvalvular atrial fibrillation (AF) who have high thromboembolic risk and are not suited for long-term oral anticoagulation (OAC). These patients should have adequate life expectancy (minimum >1 year) and quality of life to benefit from LAAC.

Key Factors: LAAC is appropriate for patients with nonvalvular AF with high thromboembolic risk who are not suited for long-term OAC. Physicians performing LAAC should have prior experience, including 50 prior left-sided ablations or structural procedures and 25 transseptal punctures (TSPs). Institutional requirements include on-site cardiovascular surgery backup. Baseline preprocedural imaging with transesophageal echocardiography (TEE) or cardiac

computed tomography angiography is recommended before LAAC. Procedural venous access, anticoagulation, transseptal puncture, delivery sheath selection and placement, LA pressure measurement, and device deployment should be performed in accordance with the testing and labeling of each specific LAAC device. Operators need to be familiar with avoidance, recognition, and management of complications associated with LAAC. Predischarge imaging should be performed with 2D transthoracic echocardiography to rule out pericardial effusion and device embolization. Same-day discharge may be appropriate after several hours of observation. The document discusses ongoing trials and evolving practices indicating significant future advancements in the field of LAAC.

Meta-Analysis of CHADS2 versus CHA2DS2-VASc for Predicting Stroke and Thromboembolism in Atrial Fibrillation Patients Independent of Anticoagulation [7]

Study Design: This document is a meta-analysis comparing the predictive risk evaluation of two scoring systems, CHADS2 and CHA2DS2-VASc, in patients with atrial fibrillation (AF) who were and were not taking anticoagulants.

Target Population: The target population includes adult participants with electrocardiographically documented AF (chronic, paroxysmal, persistent, permanent, or new-onset). The study excludes subjects with mitral or aortic valve heart disease or other specific types of AF patients.

Key Factors: The CHADS2 score is based on congestive heart failure, hypertension, age ≥75 years, diabetes mellitus, and prior stroke or transient ischemic attack. The CHA2DS2-VASc score includes additional factors such as vascular disease and female sex. The meta-analysis found that patients with CHA2DS2-VASc scores ≥2 have a greater risk of stroke and thromboembolism than those with scores <2, independent of anticoagulation therapy. The primary endpoints were stroke, thromboembolism, or both. The pooled risk ratio estimates indicate an approximate 6-fold increase in the risk of endpoint events in patients with CHA2DS2-VASc scores ≥2. The CHA2DS2-VASc score enables the identification of patients who are at genuinely high risk and can direct the selection of appropriate therapeutic approaches.

ANALYSIS OF EVIDENCE

Analysis [6,7]:

In summary, while both articles contribute valuable insights into the management of AF patients, they do so from different perspectives—one from a procedural and technical standpoint and the other from a risk stratification and predictive accuracy standpoint. This comprehensive analysis highlights the importance of integrating both procedural expertise and accurate risk assessment in optimizing patient outcomes for percutaneous LAAC.

Shared Conclusions

- Both articles emphasize the importance of risk stratification in managing AF patients and preventing thromboembolic events.
- They agree on the need for individualized patient care, considering the patient's risk profile and suitability for anticoagulation therapy

POLICY HISTORY

Date	Summary
April 2026	• Added code descriptions • Updated Background • No clinically significant changes
July 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• No substantial clinical content changes • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Applicable Line of Business adjusted – Medicare checked

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7321 for Pericardial Disease Interventions

Guideline Number: Evolent_CG_7321	**Applicable Codes**	
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Original Date: September 2019	**Last Revised Date:** June 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Pericardial Disease Interventions.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Pericardiocentesis

- Pericardial effusion with one or more of the following:
  - Cardiac tamponade [6]
  - Symptomatic moderate to large effusion non-responsive to medical therapy [7]
  - Pericarditis, when bacterial or neoplastic etiology suspected [7,8]

- Large, idiopathic **chronic** effusion (> 3 months) not responsive to conventional therapy [7,8]
- Large, idiopathic **subacute** effusion (4 - 6 weeks) not responsive to medical therapy with signs of right-sided chamber collapse on echocardiogram [7]
- Tuberculous pericarditis (diagnosis and treatment) [7]
- Purulent pericarditis (diagnosis and treatment) [7]
- Pericarditis in renal failure not responding to dialysis [7]

- Pericardial cyst (symptomatic) and **ONE** or more of the following [7]:
  - Congenital
  - Inflammatory

Pericardial Window

- Cardiac tamponade with one or more of the following characteristics [8]:
  - Recurrent
  - Loculated
  - Neoplastic
- Pericardial effusion with one or more of the following characteristics [7]:
  - Recurrent
  - Biopsy material needed
  - Not amenable to pericardiocentesis (ie, loculated and/or posterior location)

Intrapericardial Treatment

- Intrapericardial instillation of medications for one or more of the following:
  - Tuberculous pericarditis, to reduce risk of constriction [7]
  - Treatment of neoplastic effusions (ie, cytostatic or sclerosing agents) [7,8]
  - Treatment of uremic pericardial effusion (in addition to dialysis) [7]
  - Purulent pericarditis, to reduce the risk of recurrence, tamponade and constriction [7,8]
  - Treatment of autoreactive/lymphocytic effusion [7]

Pericardiectomy [9]

- Recurrent pericarditis or pericardial effusion not responsive to medical therapy [7,8]
- Chronic constrictive pericarditis with persistent and prominent symptoms (ie, New York Heart Association (NYHA) class III or IV) [7,8]
- Constrictive tuberculous pericarditis that has not improved or has deteriorated after 4 - 8

weeks of antituberculosis therapy [7]

- Purulent pericarditis with one or more of the following [7]:
  - Dense adhesions
  - Loculated or thick effusion
  - Recurrent tamponade
  - Persistent infection
  - Progression to constriction
- Chylopericardium [7]

Pericardioscopy

As an alternative to a surgical approach, to allow for one or more of the following [7]:

- Pericardial biopsy and acquisition of fluid samples when the etiology of pericardial disease is in question
- Pericardial drainage
- Instillation of medication into the pericardiac sac

CODING AND STANDARDS

Codes

Code	Description
32601	Thoracoscopy, diagnostic (separate procedure); lungs, pericardial sac, mediastinal or pleural space, without biopsy
32604	Thoracoscopy, diagnostic (separate procedure); pericardial sac, with biopsy
32658	Thoracoscopy, surgical; with removal of clot or foreign body from pericardial sac
32659	Thoracoscopy, surgical; with creation of pericardial window or partial resection of pericardial sac for drainage
32661	Thoracoscopy, surgical; with excision of pericardial cyst, tumor, or mass
33016	Pericardiocentesis, including imaging guidance, when performed

Code	Description
33017	Pericardial drainage with insertion of indwelling catheter, percutaneous, including fluoroscopy and/or ultrasound guidance, when performed; 6 years and older without congenital cardiac anomaly
33018	Pericardial drainage with insertion of indwelling catheter, percutaneous, including fluoroscopy and/or ultrasound guidance, when performed; birth through 5 years of age or any age with congenital cardiac anomaly
33019	Pericardial drainage with insertion of indwelling catheter, percutaneous, including CT guidance
33020	Pericardiotomy for removal of clot or foreign body (primary procedure)
33025	Creation of pericardial window or partial resection for drainage
33030	Pericardiectomy, subtotal or complete; without cardiopulmonary bypass
33031	Pericardiectomy, subtotal or complete; with cardiopulmonary bypass
33050	Resection of pericardial cyst or tumor

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Pericardiocentesis: It is a procedure done to remove fluid that has built up in the sac around the heart (pericardium) using a needle and small catheter to drain excess fluid either fluoroscopy or echocardiography guided.

Pericardioscopy: This procedure permits visualization and biopsy of the pericardial sac with its epicardial and pericardial layers.

Intrapericardial treatment: This procedure involves introduction of antineoplastic treatment in patients with neoplastic pericardial effusion in setting of metastatic malignancy.

Pericardial window: A pericardial window is a cardiac surgical procedure to create a communication, or 'window', from the pericardial space to the pleural cavity. The purpose of the window is to allow a pericardial effusion (usually malignant) to drain from the space surrounding the heart into the chest cavity in order to prevent a large pericardial effusion and cardiac tamponade. A pericardial window may be created by video-assisted thoracoscopy or balloon pericardiotomy by a percutaneous intervention.

Pericardiectomy: It is the surgical removal of a portion or all of the pericardium. It is also called pericardial stripping. The pericardium is a double-walled, membrane sac that surrounds the heart.

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

NYHA: New York Heart Association

SUMMARY OF EVIDENCE

2015 ESC Guidelines for the diagnosis and management of pericardial diseases [7]

Study Design: This document is a set of guidelines developed by the Task Force for the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology (ESC), endorsed by the European Association for Cardio-Thoracic Surgery (EACTS). The guidelines summarize and evaluate all available evidence on pericardial diseases to assist health professionals in selecting the best management strategies for individual patients.

Target Population: The guidelines are intended for health professionals involved in the care of patients with pericardial diseases, including cardiologists, cardiac surgeons, and other healthcare providers.

Key Factors:

- **Epidemiology and Etiology**: The guidelines cover the epidemiology, etiology, and classification of pericardial diseases, including infectious and non-infectious causes.
- **Diagnosis and Management**: Detailed recommendations are provided for the diagnosis and management of various pericardial syndromes, including acute pericarditis, recurrent pericarditis, pericardial effusion, cardiac tamponade, and constrictive

pericarditis.

- **Therapeutic Approaches**: The guidelines discuss the use of anti-inflammatory therapies, colchicine, corticosteroids, and other immunosuppressive agents, as well as interventional techniques such as pericardiocentesis and pericardiectomy.
- **Prognosis and Follow-up**: The document includes information on the prognosis and follow-up of patients with pericardial diseases, emphasizing the importance of individualized patient care.

Clinical Update in Pericardial Diseases [8]

Study Design: This is a review article that provides a clinical update on pericardial diseases, focusing on recent updates in the literature regarding diagnostic evaluation, medical therapy, and invasive therapeutic procedures from the perspective of a perioperative physician.

Target Population: The review is aimed at anesthesiologists and perioperative physicians who manage patients with pericardial diseases, particularly in the context of interventional therapies or surgery.

Key Factors:

- **Pericardial Structure and Function**: The review describes the anatomy and function of the pericardium, emphasizing its role in protecting the heart and facilitating ventricular interdependence.
- **Diagnostic Criteria**: The article outlines the diagnostic criteria for acute pericarditis, including pleuritic chest pain, pericardial friction rub, diffuse ST-segment elevation, and new or worsening pericardial effusion.
- **Imaging Techniques**: The review highlights the importance of multimodal imaging techniques, such as echocardiography, cardiac magnetic resonance (CMR) imaging, and computed tomography (CT), in diagnosing pericardial diseases.
- **Medical and Surgical Management**: The article discusses the medical management of pericarditis, including the use of nonsteroidal anti-inflammatory drugs (NSAIDs), colchicine, and corticosteroids, as well as surgical interventions such as pericardiocentesis and pericardiectomy.
- **Perioperative Considerations**: The review emphasizes the need for anesthesiologists to understand the altered physiology of pericardial diseases and their impact on perioperative management, including the potential for hemodynamic instability and the importance of careful monitoring.

ANALYSIS OF EVIDENCE

Shared Findings [7,8]**:**

Both articles emphasize the importance of understanding pericardial diseases and provide detailed guidelines for diagnosis and management. They agree on several key points:

- **Diagnostic Criteria**: Both articles outline diagnostic criteria for acute pericarditis, including pleuritic chest pain, pericardial friction rub, diffuse ST-segment elevation, and new or worsening pericardial effusion.
- **Imaging Techniques**: Both articles highlight the importance of multimodal imaging techniques such as echocardiography, cardiac magnetic resonance (CMR), and computed tomography (CT) in diagnosing pericardial diseases.
- **Medical Management**: Both articles recommend the use of nonsteroidal anti-inflammatory drugs (NSAIDs) and colchicine as first-line agents for treating acute pericarditis. They also discuss the role of corticosteroids as a second-line option in cases where NSAIDs and colchicine are ineffective or contraindicated.
- **Pericardial Effusion**: Both articles discuss the management of pericardial effusion, emphasizing the need for pericardiocentesis in cases of cardiac tamponade or suspected bacterial or neoplastic etiology.

Conclusion [7,8]

The evidence presented in both articles reiterates the importance of a comprehensive approach to diagnosing and managing pericardial diseases. The shared findings highlight the consensus on diagnostic criteria, imaging techniques, and medical management. The differing findings reflect the unique perspectives and target populations of each article, with Adler et al 2015 providing a broader overview for health professionals and Tuck and Townsley 2019 focusing on perioperative management for anesthesiologists and perioperative physicians.

Overall, both articles contribute valuable insights into the diagnosis and management of pericardial diseases, with each offering a unique perspective that complements the other.

POLICY HISTORY

Date	Summary
June 2026	• CPT table added with code descriptions • No clinical changes
June 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • No clinical changes

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7323 for Peripheral Intravascular Arterial and Venous Ultrasound

Guideline Number: Evolent_CG_7323	**Applicable Codes**	
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Original Date: October 2018	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for peripheral (non-coronary) intravascular arterial and venous ultrasound (IVUS).

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Intravascular ultrasound is primarily indicated in the lower extremities. However, approval and AUC Scores vary depending on the vessel being investigated. Use of intravascular ultrasound should only be utilized if it will significantly impact the ability to treat the lesion(s) it is interrogating.

Iliac and Lower Extremity Arteries [6]

- Preintervention Scenarios
  - Occlusion **(AUC Score 6)**
  - Plaque morphology **(AUC Score 6)**
  - Ambiguous lesion/severity **(AUC Score 7)**
  - Filling defects **(AUC Score 6)**
  - Vessel sizing **(AUC Score 7)**
  - Minimizing contrast **(AUC Score 8)**
- Intraprocedural Scenarios
  - Location of crossing track **(AUC Score 9)**
  - Determination of next therapeutic step **(AUC Score 8)**
  - Vessel sizing for device **(AUC Score 6)**
- Postintervention optimization scenarios
  - Residual stenosis/plaque after debulking **(AUC Score 7)**
  - Stent optimization/post-dilation **(AUC Score 6)**
  - Dissection detection **(AUC Score 8)**

Iliofemoral Vein [6]

- Preintervention Scenarios
  - Lesion characteristics **(AUC Score 8)**
  - Lesion severity **(AUC Score 9)**
  - Filling defects **(AUC Score 9)**
  - Vessel sizing **(AUC Score 9)**
  - Minimizing contrast **(AUC Score 9)**
- Intraprocedural Scenarios
  - Determination of next therapeutic step **(AUC Score 9)**
  - Vessel sizing for device **(AUC Score 9)**
- Postintervention optimization scenarios
  - Stent optimization/post-dilation **(AUC Score 9)**

Other Indications

- Guiding of endovascular procedures for iliac vein outflow obstruction [7]
- Assessment or guiding of treatment for aortic dissections or aneurysms [8]

- Assessment of renal infarct etiology to evaluate secondary treatment options [8]

Limitations

- IVUS is not appropriate for routine evaluation of peripheral artery disease when revascularization is not being contemplated based on angiographic results.
- Ultrasound guidance, if performed during a fistulogram or intervention, is an integral part of the procedure, and cannot be separately authorized
- IVUS can only be requested if there is documented or strongly suspected central vein stenosis in the absence of any other reason for graft/fistula malfunction during fistulogram

CODING AND STANDARDS

Codes

Code	Description
+37252	Intravascular ultrasound (noncoronary vessel) during diagnostic evaluation and/or therapeutic intervention, including radiological supervision and interpretation; initial noncoronary vessel (List separately in addition to code for primary procedure)
+37253	Intravascular ultrasound (noncoronary vessel) during diagnostic evaluation and/or therapeutic intervention, including radiological supervision and interpretation; each additional noncoronary vessel (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Intravascular ultrasound (IVUS) is an invasive imaging modality that uses a specially designed catheter with a miniaturized ultrasound probe attached to the distal end of the catheter, which allows ultrasound imaging to be performed from within the lumen of the blood vessel. IVUS can be used to assess vessel/lumen diameter, lesion length, help determine the amount of plaque buildup in a vessel and its composition and check to ensure stents have been properly placed and fully deployed.

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AUC: Appropriate use criteria

IVUS: Intravascular ultrasound

SUMMARY OF EVIDENCE

Appropriate Use of Intravascular Ultrasound During Arterial and Venous Lower Extremity Interventions [6]

Study Design: This consensus document provides guidance on the appropriate use of intravascular ultrasound (IVUS) during lower extremity arterial and venous interventions. A 12-member writing committee created a survey representing various clinical scenarios, which was completed by 30 international vascular experts.

Target Population: Patients undergoing lower extremity arterial and venous revascularization.

Key Factors: IVUS use is growing in lower extremity interventions, with observational data suggesting improved outcomes. However, large-scale prospective data are limited. To provide guidance on the appropriate use of IVUS in different phases of peripheral arterial and venous interventions. Surveys were created to represent clinical scenarios categorized by interventional phases: preintervention, intraprocedure, and postintervention optimization. Experts anonymously completed the survey, and results were categorized by appropriateness. IVUS was rated appropriate in various phases for different arterial segments and venous interventions. For example, IVUS was appropriate in all phases for tibial arteries and iliofemoral venous interventions. Expert consensus can help define clinical procedural scenarios where

IVUS may have value during lower extremity interventions while additional prospective data are collected.

Intravascular Ultrasound Use in Peripheral Arterial and Deep Venous Interventions: Multidisciplinary Expert Opinion From SCAI/AVF/AVLS/SIR/SVM/SVS [8]

Study Design: This manuscript represents considerations and consensus perspectives from a roundtable discussion including 15 physicians with expertise in interventional cardiology, interventional radiology, and vascular surgery.

Target Population: Patients with peripheral arterial and deep venous pathology.

Key Factors: Percutaneous revascularization is the primary strategy for treating lower extremity venous and arterial disease. IVUS can overcome limitations of angiography by providing intraluminal cross-sectional images of the vasculature. IVUS outperforms angiography in evaluating vascular characteristics such as stenosis, plaque burden, lesion morphology, and procedural complications. IVUS improves assessment of vessel diameter, lesion severity, and procedural outcomes. It is associated with reduced rates of major adverse limb events and long-term clinical outcomes. IVUS enhances clinical decision-making by providing accurate evaluation of thrombus burden, venous obstruction, and stent placement. It is associated with improved patency and reduced complications. There is a need for more evidence to support IVUS use in peripheral interventions, including randomized controlled trials and health economic studies.

Future Directions: The panel highlighted the need for additional registries, educational efforts, interdisciplinary collaboration, and standardized practices to improve IVUS utilization and patient outcomes.

ANALYSIS OF EVIDENCE

Analysis [6,8]:

In summary, both articles underscore the value of IVUS in peripheral vascular interventions, highlighting its ability to improve procedural outcomes and the need for standardized guidelines. The 2024 article provides more recent evidence and a broader perspective on the applications of IVUS, while the 2022 article focuses on the appropriateness of IVUS in different interventional phases. Together, they provide a comprehensive analysis of the current state and future directions of IVUS in peripheral vascular interventions.

Shared Conclusions

Both articles emphasize the growing importance of IVUS in peripheral vascular interventions, highlighting its ability to provide detailed intraluminal images that angiography cannot. They agree that IVUS can improve procedural outcomes by offering better visualization of vessel morphology, lesion characteristics, and procedural complications.

- Both articles note that IVUS has been shown to improve outcomes in peripheral vascular interventions. The 2022 article mentions that IVUS can improve periprocedural and long-term outcomes, although large-scale prospective data are limited. The 2024 article provides more recent evidence, including a systematic review and meta-analysis that

found IVUS use associated with lower rates of periprocedural adverse events and improved long-term outcomes.

- Both articles stress the need for consensus and guidelines to standardize the use of IVUS. The 2022 article discusses the development of a consensus document to guide the appropriate use of IVUS in various phases of peripheral arterial and venous interventions. The 2024 article builds on this by presenting a multidisciplinary expert opinion from several cardiovascular specialty societies, aiming to standardize the use and approach to peripheral vascular IVUS imaging.

POLICY HISTORY

Date	Summary
May 2026	• Combined indications for femoropopliteal artery and tibial artery to simplify guideline • Expanded Limitations • Added code descriptions
July 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• No substantial clinical content changes • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Adjusted placement of AUC Scores • Removed the request for medical necessity review section

LEGAL AND COMPLIANCE

Guideline Approval

Committee

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Evolent Clinical Guideline 7326 for Renal/Retroperitoneal Vascular Duplex Ultrasound

Guideline Number: Evolent_CG_7326	**Applicable Codes**	
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Original Date: July 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines, and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Renal/Retroperitoneal Vascular Duplex Ultrasound.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS BY ORGAN

Kidney

- Initial imaging of renal transplant dysfunction [6]
- Suspected renovascular hypertension with any **ONE** of the following [7,8]:
  - Abdominal bruit
  - Malignant or accelerated hypertension

- Significant hypertension in patients under 35 years of age
- Sudden onset or worsening of hypertension

- Suspected ischemic neuropathy [8]
- Suspected thromboembolism [8]
- Suspected fibromuscular dysplasia [8]
- Evaluation of renal artery stenosis, when any **ONE** of the following criteria are met [7,8]:
  - To determine hemodynamic significance
  - With worsening renal function
  - With resistant hypertension
  - In symptomatic patients with evidence of kidney size discrepancy
- Follow-up after renal artery intervention [9]:
  - Within 1 month after procedure
  - 6 months, 12 months and then annually after procedure
- As part of initial work-up for organ transplant

Mesentery

- Initial screening for suspected chronic mesenteric ischemia (CMI) [10,11], best performed in a fasting state to avoid bowel gas, with **ANY** of the following symptoms:
  - Postprandial pain
  - Abdominal bruit
  - Unexplained weight loss
  - Unexplained chronic diarrhea
  - Food phobia
- In the evaluation of possible mesenteric aneurysm [12]
- Incidental findings of superior mesenteric or celiac artery stenosis for evaluation of hemodynamic significance [8,13]
- Follow-up after surgical bypass procedure or stent insertion [8,9]
  - Within 1 month of procedure [9]
  - 6 months, 12 months, and then annually after procedure [9]

Liver

- Abnormal liver function tests with hepatocellular dominance and mild-to-severe aminotransferase increase [14]
- Chronic liver disease, with any **ONE** of the following:

- Suspected portal hypertension or portal vein thrombosis
- Suspected hepatocellular carcinoma [15]

- Evaluation for or after liver transplant [16]

Scrotum/Testicles

- Pain, swelling, or mass in the scrotum contents without history of trauma and where alteration to vascular flow is suspected (eg, torsion) [17,18]

CODING AND STANDARDS

Codes

Code	Description
93975	Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; complete study
93976	Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; limited study

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care - Median Score 7-9

- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

ACR: American College of Radiology

AUC: Appropriate use criteria

CMI: Chronic mesenteric ischemia

CT: Computed tomography

GRADE: Grading of Recommendations Assessment, Development, and Evaluation

MRI: Magnetic resonance imaging

PSV: Peak systolic velocity

RAS: Renal artery stenosis

RAR: Renal-aortic ratio

SUMMARY OF EVIDENCE

ACR Appropriateness Criteria® Renal Transplant Dysfunction [6]

Study Design: This study focuses on the appropriateness criteria for evaluating renal transplant dysfunction. It involves an extensive review of current peer-reviewed medical literature, supplemented by expert consensus where evidence is limited, using established methodologies to rate the appropriateness of imaging modalities. The criteria are reviewed and updated regularly by a multidisciplinary expert panel.

Target Population: The study targets adult patients with renal transplants who are being evaluated for possible transplant dysfunction.

Key Factors: Ultrasound is the first-line imaging modality for evaluating renal transplants given its accessibility, safety profile, and ability to evaluate both the transplant kidney and associated complications. Other imaging modalities, including nuclear medicine studies, computed tomography (CT), and magnetic resonance imaging (MRI) are considered complementary and typically reserved for specific clinical scenarios or for further evaluation when initial imaging is inconclusive. The guideline discusses various complications of renal transplantation, including vascular complications, peritransplant collections, and intrinsic renal dysfunction.

ACR Appropriateness Criteria® Renovascular Hypertension [7]

Study Design: This study focuses on the appropriateness criteria for diagnosing and treating renovascular hypertension. It involves a comprehensive review of current medical literature and the application of established methodologies such as the RAND/UCLA Appropriateness Method and the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) to rate the appropriateness of imaging and treatment procedures for specific clinical scenarios.

Target Population: The study targets patients with renovascular hypertension, which is the most common type of secondary hypertension. The prevalence is estimated to be between 0.5% and 5% of the general hypertensive population, with a higher prevalence among patients with severe hypertension and end-stage renal disease.

Key Factors: Imaging Modalities: The primary imaging modalities used to screen for renal artery stenosis are CT, MRI, and ultrasound, with the selection of imaging dependent on renal function. Investigation for renal artery stenosis is appropriate when clinical presentation suggests secondary hypertension rather than primary hypertension. The guidelines are reviewed annually by a multidisciplinary expert panel and include an extensive analysis of current medical literature from peer-reviewed journals .

Mesenteric and renal arterial duplex ultrasound: A review [8]

Study Design: This review paper discusses the use of duplex ultrasound to detect mesenteric and renal vascular disease. It provides a summary of commonly employed diagnostic criteria and includes a literature review of diagnostic criteria.

Target Population: The study targets patients with suspected mesenteric and renal vascular disease, including those with comorbidities that make invasive diagnostic testing less desirable.

Key Factors: Indications: Indications for ultrasound include suspected chronic mesenteric ischemia, median arcuate ligament syndrome, follow-up after surgical bypass procedures, post-intervention follow-up of stents, and assessment of renal artery pathology. The paper emphasizes the importance of operator education and experience, patient preparation and positioning, and equipment optimization for successful duplex ultrasound examinations. The review presents essential elements of duplex ultrasound examinations and summarizes the diagnostic criteria for mesenteric and renal duplex ultrasound.

ANALYSIS OF EVIDENCE

Analysis [6–8]:

In summary, all three articles agree on the importance of duplex ultrasound for detecting renal artery stenosis and its noninvasive nature. They highlight the use of peak systolic velocity (PSV) and renal-aortic ratio (RAR) as key parameters for identifying significant stenosis.
However, Kupinski 2023 provides more detailed technical considerations and specific criteria for stented vessels, while Taffel 2025 explores additional imaging modalities as complementary tools. Harvin 2017 focuses on the appropriateness criteria for renovascular hypertension and provides a comprehensive overview of imaging modalities used for screening.

Shared Conclusions:

- **Renal Artery Stenosis (RAS) Detection**:
    - All three articles emphasize the importance of duplex ultrasound in detecting renal artery stenosis. They highlight the use of PSV and RAR as key parameters for identifying significant stenosis.

- Harvin 2017 mentions PSV cutoff values ranging from 180 cm/s to 300 cm/s, with a sensitivity of 91% and specificity of 75% for a PSV of 200 cm/s 1. Kupinski 2023 also discusses the use of PSV and RAR, with a PSV ≥ 180 cm/s and RAR ≥ 3.5 indicating significant stenosis 2. Taffel 2025 reiterates these findings, mentioning PSV thresholds of 200 to 300 cm/s and RAR values.

- **Noninvasive Nature**:
  - All articles agree that duplex ultrasound is a noninvasive and reliable modality for evaluating renal vascular conditions. They emphasize its advantages over invasive procedures, such as angiography, due to its ability to provide real-time imaging without the need for contrast agents.

POLICY HISTORY

Date	Summary
May 2026	• Removed redundant language from Kidney indications • Clarified symptom criteria for CMI and added aneurysm to Mesentery indications • Clarified aminotransferase increase threshold and chronic liver disease requirements in Liver indications • Simplified Liver and Scrotum/Testicles indications for readability • Updated Summary of Evidence and Analysis of Evidence to reflect updated literature
July 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• No substantial clinical content changes • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Applicable Line of Business adjusted – Medicare checked • Updated citations
January 2025	• This guideline replaces UM 1125 Renal/Retroperitoneal Vascular Duplex Ultrasound • Clarified surveillance timelines for post-surgical imaging • Added indications for suspected renal conditions: ischemia, thromboembolism, fibromuscular dysplasia • Updated citations

LEGAL AND COMPLIANCE

Guideline Approval

Committee

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Evolent Clinical Guideline 7327 for Standalone Right Heart Catheterization

Guideline Number: Evolent_CG_7327	**Applicable Codes**	
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Original Date: March 2024	**Last Revised Date:** June 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

This guideline **ONLY** covers procedures that include standalone right heart catheterization in patients with a stable clinical presentation, not to those with acute syndromes or acute valvular abnormalities.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR STANDALONE RIGHT CARDIAC CATHETERIZATION

NOTE: In stable patients, preliminary evaluation with non-invasive cardiac testing is usually indicated prior to a recommendation for cardiac catheterization.

- No prior heart catheterization performed within the last 6 months
- Known history of congestive heart failure [6]

- Cardiomyopathy [7]
  - With or without heart failure
  - For re-evaluation due to change in clinical status or to guide therapy
- Known or suspected valvular heart disease [7]
- Known or suspected intracardiac shunt [8,9]
- Recent myocardial infarction (MI) [6]
- Worsening symptoms of pulmonary hypertension (PH) [6]
- Suspected PH (Pulmonary Artery (PA) Systolic Pressure > 40 mmHg) on echocardiogram [8,9]
- Post-Left ventricular assist device (LVAD) placement
  - As a bridge to transplant
    - With pulmonary hypertension (Pulmonary vascular resistance (PVR) > 2.5 Wood units) or mean PA pressure > 20 mmHg prior to LVAD placement
  - To evaluate for suspected right heart failure (RHF) [6,8]
  - To optimize device settings
- Suspected or known constrictive or effusive/constrictive pericarditis [10]
  - After undergoing **ONE** of the following imaging tests:
    - Transthoracic Echocardiogram (TTE)
    - Cardiac Magnetic Resonance Imaging (MRI) or Magnetic Resonance Angiography (MRA)
    - Cardiac Computed Tomography (CCT) or Cardiac Computed Tomography Angiography (CCTA)

CODING AND STANDARDS

Codes

Code	Description
93451	Right heart catheterization including measurement(s) of oxygen saturation and cardiac output, when performed
93503	Insertion and placement of flow directed catheter (eg, Swan-Ganz) for monitoring purposes
93530	Right heart catheterization, for congenital cardiac anomalies

Code	Description
93593	Right heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone; normal native connections
93594	Right heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone; abnormal native connections
+93463	Pharmacologic agent administration (eg, inhaled nitric oxide, intravenous infusion of nitroprusside, dobutamine, milrinone, or other agent) including assessing hemodynamic measurements before, during, after and repeat pharmacologic agent administration, when performed (List separately in addition to code for primary procedure)
+93598	Cardiac output measurement(s), thermodilution or other indicator dilution method, performed during cardiac catheterization for the evaluation of congenital heart defects (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(2)]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

CCT: Cardiac computed tomography

CCTA: Coronary computed tomographic angiography

LVAD: Left ventricular assist device

MI: Myocardial Infarction

MRA: Magnetic resonance angiography

MRI: Magnetic resonance imaging

PA: Pulmonary artery

PE: Pulmonary Embolism

PH: Pulmonary hypertension

PVR: Pulmonary vascular resistance

RHF: Right heart failure

SUMMARY OF EVIDENCE

Right ventricular failure: Current strategies and future development [6]

Study Design: This systematic review focuses on current strategies and future development for managing right ventricular failure (RVF). The study includes a combination of clinical assessment, echocardiographic, laboratory, and hemodynamic parameters, and clinical risk assessment.

Target Population: The study targets patients with right ventricular failure (RVF), including those with pressure overload, volume overload, or decreased contractility due to ischemia, cardiomyopathy, or arrhythmias.

Key Factors:

- **Diagnosis:** Diagnosis of RVF is based on a combination of clinical assessment, echocardiographic, laboratory, and hemodynamic parameters. Early diagnosis is crucial for successful management.
- **Treatment:** Treatment includes medical management, mechanical assist devices, and transplantation if recovery is not observed. Immediate diagnosis and management of RVF, including mechanical circulatory support where needed, alongside a protocolized approach to weaning, is important in successfully managing RVF.
- **Future Development:** The future is moving towards new therapies, both pharmacological and device-centered. Molecular imaging and specific biomarkers for RVF are currently under research.

Evaluation and Management of Right-Sided Heart Failure: A Scientific Statement From the American Heart Association [8]

Study Design: This scientific statement from the American Heart Association provides guidance on the assessment and management of right-sided heart failure (RHF). The writing group used systematic literature reviews, published translational and clinical studies, clinical practice guidelines, and expert opinion/statements to summarize existing evidence and identify areas requiring future research.

Target Population: The study focuses on patients with right-sided heart failure (RHF), including those with primary cardiomyopathies with right ventricular (RV) involvement, RV ischemia and infarction, congenital heart disease, valvular pathologies, and pulmonary hypertension.

Key Factors:

- **Pathophysiology:** RHF is caused by the inability of the RV to support optimal circulation in the presence of adequate preload. It includes diverse causes, pathways, and pathological processes.
- **Assessment:** Functional assessment of the right side of the heart can be hindered by its complex geometry. Multiple hemodynamic and biochemical markers are associated with worsening RHF and can guide clinical assessment and therapeutic decision-making.
- **Management:** Pharmacological and mechanical interventions targeting isolated acute and chronic RHF have not been well investigated. Specific therapies promoting stabilization and recovery of RV function are lacking.

2022 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension [9]

Study Design: These guidelines were developed by the task force for the diagnosis and treatment of pulmonary hypertension (PH) of the European Society of Cardiology (ESC) and the European Respiratory Society (ERS). The guidelines were developed after careful consideration of scientific and medical knowledge and evidence available at the time of drafting.

Target Population: The guidelines focus on patients with pulmonary hypertension (PH), including those with pulmonary arterial hypertension (PAH), chronic thrombo-embolic pulmonary hypertension (CTEPH), left heart disease, lung disease, and unclear or multifactorial mechanisms.

Key Factors:

- **Diagnosis:** The guidelines provide a comprehensive diagnostic algorithm for PH, including clinical presentation, electrocardiogram, chest radiography, pulmonary function tests, echocardiography, ventilation/perfusion lung scan, computed tomography, and cardiac magnetic resonance imaging.
- **Treatment:** The guidelines offer evidence-based recommendations for the treatment of PH, including general measures, PAH therapies, interventional therapy, advanced right ventricular failure management, and lung and heart-lung transplantation.
- **Risk Assessment:** The guidelines include a risk-stratification table with additional echocardiographic and cardiac magnetic resonance imaging prognostic indicators. The recommendations for initial drug therapies have been simplified, building on a revised,

three-strata, multiparametric risk model to replace functional classification.

ANALYSIS OF EVIDENCE

Shared Findings [6,8,9]

All three articles emphasize the importance of right heart catheterization (RHC) in diagnosing and managing right heart failure (RHF) and pulmonary hypertension (PH). They agree on several key points:

- **Diagnostic Value**:
  - RHC is considered the gold standard for diagnosing PH and assessing right-sided filling pressures, contractility, and afterload.
  - It provides continuous, real-time data that is crucial for accurate diagnosis and management.
- **Prognostic Information**:
  - Hemodynamic parameters obtained from RHC, such as pulmonary artery pulsatility index (PAPi), right ventricular stroke work index (RVSWI), and pulmonary vascular resistance (PVR), offer valuable prognostic information.
- **Management of RHF**:
  - RHC is essential for guiding the management of RHF, including optimizing preload, reducing afterload, and enhancing RV contractility.

Conclusions [6,8,9]

In summary, all three articles highlight the critical role of RHC in diagnosing and managing RHF and PH. They share conclusions on the diagnostic value, prognostic information, and management of RHF.

POLICY HISTORY

Date	Summary
June 2026	• Updated abbreviations • Updated formatting • Added CPT code table and description • No clinical change
May 2025	• Guideline renamed Standalone Right Heart Catheterization • Updated citations • Removed AUC scores

Date	Summary
	● Added third bullet to General Information ● Removed Background ● Added Summary of Evidence and Analysis of Evidence
January 2025	● Added CPT code 93463

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7330 for Cardioversion of Atrial Fibrillation, Atrial Flutter and Atrial Tachycardia

Guideline Number: Evolent_CG_7330	**Applicable Codes**	
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Original Date: August 2011	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

To provide guidance pertaining to cardioversion from atrial fibrillation, atrial flutter, and suspected reentrant intra-atrial reentrant tachycardias to sinus rhythm.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Anticoagulation and Left Atrial Appendage Imaging Prior to Elective Cardioversion of Atrial Fibrillation [6]

- In patients with atrial fibrillation (AF), atrial flutter (AFL), or atrial tachycardia (AT) duration of ≥ 48 hours, a 3-week duration of uninterrupted therapeutic anticoagulation or imaging evaluation to exclude intracardiac thrombus is indicated before elective cardioversion, unless the patient is hemodynamically unstable

- In patients with AF/AFL/AT in whom cardioversion is deferred due to left atrial appendage (LAA) thrombus detected on pre-cardioversion imaging, therapeutic anticoagulation should be instituted for at least 3 to 6 weeks, after which imaging should be repeated before cardioversion
- In patients with AF/AFL/AT in whom left atrial appendage isolation procedures (Watchman, surgical ligation, etc.) have been performed, anticoagulation need not be maintained prior to cardioversion, providing that transesophageal echocardiogram is planned to "clear" the atrium of potential thrombi prior to the procedure
- In patients with AF/AFL/AT with a documented contraindication to anticoagulation therapy, cardioversion may be performed if transesophageal echocardiogram is planned to "clear" the atrium of potential thrombi prior to the procedure

Direct Current Synchronized Cardioversion of Atrial Fibrillation/Flutter/Tachycardia (6)

- In patients with hemodynamic instability attributable to AF/AFL/AT, immediate electrical cardioversion should be performed to restore sinus rhythm
- In patients with AF/AFL/AT who are hemodynamically stable, electrical cardioversion may be performed as initial rhythm-control strategy or after unsuccessful pharmacological cardioversion
    - In patients with AF/AFL/AT undergoing electrical cardioversion, energy delivery should be synchronized to the QRS to reduce the risk of inducing ventricular fibrillation (VF)

Intravenous Pharmacological Cardioversion of Atrial Fibrillation (6)

- For patients with AF/AFL/AT, pharmacological cardioversion is an appropriate alternative to electrical cardioversion for those who are hemodynamically stable or when electrical cardioversion cannot be performed
    - For patients with AF/AFL/AT and left ventricular ejection fraction (LVEF) > 40%, ibutilide may be used pharmacological cardioversion
    - For patients with AF/AFL/AT, intravenous amiodarone may be used for pharmacological cardioversion, although time to conversion is generally longer than with other agents (typically 8 hours)
    - For patients with AF/AFL/AT, intravenous procainamide may be used for pharmacological cardioversion when other intravenous agents are contraindicated

CODING AND STANDARDS

Codes

Code	Description
92960	Cardioversion, elective, electrical conversion of arrhythmia; external
92961	Cardioversion, elective, electrical conversion of arrhythmia; internal (separate procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Atrial fibrillation (AF) is the most common heart rhythm disturbance, with a prevalence of 5.2 million persons in the US in 2010, expected to reach 12.1 million by 2030. It is associated with a 1.5 to 2.0-fold increase in mortality and a 2.4-fold increase in stroke. [(6)] It is associated with increased risks for myocardial infarction, heart failure, and chronic kidney disease, among others. It is widely recognized that "atrial fibrillation begets atrial fibrillation;" prolonged AF results in electrical remodeling of the atria that reduces the potential to sustain sinus rhythm. Thus, expedient conversion to sinus rhythm, utilizing pharmacologic therapy, cardioversion, or ablation can restore sinus rhythm and ameliorate the risks associated with AF.

Because of the propensity for thrombus formation, especially in the left atrial appendage, during AF, anticoagulation therapy is indicated in patients with prolonged (> 48 hours) duration and with CHA_2DS_2-VASc scores of 2 or greater. [(6)]

Imaging of the left atrium, typically with transesophageal echocardiography (TEE) or with cardiac computerized tomographic Angiography (CTA), to exclude left-sided thrombus formation, is typically performed in higher risk patients before elective cardioversion (either electrical or pharmacological), particularly when continuity of effective anticoagulation is not certain. [(6)]

Definitions

CHA_2DS_2-VASc score: A system used to evaluate the risk of stroke in patients with atrial fibrillation, in which points are assigned for age > 65 (1 point) or > 75 (2 points); female gender (1 point); heart failure history (1 point); hypertension (1 point); prior stroke or thromboembolism (2 points); history of vascular disease (1 point); and diabetes (1 point). A score of 2 or greater is considered an indication for systemic anticoagulation therapy. [6]

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AF: Atrial fibrillation

AFL: Atrial flutter

AT: Atrial tachycardia

AUC: Appropriate use criteria

CTA: Computerized tomographic angiography

LAA: Left atrial appendage

LVEF: Left ventricular ejection fraction

TTE: Transesophageal Echocardiogram

VF: Ventricular fibrillation

SUMMARY OF EVIDENCE

2023 ACC/AHA/ACCP/HRS Guideline for the Diagnosis and Management of Atrial Fibrillation [6]

Study Design:

The guideline is based on a comprehensive literature search conducted from May 12, 2022, to November 3, 2022, encompassing studies, reviews, and other evidence conducted on human subjects published in English from various databases such as PubMed, EMBASE, the Cochrane Library, and the Agency for Healthcare Research and Quality. Additional relevant studies published through November 2022 were also considered by the writing committee and added to the evidence tables where appropriate.

Target Population:

The guideline targets clinicians involved in the treatment of patients with atrial fibrillation. It provides recommendations to guide clinicians in the diagnosis and management of AF, including thromboembolic risk assessment, anticoagulation, left atrial appendage occlusion, AF catheter or surgical ablation, risk factor modification, and AF prevention.

Key Factors:

- **Epidemiology**: AF is the most sustained common arrhythmia, with increasing incidence and prevalence globally. The estimated global prevalence was 50 million in 2020.
- **Risk Factors**: The guideline presents evidence for widely reported and validated factors for AF from single studies, meta-analyses, and Mendelian randomization studies. Risk factors include demographic, anthropometric, cardiovascular risk factors, noncardiac conditions, biomarkers, and genetic markers.
- **Mechanisms and Pathophysiology**: AF is a chaotic, rapid, and irregular atrial rhythm resulting from either electrophysiological abnormalities or structural abnormalities of cellular connections. The guideline discusses electrophysiological mechanisms, electrical remodeling, atrial structural abnormalities, remodeling, atrial myopathy, and the role of the autonomic nervous system.
- **Shared Decision-Making (SDM):** The guideline emphasizes the importance of SDM in AF management, recommending the use of evidence-based decision aids to guide stroke reduction therapy treatment decisions throughout the disease course to improve engagement, decisional quality, and patient satisfaction.
- **Clinical Evaluation**: The guideline recommends a targeted history and physical examination, basic laboratory tests, and a transthoracic echocardiogram for the initial clinical evaluation of patients with newly diagnosed or suspected AF.
- **Lifestyle and Risk Factor Modification (LRFM)**: The guideline provides recommendations for primary and secondary prevention of AF through comprehensive LRFM, including weight loss, physical fitness, smoking cessation, alcohol consumption, caffeine consumption, diet and dietary supplementation, diabetes management, hypertension treatment, and sleep management.
- **Prevention of Thromboembolism**: The guideline recommends evaluating patients with AF for their annual risk of thromboembolic events using validated clinical risk scores and considering factors that might modify their risk of stroke to help inform the decision on anticoagulation

ANALYSIS OF EVIDENCE

Prevention of Thromboembolism:

- For patients with AF duration of ≥48 hours, a 3-week duration of uninterrupted therapeutic anticoagulation or imaging evaluation to exclude intracardiac thrombus is recommended before elective cardioversion.
- Therapeutic anticoagulation should be established before cardioversion and continued

for at least 4 weeks afterward without interruption to prevent thromboembolism.

- In patients with AF in whom cardioversion is deferred due to left atrial appendage (LAA) thrombus detected on precardioversion imaging, therapeutic anticoagulation should be instituted for at least 3 to 6 weeks, after which imaging should be repeated before cardioversion.

Electrical Cardioversion:

- Immediate electrical cardioversion should be performed in patients with hemodynamic instability attributable to AF.
- Electrical cardioversion can be performed as an initial rhythm-control strategy or after unsuccessful pharmacological cardioversion.
- Energy delivery should be confirmed to be synchronized to the QRS to reduce the risk of inducing ventricular fibrillation (VF).
- Use of biphasic energy of at least 200 J as initial energy can be beneficial to improve the success of the initial electrical shock.
- Optimization of electrode vector, use of higher energy, and pretreatment with antiarrhythmic drugs can facilitate the success of electrical cardioversion.

Pharmacological Cardioversion:

- Pharmacological cardioversion is reasonable as an alternative to electrical cardioversion for those who are hemodynamically stable or in situations when electrical cardioversion is preferred but cannot be performed.
- Ibutilide is reasonable for pharmacological cardioversion for patients without depressed left ventricular function (LVEF <40%).
- Intravenous amiodarone is reasonable for pharmacological cardioversion, although the time to conversion is generally longer than with other agents (8-12 hours).
- The "pill-in-the-pocket" (PITP) approach with a single oral dose of flecainide or propafenone, with a concomitant atrioventricular nodal blocking agent, is reasonable for pharmacological cardioversion if previously tested in a monitored setting.
- Intravenous procainamide may be considered for pharmacological cardioversion when other intravenous agents are contraindicated or not preferred.

Key Factors:

- **Thromboembolic Risks**: Elevated thromboembolic risks around the time of cardioversion, especially within the 30 days after cardioversion.
- **Atrial Stunning**: Observation of atrial dysfunction and spontaneous echocardiographic contrast in association with atrial stunning on transesophageal echocardiography (TEE) after cardioversion.
- **Energy Delivery**: Importance of synchronized energy delivery to the QRS complex to avoid VF.
- **Optimization Techniques**: Use of biphasic energy, electrode vector optimization, manual pressure augmentation, and pretreatment with antiarrhythmic drugs to improve

the success of electrical cardioversion.

This analysis highlights the importance of anticoagulation, synchronization of energy delivery, and optimization techniques in cardioversion for AF. The guidelines provide a comprehensive framework for managing cardioversion, incorporating the latest evidence and expert consensus to guide clinical practice

POLICY HISTORY

Date	Summary
April 2026	• Added indication for patients with AF/AFL/AT and have undergone left atrial appendage isolation procedures or documented contraindication to anticoagulation therapy • Added code description
July 2025	• Guideline name changed from Cardioversion of Atrial Fibrillation to Cardioversion of Atrial Fibrillation, Atrial Flutter and Atrial Tachycardia • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Added atrial flutter and atrial tachycardia to list of indications • Added a Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7331 for Temporal Artery Biopsy

Guideline Number: Evolent_CG_7331	**Applicable Codes**	
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Original Date: July 2017	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for a temporal artery biopsy, which is primarily used to diagnose Giant Cell Arteritis and Temporal Arteritis.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

NOTE: Particularly when occurring in conjunction with patient age > 50 years and/or elevated C-Reactive Protein (CRP) (≥ 10 mg/L) [6,7]

- Vision problems including [6–8]:
  - Anterior ischemic optic neuropathy
  - Cotton wool spots
  - Cilio-retinal or central retinal artery occlusion

- Cranial nerve palsy
- Double vision
- Sudden vision loss

- Jaw claudication [6,7]
- Pulseless temporal artery [7]
- Temporal tenderness [6,7]
- New onset, localized headache, particularly if presenting with [6,8]
  - Night sweats
  - Weight loss
  - Malaise
  - Depression
- Elevated erythrocyte sedimentation rate (ESR) (maximum ≥ 50 mm/hr) [7,8]

CODING AND STANDARDS

Codes

Code	Description
37609	Ligation or biopsy, temporal artery

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Temporal arteritis (TA) is an inflammatory vasculopathy affecting medium- and large-sized arteries, also referred to as giant cell arteritis leading to granulomatous pan arteritis with mononuclear cell infiltrates and giant cell formation within the vessel wall. It predominantly affects the cranial branches of arteries arising from the arch of the aorta, mainly the superficial temporal branch of the carotid artery. Mean onset for TA is at age 70 years.

Temporal Artery biopsy is a surgical procedure performed under local anesthesia where at least 1 cm of temporal artery on the symptomatic side is biopsied and looked under microscope for evidence of multinucleated giant cells. Biopsy of bilateral temporal arteries are usually not required. Temporal artery biopsy has a very low complication rate. Most commonly encountered complications are scarring, hematoma, wound infection, and skin necrosis.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

SUMMARY OF EVIDENCE

Giant cell arteritis: reviewing the advancing diagnostics and management [6]

Study Design: This is a review article discussing the advancements in diagnostics and management of giant cell arteritis (GCA).

Target Population: The review focuses on individuals aged 50 or older, as GCA predominantly affects this age group.

Key Factors: The article highlights the importance of immediate high-dose glucocorticoids as the standard emergency treatment for GCA. It also discusses the role of cranial ultrasound in reducing diagnostic delay and improving clinical outcomes. The review emphasizes the need for clear diagnostic criteria, accessible specialist referral pathways, and informative management guidelines to ensure prompt diagnosis and appropriate treatment.

Temporal Artery Biopsy for Diagnosing Giant Cell Arteritis: A Ten-year Review [7]

Study Design: This study is a retrospective chart review conducted over a ten-year period to assess the use of temporal artery biopsy (TAB) in diagnosing giant cell arteritis (GCA) and to evaluate patients' clinical and laboratory characteristics.

Target Population: The study included 114 patients with suspected GCA who underwent TAB at a tertiary center in Iran.

Key Factors: The study found that the majority of TABs were negative, with only 14.9% showing characteristics of GCA. The mean age of TAB-positive patients was significantly higher than that of TAB-negative patients. The study suggested that the diagnosis of GCA should be based on clinical suspicion to reduce the number of redundant biopsies.

Necessity of Temporal Artery Biopsy for Giant Cell Arteritis: A Systematic Review [8]

Study Design: This study is a systematic review aimed at determining the usefulness of temporal artery biopsy (TAB) for managing giant cell arteritis (GCA). The review included studies comparing steroid treatment between TAB-positive and TAB-negative patients.

Target Population: The study involved 13 studies with a total of 1355 patients suspected of having GCA.

Key Factors: The review found that the rate of prebiopsy steroid treatment was higher in TAB-positive patients compared to TAB-negative patients (93% vs. 63%). However, the duration of steroid treatment did not significantly differ between the two groups. The study concluded that TAB results have minimal impact on treatment and suggested reconsidering the utility of TAB when a clinical diagnosis of GCA is possible.

ANALYSIS OF EVIDENCE

Analysis [6–8]:

In summary, while all three articles agree on the limited utility of TAB in GCA management, they differ in their emphasis on alternative diagnostic methods and the need for reducing redundant biopsies. The overall evidence suggests a move towards more efficient and less invasive diagnostic approaches for GCA.

Shared Conclusions:

- All three articles highlight the importance of clinical diagnosis and the potential limitations of TAB in diagnosing GCA.
- There is a consensus that TAB results have minimal impact on treatment duration and management decisions.
- The need for reducing redundant biopsies and considering alternative diagnostic tools like ultrasound and PET imaging is emphasized.

POLICY HISTORY

Date	Summary
April 2026	• No substantive clinical change

Date	Summary
	● Added code description
July 2025	● Added a Summary of Evidence and Analysis of Evidence
May 2025	● No substantial clinical content changes ● Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices ● Removed review of request for medical necessity criteria

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7332 for Thoracentesis and Pleurodesis

Guideline Number: Evolent_CG_7332	**Applicable Codes**	
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Original Date: September 2019	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

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- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Thoracentesis and Pleurodesis.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Thoracentesis

- Evaluation of undiagnosed pleural effusion [6]
- Therapeutic drainage of symptomatic pleural effusion [6–8]
- Therapeutic drainage of infected fluid [6]

Pleurodesis

- Pleural Effusion
  - Symptomatic malignant pleural effusion and known (or suspected) expandible lung, as an alternative to repeat thoracentesis [7]
- Pneumothorax
  - Primary (see **Definitions** section) spontaneous pneumothorax with one or more of the following characteristics [6,7,9]:
    - Recurrent effusion
    - Persistent air leak (> 3-5 days)
    - Bilateral pneumothorax
    - Hemopneumothorax
    - Tension pneumothorax
    - Professions/hobbies at risk for recurrence (e.g., flying, diving)
  - Secondary (see **Definitions** section) spontaneous pneumothorax [7]

CODING AND STANDARDS

Codes

Code	Description
32550	Insertion of indwelling tunneled pleural catheter with cuff
32552	Removal of indwelling tunneled pleural catheter with cuff
32554	Thoracentesis, needle or catheter, aspiration of the pleural space; without imaging guidance
32555	Thoracentesis, needle or catheter, aspiration of the pleural space; with imaging guidance
32556	Pleural drainage, percutaneous, with insertion of indwelling catheter; without imaging guidance
32557	Pleural drainage, percutaneous, with insertion of indwelling catheter; with imaging guidance
32560	Instillation, via chest tube/catheter, agent for pleurodesis (eg, talc for recurrent or persistent pneumothorax)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Limitations

There are currently no established guidelines and limited data on the best treatment for refractory non-malignant pleural effusions. Invasive treatments such as pleurodesis and indwelling pleural catheters are options once standard medical therapy for the underlying condition(s) has been maximized. [7]

Definitions

Thoracentesis: a procedure that is done to remove a sample of fluid from around the lung.

Pleurodesis: a procedure that induces pleural inflammation resulting in adhesions between the parietal and visceral pleura, and prevention of fluid re-accumulation. Pleurodesis can be accomplished by medical (instillation of a chemical or material in the pleural space) or surgical (mechanical abrasion of the pleura) techniques.

Primary pneumothorax: pneumothorax occurring in the absence of underlying lung disease.

Secondary pneumothorax: pneumothorax occurring as a consequence of underlying lung disease.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

SUMMARY OF EVIDENCE

British Thoracic Society Guideline for pleural disease [6]

Study Design: The study involved the development of guidelines for pleural disease by the British Thoracic Society (BTS). The guidelines were created by the BTS Pleural Disease Guideline Development Group and the BTS Clinical Statement on Pleural Procedures Group. The process included a comprehensive review of published evidence, diagnostic and therapeutic procedures, and assessment of the risk-benefit ratio. The guidelines were developed by a task force of selected experts in the field, representing various BTS sub-specialty groups.

Target Population: The guidelines focus on patients with pleural disease, including those with spontaneous pneumothorax, undiagnosed unilateral pleural effusion, pleural infection, and pleural malignancy. The target population encompasses a wide range of pleural conditions and patient demographics.

Key Factors:

Recommendations: The guidelines provide evidence-based recommendations for the diagnosis, management, and treatment of pleural disease, including pleural aspiration, chest drain insertion, indwelling pleural catheter (IPC) insertion, image-guided pleural biopsy, and medical thoracoscopy.

Diagnostic Testing: The guidelines emphasize the importance of accurate diagnosis, risk assessment, and selection of the most suitable type of intervention. Diagnostic testing includes thoracic ultrasound (TUS), computed tomography (CT), positron emission tomography-computed tomography (PET-CT), and magnetic resonance imaging (MRI).

Medical Therapy: The guidelines recommend medical therapy for pleural infection, pleural malignancy, and other related conditions. Specific therapies include antibiotics, analgesics, and pleurodesis agents.

Surgical and Interventional Procedures: The guidelines provide detailed recommendations for surgical and interventional procedures for various pleural conditions, including pneumothorax, pleural effusion, pleural infection, and pleural malignancy.

Follow-up Care: The guidelines emphasize the importance of follow-up care for pleural disease patients, including regular imaging, monitoring for complications, and patient education.

Exploring the efficacy and advancements of medical pleurodesis: a comprehensive review of current research [7]

Study Design: This narrative review aims to provide an overview of medical pleurodesis techniques, their indications, and potential adverse effects. The review was performed by checking scientific databases for medical literature, focusing especially on data derived from randomized controlled trials (RCTs).

Target Population: The review focuses on patients with malignant pleural effusions (MPEs), recurrent or refractory nonmalignant pleural effusions (NMPEs), and recurrent pneumothorax. These conditions significantly affect patient morbidity and quality of life.

Key Factors:

Medical Pleurodesis Techniques: Various nonsurgical techniques exist to perform pleurodesis, including talc pleurodesis, indwelling pleural catheter (IPC) placement, and autologous blood patch pleurodesis. Talc pleurodesis is highlighted as the safest and most effective method.

Efficacy and Safety: Talc pleurodesis demonstrates an overall success rate ranging from 80% to 95%, depending on the dose, the number of administrations, the pathological entity being treated, and the patient's condition. IPCs are considered suitable for patients with a history of pleurodesis failure and those with limited life expectancy.

Combination of Techniques: The combination of IPCs with talc pleurodesis enhances success rates in MPE management. Single-day procedures involving thoracoscopic talc poudrage and IPC insertion offer potential for effective pleurodesis.

Complications: Although medical pleurodesis is generally considered safe, it can be associated with certain complications, such as pain, fever, empyema, and infections. The use of IPCs is associated with complications in approximately 10-20% of cases.

SPLF/SMFU/SRLF/SFAR/SFCTCV Guidelines for the management of patients with primary spontaneous pneumothorax [9]

Study Design: These guidelines were developed by the French Speaking Society of Respiratory Diseases (SPLF), the French Society of Emergency Medicine (SFMU), the French Intensive Care Society (SRLF), the French Society of Anesthesia & Intensive Care Medicine (SFAR), and the French Society of Thoracic and Cardiovascular Surgery (SFCTCV). The guidelines are based on literature review and analysis according to the GRADE (Grading of Recommendation Assessment, Development, and Evaluation) methodology.

Target Population: The guidelines focus on the management of patients with primary spontaneous pneumothorax (PSP). The target population includes adult patients (>15 years old) with PSP.

Key Factors:

Diagnostic Methods: The guidelines emphasize the importance of diagnostic imaging, including chest X-ray (CXR), chest CT scan, and chest ultrasound, for assessing the size of the pneumothorax and ruling out differential diagnoses.

Therapeutic Management: The therapeutic strategy depends on the clinical presentation, including emergency needle aspiration for tension PSP, conservative management for small PSP, and chest tube drainage for large PSP. Outpatient management is recommended for stable patients with large PSP without signs of immediate severity.

Surgical Management: Surgery is proposed for patients with recurrent PSP, persistent air leaks, or PSP occurring during pregnancy. Minimally invasive techniques are preferred for inducing pleurodesis.

Analgesia: The guidelines recommend multimodal analgesia, including local anesthesia, to reduce pain associated with chest tube removal and other procedures.

ANALYSIS OF EVIDENCE

Shared Findings [6,7,9]

All three articles emphasize the importance of thoracentesis and pleurodesis in managing pleural effusions and pneumothorax. They agree on several key points:

- **Thoracentesis for Diagnostic and Therapeutic Purposes**:
  - Thoracentesis is a crucial procedure for both diagnosing and managing pleural effusions. It helps in obtaining pleural fluid samples for analysis and can provide symptomatic relief by removing excess fluid.
- **Pleurodesis for Preventing Recurrence**:
  - Pleurodesis is recommended to prevent the recurrence of pleural effusions and pneumothorax. Talc pleurodesis is highlighted as the most effective and commonly used method.
- **Use of Talc in Pleurodesis**:
  - Talc is considered the safest and most effective agent for pleurodesis. It can be administered as talc slurry or talc poudrage, with both methods showing comparable success rates.

Conclusions [6,7,9]

In summary, all three articles highlight the critical role of thoracentesis and pleurodesis in managing pleural effusions and pneumothorax. They share conclusions on the importance of these procedures for diagnostic and therapeutic purposes, the use of talc in pleurodesis, and the prevention of recurrence.

POLICY HISTORY

Date	Summary
April 2026	• No substantive clinical changes • Added code description
May 2025	• Updated citations • Added third bullet to General Information • Added Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7333 for Tilt Table Testing

Guideline Number: Evolent_CG_7333	Applicable Codes	
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Original Date: August 2011	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
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- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Tilt Table Testing

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

If initial testing results were unclear or not diagnostic, tilt-table testing may be appropriate for:

- Suspected vasovagal syncope (especially if syncope is recurrent) [6]
- Syncope and suspected orthostatic hypotension [6–8]
- Suspected POTS (postural orthostatic tachycardia syndrome) [7,8]
- Distinguishing convulsive/myoclonic syncope from epilepsy [6,8]
- Distinguishing psychogenic pseudosyncope from vasovagal syncope [6,8]

CODING AND STANDARDS

Codes

Code	Description
93660	Evaluation of cardiovascular function with tilt table evaluation, with continuous ECG monitoring and intermittent blood pressure monitoring, with or without pharmacological intervention

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Tilt table testing is used to evaluate the autonomic nervous system control of cardiovascular function in patients with syncope, generally after other, potentially more harmful, likely, or readily managed causes have been ruled out by history, physical examination or other appropriate tests. The test utilizes a specialized table which passively takes the patient from a supine position to a head-up position (60 to 90 degrees), which is maintained for 30-40 minutes. Heart rate, blood pressure and ECG are continuously monitored. Provocative testing with sublingual nitroglycerin or intravenous isoproterenol has been shown to increase sensitivity, but at the expense of an increase in false-positive results (lower specificity).

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

SUMMARY OF EVIDENCE

2017 ACC/AHA/HRS Guideline for the Evaluation and Management of Patients With Syncope [6]

Study Design: The document is a clinical practice guideline developed by the American College of Cardiology (ACC), American Heart Association (AHA), and Heart Rhythm Society (HRS) for the evaluation and management of patients with syncope. It was created in collaboration with the American College of Emergency Physicians and Society for Academic Emergency Medicine and endorsed by the Pediatric and Congenital Electrophysiology Society.

Target Population: The guideline is intended for healthcare providers managing adult and pediatric patients with suspected syncope. It aims to provide contemporary, accessible, and succinct guidance on the management of these patients in various clinical settings.

Key Factors: It discusses the prevalence and incidence of syncope in different populations, noting that syncope can occur at any age but has a trimodal distribution with peaks around 20, 60, and 80 years. Recommendations for history taking, physical examination, and electrocardiography (ECG) are provided to identify the prognosis, diagnosis, and comorbidities. The guideline emphasizes the importance of assessing the cause of syncope and underlying comorbidities to guide treatment and prevent long-term morbidity and mortality. It includes recommendations for blood testing, cardiovascular testing, cardiac monitoring, in-hospital telemetry, electrophysiological study (EPS), and tilt-table testing. The guideline reviews evidence for managing syncope in patients with various cardiac conditions, including arrhythmic conditions, structural heart disease, and inheritable arrhythmic conditions. Recommendations for managing vasovagal syncope, carotid sinus syndrome, and other reflex conditions are provided. The guideline discusses the evaluation and management of neurogenic orthostatic hypotension and dehydration-related syncope. It includes recommendations for pediatric patients, adults with congenital heart disease, and geriatric patients.

Recommendations for tilt table testing and other provocative cardiovascular autonomic tests in conditions that may cause transient loss of consciousness: Consensus statement of the European Federation of Autonomic Societies (EFAS) endorsed by the American Autonomic Society (AAS) and the European Academy of Neurology (EAN) [8]

Study Design: The document is a consensus statement from the European Federation of Autonomic Societies (EFAS), endorsed by the American Autonomic Society (AAS) and the European Academy of Neurology (EAN). It aims to provide recommendations for tilt-table testing (TTT) and other provocative cardiovascular autonomic tests in conditions that may cause transient loss of consciousness (TLOC).

Target Population: The consensus statement is intended for healthcare providers diagnosing and managing patients with disorders that may cause TLOC, including reflex syncope, orthostatic hypotension (OH), postural orthostatic tachycardia syndrome (POTS), and psychogenic pseudosyncope.

Key Factors: The primary aim of TTT is to obtain a pathophysiological correlate for orthostatic intolerance and TLOC. It is indicated when initial evaluation does not yield a definite diagnosis but raises suspicion of reflex syncope, OH, POTS, or psychogenic pseudosyncope. The document outlines various TTT protocols, including classic TTT, active standing test, Valsalva

maneuver, deep breathing, carotid sinus massage, venipuncture, meal provocation, and tailored provocations. Basic equipment for TTT includes a tilt table, continuous beat-to-beat blood pressure monitor, at least one ECG lead, and trained staff. Additional equipment may include video, EEG, respiratory recordings, blood sampling, transcranial Doppler, and near-infrared spectroscopy.

ANALYSIS OF EVIDENCE

Analysis [6,8]:

Both articles provide comprehensive evidence for the evaluation and management of syncope, with a focus on different aspects of the condition. The ACC/AHA/HRS guidelines offer a broad overview of syncope management, including specific recommendations for various cardiovascular conditions. The EFAS consensus statement provides a detailed discussion on the use of TTT and other autonomic tests, highlighting their diagnostic and therapeutic utility.

In conclusion, while both articles share common ground in their approach to syncope evaluation and management, they differ in their focus and specific recommendations. The ACC/AHA/HRS guidelines provide a broader perspective on syncope management, while the EFAS consensus statement offers a more detailed discussion on the use of TTT and other autonomic tests.

Shared Conclusions:

- **Syncope Evaluation and Management**: Both articles emphasize the importance of a thorough initial evaluation, including history taking, physical examination, and ECG, to diagnose and manage syncope. They agree that syncope can have various causes, including cardiovascular, neurological, and reflex-mediated conditions.
- **Tilt Table Testing (TTT)**: Both documents recognize the value of Tilt Table Testing (TTT) in diagnosing syncope, particularly for conditions like vasovagal syncope (VVS) and orthostatic hypotension (OH). They agree that TTT can help identify the pathophysiological mechanisms underlying syncope and provide a clinical-pathophysiological correlate.
- **Orthostatic Hypotension (OH)**: Both articles discuss the different forms of OH, including initial, classic, and delayed OH. They agree that OH can be diagnosed through TTT or active standing tests and that it is essential to distinguish between neurogenic and non-neurogenic causes.

POLICY HISTORY

Date	Summary
April 2026	• Added code description • Adjusted background section

Date	Summary
July 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• No substantial clinical content changes • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7338 for Tricuspid Valve Surgery

Guideline Number: Evolent_CG_7338	**Applicable Codes**	
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Original Date: April 2011	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Tricuspid Valve Surgery.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Tricuspid Regurgitation (TR)

Tricuspid valve surgery is recommended for patients with:

- Severe TR and one or more of the following [6,7]:
  - undergoing left-sided valve surgery
  - isolated tricuspid valve surgery for primary TR with signs and symptoms of right-sided heart failure (HF)

- isolated tricuspid valve surgery for TR secondary to annular dilatation (without left-sided disease or pulmonary hypertension) in patients who are poorly responsive to medical therapy
- isolated tricuspid valve surgery for signs and symptoms of right-sided HF and history of previous left-sided valve surgery
- isolated tricuspid valve surgery for asymptomatic patients with primary TR and progressive right ventricular (RV) dilation or systolic dysfunction
- following an atrial switch procedure, regardless of symptoms, EF > 40% [8]
- For patients with congenitally corrected transposition of the great arteries and either [8]:
  - Symptomatic severe TR and preserved or mildly depressed systemic ventricular function (EF ≤ 40%)
  - Asymptomatic severe TR and dilatation or mild dysfunction of the systemic ventricle

- Progressive TR (i.e. mild or moderate) undergoing left-sided valve surgery if there is [6,7]:
  - tricuspid annular dilation (annulus end diastolic diameter >4.0 cm) **or**
  - signs and symptoms of right sided heart failure
- Ebstein anomaly and significant tricuspid regurgitation with any of the following [9]:
  - HF signs and symptoms
  - objective evidence of worsening exercise capacity
  - progressive RV systolic dysfunction
  - progressive RV enlargement
  - atrial tachyarrhythmias
  - paradoxical embolism
  - systemic desaturation from a right-to-left atrial shunt

Tricuspid Stenosis (TS) [7]

Tricuspid valve surgery is recommended for:

- Severe TS and one or more of the following:
  - patients undergoing left-sided valve intervention **or**
  - symptomatic patients

CODING AND STANDARDS

Codes

Code	Description
33463	Valvuloplasty, tricuspid valve; without ring insertion
33464	Valvuloplasty, tricuspid valve; with ring insertion
33465	Replacement, tricuspid valve, with cardiopulmonary bypass
+33530	Reoperation, coronary artery bypass procedure or valve procedure, more than 1 month after original operation (List separately in addition to code for primary procedure

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

HF: heart failure

RV: right ventricle

TR: tricuspid regurgitation

TS: tricuspid stenosis

SUMMARY OF EVIDENCE

2020 ACC/AHA Guideline for the Management of patients With Valvular Heart Disease [6]

Study Design: The guidelines were developed by the American College of Cardiology (ACC) and the American Heart Association (AHA) Joint Committee on Clinical Practice Guidelines. The document is based on systematic methods to evaluate and classify evidence, including literature reviews, randomized controlled trials (RCTs), registries, nonrandomized comparative and descriptive studies, case series, cohort studies, systematic reviews, and expert opinion.

Target Population: The guidelines focus on the diagnosis and management of adult patients with valvular heart disease (VHD). The recommendations are applicable to patients with or at risk of developing cardiovascular disease, with a particular emphasis on those in the United States but relevant to patients worldwide.

Key Factors:

Evaluation and Management: The guidelines provide detailed recommendations for the evaluation and management of various types of VHD, including aortic stenosis (AS), aortic regurgitation (AR), bicuspid aortic valve (BAV), mitral stenosis (MS), mitral regurgitation (MR), tricuspid valve disease, and mixed valve disease.

Diagnostic Testing: The guidelines emphasize the importance of diagnostic testing, including transthoracic echocardiography (TTE), transesophageal echocardiography (TEE), cardiac magnetic resonance (CMR) imaging, computed tomography (CT) angiography, and cardiac catheterization.

Medical Therapy: Recommendations for medical therapy include the use of anticoagulants, antiplatelet agents, and other medications for managing symptoms and preventing complications.

Intervention: The guidelines provide criteria for surgical and transcatheter interventions, including valve repair and replacement, based on the severity of the disease and patient-specific factors.

Follow-Up and Monitoring: The document outlines the importance of regular follow-up and monitoring of patients with VHD, including periodic imaging and assessment of ventricular function.

2021 ESC/EACTS Guidelines for the management of valvular heart disease [7]

Study Design: The study involved the development of guidelines for the management of valvular heart disease (VHD) by the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). The guidelines were developed by a task force of selected experts in the field, representing various ESC sub-specialty groups. The process included a comprehensive review of published evidence, diagnostic and therapeutic procedures, and assessment of the risk-benefit ratio.

Target Population: The guidelines focus on patients with valvular heart disease (VHD), including those with aortic regurgitation, aortic stenosis, mitral regurgitation, mitral stenosis, tricuspid regurgitation, tricuspid stenosis, and prosthetic heart valves. The target population encompasses a wide range of valvular heart conditions and patient demographics.

Key Factors:

Recommendations: The guidelines provide evidence-based recommendations for the diagnosis, management, and treatment of VHD, including surgical and transcatheter interventions, medical therapy, and follow-up care.

Diagnostic Testing: The guidelines emphasize the importance of accurate diagnosis, risk assessment, and selection of the most suitable type of intervention. Diagnostic testing includes echocardiography, cardiovascular magnetic resonance imaging (CMR), cardiovascular computed tomography (CCT), and cardiac catheterization.

Medical Therapy: The guidelines recommend medical therapy for heart failure, arrhythmias, pulmonary hypertension, and other related conditions. Specific therapies include beta blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), and pulmonary vasodilators.

Surgical and Transcatheter Interventions: The guidelines provide detailed recommendations for surgical and transcatheter interventions for various valvular heart conditions, including aortic regurgitation, aortic stenosis, mitral regurgitation, mitral stenosis, tricuspid regurgitation, and tricuspid stenosis.

Follow-up Care: The guidelines emphasize the importance of lifelong follow-up care for VHD patients, including regular imaging, exercise testing, and monitoring for complications.

2018 AHA/ACC Guideline for the Management of Adults With Congenital Heart Disease [9]

Study Design: The study involved the development of the 2018 AHA/ACC Guideline for the Management of Adults with Congenital Heart Disease (ACHD). The guidelines were developed by the American College of Cardiology (ACC) and the American Heart Association (AHA) Task Force on Clinical Practice Guidelines. The process included a comprehensive review of published evidence, diagnostic and therapeutic procedures, and assessment of the risk-benefit ratio. The guidelines were developed by a task force of selected experts in the field, representing various ACC sub-specialty groups.

Target Population: The guidelines focus on adults with congenital heart disease (ACHD), including those with simple, moderate, and complex congenital heart defects. The target population encompasses a wide range of congenital heart conditions, such as atrial septal defect (ASD), ventricular septal defect (VSD), atrioventricular septal defect (AVSD), patent ductus arteriosus (PDA), left ventricular outflow tract obstruction (LVOTO), coarctation of the aorta (CoA), and aortopathies.

Key Factors:

Recommendations: The guidelines provide evidence-based recommendations for the diagnosis, management, and treatment of ACHD, including surgical and catheter interventions, medical therapy, and follow-up care.

Diagnostic Testing: The guidelines emphasize the importance of accurate diagnosis, risk assessment, and selection of the most suitable type of intervention. Diagnostic testing includes

echocardiography, cardiovascular magnetic resonance imaging (CMR), cardiovascular computed tomography (CCT), and cardiac catheterization.

Medical Therapy: The guidelines recommend medical therapy for heart failure, arrhythmias, pulmonary hypertension, and other related conditions. Specific therapies include beta blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), and pulmonary vasodilators.

Surgical and Catheter Interventions: The guidelines provide detailed recommendations for surgical and catheter interventions for various congenital heart defects, including ASD, VSD, AVSD, PDA, LVOTO, CoA, and aortopathies.

Follow-up Care: The guidelines emphasize the importance of lifelong follow-up care for ACHD patients, including regular imaging, exercise testing, and monitoring for complications.

ANALYSIS OF EVIDENCE

Shared Conclusions [6,7,9]

- **Indications for Surgery**:
  - All three articles agree that tricuspid valve surgery is indicated for patients with severe tricuspid regurgitation (TR) who are symptomatic or have progressive right ventricular (RV) dilatation or dysfunction.
  - They also concur that surgery should be considered in patients with severe TR who have undergone previous left-sided valve surgery and do not have recurrent left-sided valve dysfunction.
- **Evaluation and Diagnosis**:
  - Echocardiography is emphasized as the primary tool for evaluating tricuspid valve disease, assessing valve morphology, severity of regurgitation, and RV function.
  - Cardiac magnetic resonance (CMR) and computed tomography (CT) are recommended for further assessment when echocardiographic data are inconclusive.
- **Surgical Techniques**:
  - Valve repair is preferred over replacement when feasible, as it is associated with better outcomes.
  - The articles highlight the importance of experienced centers and specialized teams for performing tricuspid valve surgery.

Conclusion [6,7,9]

The three articles provide a comprehensive overview of tricuspid valve surgery, with shared conclusions on indications for surgery, evaluation and diagnosis, and surgical techniques.

POLICY HISTORY

Date	Summary
April 2026	• Added indications for atrial switch and ccTGA • Updated citations
May 2025	• Moved explanatory text to background. • Edited display of acronyms in text • Added third bullet to General Information • Added Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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1. Patel MR, Spertus JA, Brindis RG, et al. ACCF Proposed Method for Evaluating the Appropriateness of Cardiovascular Imaging. *J Am Coll Cardiol*. 2005;46(8):1606-1613. doi:10.1016/j.jacc.2005.08.030
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Evolent Clinical Guideline 7339 for Ultrasound-Guided Vascular Access

Guideline Number: Evolent_CG_7339	**Applicable Codes**	
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Original Date: December 2021	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for ultrasound-guided vascular access.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Ultrasound guidance is recommended for intravascular procedures to increase safety, improve first-time success, reduce total procedure time, and reduce the overall risk of complications. It is most strongly recommended for procedures where either [6,7]:

- Anatomical location may be obscured
- Direct visualization or palpation may not be sufficient

Limitations

- Ultrasound guidance is considered unnecessary if it does not add any increased safety or technical advantage to the procedure. Accordingly, ultrasound guidance is not required for a fistulogram, or sclerotherapy of varicose veins except for select circumstances, evaluated on a case-by-case basis.
- Ultrasound guidance is included in radiofrequency, laser, mechanicochemical, noncompounded foam sclerotherapy and medical adhesive ablations of varicose veins.

CODING AND STANDARDS

Codes

Code	Description
+76937	Ultrasound guidance for vascular access requiring ultrasound evaluation of potential access sites, documentation of selected vessel patency, concurrent real time ultrasound visualization of vascular needle entry, with permanent recording and reporting (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [(3)]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6

- Rarely Appropriate Care - Median Score 1-3

SUMMARY OF EVIDENCE

European Society of Anaesthesiology guidelines on peri-operative use of ultrasound-guided for vascular access (PERSEUS vascular access) [6]

Study Design: The study focuses on the European Society of Anaesthesiology guidelines on perioperative use of ultrasound-guided vascular access (PERSEUS vascular access). The guidelines were developed by the ESA Task Force, which conducted a literature search and used the Grading of Recommendation Assessment (GRADE) system to assess levels of evidence and grade recommendations.

Target Population: The guidelines cover three main domains of application in ultrasound-guided vascular cannulation: adults, children, and training. The study includes recommendations for ultrasound-guided cannulation of various veins and arteries in both adults and children.

Key Factors: Ultrasound-Guided Cannulation in Adults: Recommendations for internal jugular vein, subclavian vein, axillary vein, femoral vein, and peripheral veins during emergency or elective situations. **Ultrasound-Guided Cannulation in Children**: Recommendations for internal jugular vein, brachiocephalic vein, femoral vein, radial artery, and peripheral veins. **Training**: Emphasis on proper training for achieving competency and proficiency before performing any ultrasound-guided vascular procedure.

Vascular Access: 2018 Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS) [7]

Study Design

The study presents the 2018 Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS) for vascular access in patients undergoing hemodialysis. The guidelines were developed by the ESVS Guidelines Committee, which performed a systematic literature search and used a grading system based on the European Society of Cardiology (ESC) guidelines methodology.

Target Population

The guidelines are intended for surgeons and physicians involved in the care of patients with hemodialysis and vascular access. The target population includes patients with chronic kidney disease (CKD) stage 5, end-stage renal disease (ESRD), and those requiring renal replacement therapy.

Key Factors: Epidemiology of CKD and ESRD: Incidence, prevalence, and demographics of CKD stage 5 and ESRD. **Clinical Decision Making**: Choice of type of vascular access, timing of referral for vascular access surgery, and selection of vascular access modality.

Pre-operative Imaging: Methods for pre-operative assessment and imaging for vascular access surveillance. **Creation of Vascular Access**: Technical aspects, peri-operative assessment, and complications. **Surveillance of Vascular Access**: Access maturation, care,

monitoring, and surveillance. **Late Vascular Access Complications**: True and false access aneurysms, infection, stenosis, thrombosis, and central venous occlusive disease.

ANALYSIS OF EVIDENCE

Analysis [6,7]:

Both articles provide strong evidence supporting the use of ultrasound-guided vascular access. In conclusion, both articles reiterate the findings that ultrasound-guided vascular access improves success rates, reduces complications, and is cost-effective. However, they differ in their scope, target population, and specific recommendations.

Shared Conclusions

Both articles emphasize the importance of ultrasound-guided vascular access in improving success rates and reducing complications. They highlight the benefits of ultrasound guidance in terms of safety, efficacy, and cost-effectiveness.

POLICY HISTORY

Date	Summary
May 2026	• Added Limitations section • Edited Background • Added code descriptions
July 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• No substantial clinical content changes • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices
January 2025	• This guideline replaces UM CARDIO_1453 for Ultrasound-Guided Vascular Access • Clinical indications were updated per societal guidance

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7342 for Venous Duplex

Guideline Number: Evolent_CG_7342	Applicable Codes	
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Original Date: April 2011	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Venous Duplex.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Upper Extremity (UE)

Venous Duplex Ultrasound of the upper extremity is appropriate for the following:

- Swelling
  - Acute:
    - Unilateral **(AUC Score 9)** [6]

- Bilateral (i.e., suspected central venous obstruction) **(AUC Score 8)** [6]

- Chronic, persistent
  - Unilateral **(AUC Score 7)** [6]
  - Bilateral (i.e., suspected central venous obstruction and no alternative diagnosis identified such as heart failure (HF) or hypoalbuminemia) **(AUC Score 7)** [6]

- Pain
  - Evidence of superficial thrombophlebitis (tender, palpable cord in UE) **(AUC Score 8)** [6]
- Venous Malformation **(AUC Score 9)** [7]
  - Known or suspected as evidenced by:
    - Swelling, pain
    - Discoloration or ulceration
    - Thrill or vascular bruit
- Pulmonary embolism (PE)
  - Diagnosed or suspected PE in the presence of indwelling UE venous catheter or device *(i.e., pacemaker, ICD)* **(AUC Score 6)** [6]
- Venous Thrombosis
  - Suspected deep vein thrombosis (DVT) **(AUC Score 9)** [8]
  - Known DVT with new UE pain or swelling while on anticoagulation, or not on anticoagulation due to contraindication **(AUC Score 7)** [6]
  - Surveillance after diagnosis of UE superficial thrombophlebitis **(AUC Score 6)** [6]
    - Not on anticoagulation with phlebitis ≤5 cm from deep vein junction **(AUC Score 6)** [6]
- Thoracic Outlet Syndrome
  - Vascular (venous or arterial) **(AUC Score 9)** [9]
    - For initial evaluation and post-intervention follow-up
  - Neurogenic **(AUC Score 6)** [9]
    - For initial evaluation and post-intervention follow-up
- Vein Mapping
  - For coronary or peripheral vessel bypass surgery, when there are no adequate leg veins for harvesting **(AUC Score 8)** [6]
  - For hemodialysis access:
    - Preoperative mapping study, <3 months prior to access placement **(AUC Score 8)** [6]
    - "Failure to mature" on basis of physical exam:

- □ 0-6 weeks after placement **(AUC Score 6)** [6]
- □ > 6 weeks after placement **(AUC Score 8)** [6]

Lower Extremity (LE)

Venous Duplex Ultrasound of the lower extremity (LE) is appropriate for the following:

- Swelling
  - Acute
    - Unilateral **(AUC Score 9)** [6]
    - Bilateral **(AUC Score 8)** [6]
  - Chronic, persistent
    - Unilateral **(AUC Score 7)** [6]
    - Bilateral (and no alternative diagnosis identified such as HF or hypoalbuminemia) **(AUC Score 6)** [6]
- Pain
  - Non-articular, thigh or calf **(AUC Score 7)** [6]
  - Evidence of superficial thrombophlebitis (tender, palpable cord in LE) **(AUC Score 8)** [6]
- Venous Malformation **(AUC Score 9)** [7]
  - Known or suspected
    - Swelling, pain
    - Discoloration or ulceration
    - Thrill or vascular bruit
- Pulmonary embolism [6,10]
  - Suspected PE-*initial* imaging (**Wells criteria** for assessing Pre-Test Probability (PTP)) **(AUC Score 8)** [6]
    - High PTP
    - Pregnant patient
  - Diagnosed PE **(AUC Score 7)** [6]
- Venous Thrombosis [6,11]
  - Suspected DVT **(AUC Score 9)** [11]
  - Surveillance of calf vein thrombosis for propagation within 2 weeks of diagnosis in patient with contraindication to anticoagulation **(AUC Score 7)** [6]
  - Known DVT with new LE pain or swelling:
    - While on anticoagulation **(AUC Score 7)** [6]

- Not on anticoagulation (i.e. due to contraindication) **(AUC Score 8)** [6]
  - Surveillance of LE superficial thrombophlebitis
    - Not on anticoagulation with phlebitis ≤5 cm from deep vein junction **(AUC Score 7)** [6]
- Vein Mapping [6]
  - For coronary or peripheral vessel bypass surgery vein harvest, with or without prior lower extremity vein harvest or ablation procedure **(AUC Score 8)** [6]
  - Prior to surgical procedures [12]
  - For assessment of dialysis access [12]
- Post-endovascular (Great or Small) Saphenous Vein Ablation
  - LE swelling or pain **(AUC Score 8)** [6]
  - Routine follow-up within 10 days of procedure, no LE pain or swelling **(AUC Score 7)** [6]
- Chronic Venous Disease **(AUC Score 9)** [13]
  - Initial diagnosis
    - Varicose veins
    - Suspected iliocaval or LE disease with severe post-thrombotic changes
    - Venous leg ulcer
- Other Symptoms or Signs of Vascular Disease
  - Venous obstruction noted on physiologic testing (i.e. plethysmography) **(AUC Score 7)** [6]
  - Suspected paradoxical embolism in patient with patent foramen ovale **(AUC Score 7)** [6]

CODING AND STANDARDS

Codes

Code	Description
93970	Duplex scan of extremity veins including responses to compression and other maneuvers; complete bilateral study
93971	Duplex scan of extremity veins including responses to compression and other maneuvers; unilateral or limited study

Code	Description
93985	Duplex scan of arterial inflow and venous outflow for preoperative vessel assessment prior to creation of hemodialysis access; complete bilateral study
93986	Duplex scan of arterial inflow and venous outflow for preoperative vessel assessment prior to creation of hemodialysis access; complete unilateral study

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Wells Criteria [14]

Pretest probability (PTP) assessment is an important step in the diagnosis of pulmonary embolism because correct interpretation of subsequent testing depends upon it. The Wells criteria, a points-based scoring system, have been extensively validated and are widely used to determine the PTP of pulmonary embolism.

Criterion	Points
Clinical signs of DVT	3.0
Recent surgery/immobilization	1.5
Heart rate > 100 bpm	1.5
Previous history of PE/DVT	1.5
Hemoptysis	1.0
Malignancy	1.0

Criterion	Points
Alternative Diagnosis less likely than PE	3.0

Table 1: Pretest probability - Low < 2pts, Intermediate 2-6 pts, High > 6pts

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

BPM: beats per minute

DVT: deep vein thrombosis

HF: heart failure

ICD: implantable cardioverter defibrillator

LE: lower extremity

PE: pulmonary embolism

PTP: pretest probability

UE: upper extremity

SUMMARY OF EVIDENCE

ACCF/ACR/AIUM/ASE/IAC/SCAI/SCVS/SIR/SVM/SVS/SVU 2013 Appropriate Use Criteria for Peripheral Vascular Ultrasound and Physiological Testing Part II: Testing for Venous Disease and Evaluation of Hemodialysis Access [6]

Study Design: This document is a report by the American College of Cardiology Foundation Appropriate Use Criteria Task Force. It includes a review of common clinical scenarios where noninvasive vascular testing is frequently considered. The indications were developed by a diverse writing group and scored by an independent technical panel.

Target Population: Patients undergoing peripheral vascular ultrasound and physiological testing for venous disease and evaluation of hemodialysis access.

Key Factors: The document provides appropriate use criteria for various clinical scenarios, including upper and lower extremity venous duplex ultrasound, duplex evaluation of the inferior vena cava and iliac veins, hepatoportal and renal venous evaluation, and hemodialysis vascular

access duplex ultrasound. The criteria are intended to guide clinicians in making decisions regarding the use of vascular ultrasound and physiological testing.

ACR Appropriateness Criteria® Clinically Suspected Vascular Malformation of the Extremities [7]

Study Design: This publication includes evidence-based guidelines developed by a multidisciplinary expert panel. The guidelines are reviewed annually and involve an extensive analysis of current medical literature from peer-reviewed journals.

Target Population: Patients with clinically suspected vascular malformations of the extremities.

Key Factors: The guidelines recommend various imaging modalities for the initial assessment of suspected vascular malformations, including MR angiography, MRI, CT angiography, and ultrasound duplex Doppler. The choice of imaging modality depends on the clinical presentation and the specific characteristics of the suspected vascular malformation.

ACR Appropriateness Criteria® Suspected Upper Extremity Deep Vein Thrombosis [8]

Study Design: This publication includes evidence-based guidelines developed by a multidisciplinary expert panel. The guidelines are reviewed annually and involve an extensive analysis of current medical literature from peer-reviewed journals.

Target Population: Patients with suspected upper extremity deep vein thrombosis (UEDVT).

Key Factors: The guidelines recommend ultrasound duplex Doppler as the most appropriate imaging modality for assessing UEDVT. CT venography and MR venography are appropriate for assessing central venous structures, while catheter venography is appropriate if therapy is required. Radionuclide venography and chest radiography are usually not appropriate.

ANALYSIS OF EVIDENCE

Analysis [6–8]:

In summary, while all three articles highlight the importance and diagnostic accuracy of venous duplex ultrasound, they differ in their focus on specific clinical scenarios, imaging techniques, and recommendations for particular conditions. "Desjardins et al. (2020)" focuses on UEDVT, "Gornik et al. (2013)" provides a comprehensive overview of peripheral vascular ultrasound applications, and "Obara et al. (2019)" emphasizes the evaluation of vascular malformations. These differences reflect the diverse applications and clinical utility of venous duplex ultrasound in various vascular conditions.

Shared Conclusions

- **Importance of Venous Duplex Ultrasound**: All three articles emphasize the importance of venous duplex ultrasound (US) as a primary imaging modality for evaluating venous diseases and vascular malformations. It is highlighted as a non-invasive, effective, and widely available tool for initial assessment and diagnosis.

- **Diagnostic Accuracy**: Venous duplex ultrasound is recognized for its high diagnostic accuracy in identifying venous thrombosis and vascular malformations. It can visualize thrombus, assess blood flow patterns, and evaluate the extent of vascular involvement.
- **Clinical Utility**: The articles agree on the clinical utility of venous duplex ultrasound in guiding treatment decisions, monitoring disease progression, and evaluating treatment response. It is considered a valuable tool for both initial diagnosis and follow-up.

POLICY HISTORY

Date	Summary
May 2026	• Added indications for Lower Extremity Vein Mapping • Updated references • Added technical description to codes
July 2025	• Added a Summary of Evidence and Analysis of Evidence
May 2025	• No substantial clinical content changes • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Updated AUC Scores • Applicable Line of Business adjusted – Checked Medicare

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

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Evolent Clinical Guideline 7343 for Mechanical Circulatory Support - Percutaneous and Permanent

Guideline Number: Evolent_CG_7343	**Applicable Codes**	
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Original Date: February 2020	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for the utilization of Mechanical Circulatory Support/Ventricular Assist Devices (VAD).

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR MECHANICAL CIRCULATORY SUPPORT (LVAD)

Overview

Mechanical Circulatory Support (MCS or Ventricular Assist) Devices are indicated for management of patients presenting with advanced heart failure (see **Definitions**) refractory to the administration of maximally tolerated Guideline Directed Medical Therapy (GDMT) when heart transplantation is not immediately available. The approach to MCS is dependent on the

clinical scenario. MCS may be used as a bridge to recovery, when return of satisfactory ventricular function is anticipated; as bridge to transplantation in critically ill patients listed for heart transplantation (OHT); and as destination therapy when the patient is not a candidate for transplantation. These designations are not rigid and may change as the patient's clinical course evolves.

Bridge to Recovery [6,7]

Potentially fatal low cardiac output in situations where recovery is possible or probable. Clinical scenarios for MCS for Bridge to Recovery include:

- Acute myocardial infarction complicated by cardiogenic shock [8] (**AUC Score 8**)
- Acute myocarditis with shock [8] (**AUC Score 8**)
- Acute cardiac failure following cardiac surgery [8,9] (**AUC Score 8**)
- MCS using a nondurable (temporary) support device is recommended in patients with multiorgan failure, sepsis, or on mechanical ventilation to allow successful optimization of clinical status and neurological assessment before consideration of a long-term device. [8] (**AUC Score 7**)
- Dilated nonischemic cardiomyopathy of recent onset refractory to maximally tolerated GDMT [8] (**AUC Score 9**)
- Post-cardiotomy shock with failure to wean from cardiopulmonary bypass [9]
- For patients with severe renal dysfunction, initial support with a nondurable MCS (temporary device) to assess for potential of renal recovery before implanting durable MCS may be undertaken. [8] (**AUC Score 5**)

Bridge to Transplantation [6]

- Device must be FDA-approved for bridge-to-transplant use and used according to labeling instructions. These are durable devices, and include extracorporeal MCS, implantable MCS, and total artificial heart (TAH) **AND**
- The patient must be approved and listed as a candidate for heart transplantation or be undergoing evaluation of candidacy by an interdisciplinary patient selection committee [10] (**AUC Score 8**) **AND**
- NHYA class IV symptoms despite optimal GDMT or patients deemed to be dependent on IV inotropes. [11] (**AUC SCORE 8**)

Clinical Scenarios for MCS for Bridge to Transplantation MCS include [6]:

- Severe reductions in cardiac output or noncardiac-co-morbidities such that survival and successful cardiac transplantation are unlikely without mechanical circulatory support [10] (**AUC Score 8**)
- Impending cardiogenic shock despite inotropic support and intra-aortic balloon pump (±IABP) in presence of acute renal dysfunction (creatinine > 2.0) that is deemed secondary to insufficient renal blood flow and is unresponsive to inotropic support [10] (**AUC Score 8**)

- Pulmonary hypertension (PA systolic pressure > 60) that persists despite optimal medical and inotropic therapy (**AUC Score 8**)
- In patients with treatment-refractory recurrent sustained ventricular tachycardia or ventricular fibrillation in the presence of an untreatable arrhythmogenic substrate (e.g., giant cell myocarditis, scar, sarcoidosis), biventricular support or a TAH is preferred over isolated left ventricular (LV) support [8,10] (**AUC Score 7**)

Destination Therapy (DT) or Long-term therapy [6]

- Device must be FDA-approved for destination therapy use and used according to labeling instructions (**AUC Score 8**), **AND**
- Patients with a major contraindication to cardiac transplantation (**AUC Score 8**), **AND**
- Dependence on intravenous inotropic support [7] (**AUC Score 8**), **OR**
- Class IV heart failure with expected mortality exceeding 50% in one year despite maximum GDMT [7] (**AUC Score 8**)

INDICATIONS FOR RIGHT VENTRICULAR ASSIST DEVICE IMPLANTATION/UTILIZATION [8]

- Support with a right ventricular assist device (RVAD) should be performed in patients with medically refractory RV failure after durable left ventricular assist device (LVAD) implantation
- Patients with high-risk preoperative features for right ventricular failure may undergo planned RVAD implantation before worsening of cardiogenic shock

CONTRAINDICATIONS FOR VENTRICULAR ASSIST DEVICE [8]

Absolute Contraindications [9,11,12]

- Irreversible hepatic disease
- Irreversible renal disease (GFR < 30, not expected to recover)
- Irreversible neurological disease (e.g. severe dementia, major recent stroke)
- Patient refusal of medical adherence that is necessary for post-operative recovery
- Severe psychosocial limitation
- Severely restricted pulmonary function
- Neuromuscular or musculoskeletal disease that impairs rehabilitation

- Active systemic infection
- Prolonged intubation
- Severe, uncorrectable right ventricular failure (for isolated LVAD)
- Small LV cavity size (LVEDD < 4.5 cm for LVAD)
- Severe aortic regurgitation (unless corrected)
- Severe tricuspid/pulmonary valve disease
- Severe technical/surgical barriers (e.g. hostile mediastinum, chest wall deformity)
- Untreated/active malignancy with < 2 years life expectancy
- Severe peripheral vascular disease (PVD)
- Active substance use
- Impaired cognitive function
- Unstable psychiatric conditions
- Lack of social support
- DMCS is relatively contraindicated in the setting of diabetes-related proliferative retinopathy, very poor glycemic control, severe nephropathy, vasculopathy, or peripheral neuropathy*
- Active pregnancy [8]

***NOTE:** Durable MCS may be used in selected members with manageable PVD [10]

Relative Contraindications [8,10]

- Advanced age (> 80 years old)
- Severe obesity (BMI >35–40) or severe cachexia
- Severe pulmonary disease not amenable to transplant/VAD
- Severe non-cardiac comorbidities

CODING AND STANDARDS

Codes

Code	Description
33975	Insertion of ventricular assist device; extracorporeal, single ventricle
33976	Insertion of ventricular assist device; extracorporeal, biventricular

Code	Description
33979	Insertion of ventricular assist device, implantable intracorporeal, single ventricle
33980	Removal of ventricular assist device, implantable intracorporeal, single ventricle
33981	Replacement of extracorporeal ventricular assist device, single or biventricular, pump(s), single or each pump
33982	Replacement of ventricular assist device pump(s); implantable intracorporeal, single ventricle, without cardiopulmonary bypass
33983	Replacement of ventricular assist device pump(s); implantable intracorporeal, single ventricle, with cardiopulmonary bypass
33991	Insertion of ventricular assist device, percutaneous, including radiological supervision and interpretation; left heart, both arterial and venous access, with transseptal puncture
33995	Insertion of ventricular assist device, percutaneous, including radiological supervision and interpretation; right heart, venous access only
33997	Removal of percutaneous right heart ventricular assist device, venous cannula, at separate and distinct session from insertion

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Bridge to Recovery

This category of MCS includes the use of nondurable percutaneous support devices (VADs), which are used for cardiogenic shock when the risk of implantation of a durable device is prohibitive or recovery of function after short-term support is anticipated. These devices are removed once clinical recovery has occurred, or at the time of implantation of durable MCS. Under certain conditions, durable LVADs may be implanted as a bridge to recovery when the recovery period is anticipated to be prolonged.

Nondurable MCS devices include:

- Intra-Aortic Balloon Counter-Pulsation (IABP)
- Extracorporeal Membrane Oxygenation (ECMO)
- Extracorporeal MCS pump (implanted via sternotomy)
- Percutaneous MCS pump

Bridge to Transplantation

Implantation of a durable LVAD in patients who are eligible for cardiac transplantation but in whom a donor heart is not available in the setting of refractory Class IV heart failure requiring inotropic support despite maximally tolerated GDMT

Destination Therapy

Implantation of a durable LVAD in patients who have refractory Class IV heart failure requiring inotropic support despite maximally tolerated GDMT but are not candidates for heart transplantation.

Right Ventricular Assist Devices (RVADs)

Right heart failure after LVAD implantation may be managed medically in many cases. RVAD is indicated when hemodynamic indices fail to improve with medical therapy, and before end-organ damage is encountered. Both ECMO and RVAD have been used to support RV recovery after LVAD implantation. Newer percutaneous RVAD devices provide hemodynamic unloading comparable to surgical devices with less morbidity and may be appropriate for selected patients. [8]

Definitions

Advanced Heart Failure: Consensus for this definition is difficult to achieve but is widely accepted to include: (1) Clinically significant circulatory compromise with class IV symptoms and requiring inotropic support; (2) Frequent hospitalizations for heart failure, resulting in consideration of heart transplantation or resulting in anticipated life expectancy < 2 years; and (3) Interference with activities of daily living. [11] Objective measurements may include $VO_2 \leq 14$ ml/kg/min, or 6-min walk distance < 300 m. Patients may manifest intolerance to recommended heart failure therapy due to hemodynamic instability.

Clinical manifestations of advanced heart failure include, but are not limited to, the following [11]:

- Left ventricular ejection fraction (LVEF) ≤ 30%
- Inotrope dependence
- Frequent hospitalizations for heart failure (HF) in the past 12 months
- Refractory clinical congestion
- Progressive deterioration in renal or hepatic function
- Worsening right-sided HF or secondary pulmonary hypertension
- Low systolic blood pressure (SBP) ≤ 90 mm Hg
- Cardiac cachexia
- Persistent hyponatremia (serum sodium, < 134 mEq/L)
- Refractory or recurrent ventricular arrhythmias; frequent ICD shocks
- Increased predicted 1-year mortality (e.g., > 20%) according to HF survival models (e.g., MAGGIC, SHFM)

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

DMCS: Durable Mechanical Circulatory Support

DT: Destination Therapy

ECMO: Extracorporeal Membrane Oxygenation

GDMT: Guideline-Directed Medical Therapy

HF: Heart Failure

IABP: Intra-Aortic Balloon Counter-Pulsation

LVAD: Left Ventricular Assist Device

LVEF: Left Ventricular Ejection Fraction

MAGGIC: Meta-analysis Global Group in Chronic Heart Failure

MCS: Mechanical Circulatory Support

PVD: Peripheral Vascular Disease

RVAD: Right Ventricular Assist Device

SHFM: Seattle Heart Failure Model

TAH: Total Artificial Heart

VAD: Ventricular Assist Device

SUMMARY OF EVIDENCE

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure [11]

Study Design: This document is a clinical practice guideline for the management of heart failure, developed by the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines.

Target Population: The guidelines are intended for clinicians to prevent, diagnose, and manage patients with heart failure.

Key Factors: The guidelines are based on a comprehensive literature search from May 2020 to December 2020, including studies, reviews, and other evidence conducted on human subjects published in English. The recommendations present an evidence-based approach to managing patients with heart failure, aiming to improve quality of care and align with patients' interests. The document includes sections on the definition of heart failure, stages of heart failure, initial and serial evaluation, management strategies, and special populations.

Mechanical circulatory support: registering a therapy in evolution [6]

Study Design: This document discusses the development and application of mechanical circulatory support systems, including the establishment of the Interagency Registry for Mechanically Assisted Circulatory Support (INTERMACS).

Target Population: The majority of mechanical circulatory support patients are between the ages of 50 and 70 years, with 90% of patients in the highest levels of clinical instability before implantation.

Key Factors: The document covers the developmental history of mechanical circulatory support, profiles of disease severity, device strategies, and current outcomes. It highlights the importance of detailed longitudinal data on patients receiving long-term mechanical circulatory support and the need for rigorous data collection to evaluate the utility and associated adverse outcomes of these devices. The document also discusses the standardization of adverse event definitions and the impact of device type, location, and strategy on patient outcomes.

The 2023 International Society for Heart and Lung Transplantation Guidelines for Mechanical Circulatory Support: A 10- Year Update [8]

Study Design: This document is an update to the 2013 International Society for Heart and Lung Transplantation Guidelines for Mechanical Circulatory Support.

Target Population: The guidelines pertain to patients treated with implantable left ventricular assist devices (LVADs) and other configurations of durable mechanical circulatory support (DMCS).

Key Factors: The update includes new information on the HeartMate III and the discontinuation of the HVAD, as well as changes in the approval categories for LVADs by the Centers for Medicare and Medicaid Services. The guidelines are organized into nine task forces covering preoperative, intraoperative, and postoperative management of DMCS patients. The document emphasizes the importance of selecting candidates for DMCS, optimizing patient care, and managing risk factors before, during, and after implantation.

ANALYSIS OF EVIDENCE

Shared Findings [6,8,11]

- Role of VADs: All three documents emphasize the importance of VADs in managing advanced heart failure, particularly as a bridge to transplantation or as destination therapy.
- Patient Selection: They highlight the need for careful patient selection and risk assessment to optimize outcomes.
- Technological Advancements: The documents acknowledge the significant advancements in VAD technology and the impact on patient outcomes.

Conclusion [6,8,11]

In summary, while all three documents recognize the critical role of VADs in managing advanced heart failure, they differ in their scope, focus, and the specific aspects of VAD technology and patient management they emphasize. The guidelines and recommendations provided by these documents collectively contribute to a comprehensive understanding of the use of VADs in clinical practice.

POLICY HISTORY

Date	Summary
April 2026	• AUC Score added • CPT Code table and descriptions added • Contraindications section expanded • References updated
June 2025	• Added a Summary of Evidence and Analysis of Evidence

Date	Summary
May 2025	• Shortened guideline name from Mechanical Circulatory Support (Ventricular Assist Device) - Percutaneous and Permanent to Mechanical Circulatory Support - Percutaneous and Permanent • Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices • Edited text for clarity • Removed AUC score and code description • Adjusted applicable lines of business – Medicare Advantage checked
January 2025	• This guideline replaces UM CARDIO_1390 Ventricular Assist Device (VAD) - Percutaneous and Permanent • Indications updated per societal guidance • Removed bullet-point for “Age greater than 80 for destination therapy” from the Contraindications section

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members’ health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7345 for Wireless Pulmonary Artery Pressure Device Placement and Monitoring

Guideline or Policy Number: Evolent_CG_7345	**Applicable Codes**	
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Original Date: June 2020	**Last Revised Date:** April 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for the implantation of a Wireless Invasive Pulmonary Artery Pressure Monitoring device and ongoing data collection. Wireless pulmonary artery pressure monitors are implantable devices that monitor the pressure in the pulmonary artery and output data to an external analyzer.

Special Note

Guideline Directed Medical Therapy (GDMT)

Documentation is required confirming that patient is receiving optimal GDMT for heart failure, including standard medication (and, as indicated, coronary revascularization and biventricular pacing).

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

- Patients with **New York Heart Association (NYHA)** Class II or III Heart Failure (HF) (systolic or diastolic) with any of the following [6,7]
  - Hospitalization for heart failure in the past year
  - Persistent or worsening symptoms when hemodynamics are uncertain
  - Elevated natriuretic peptides

Limitations

Implantable hemodynamic monitoring is not recommended for patients with [7]:

- An inability to take dual antiplatelet or anticoagulants for one-month post implant
- A history of recurrent pulmonary embolism or deep vein thrombosis
- A right-sided mechanical valve

CODING AND STANDARDS

Codes

Code	Description
33289	Transcatheter implantation of wireless pulmonary artery pressure sensor for long-term hemodynamic monitoring, including deployment and calibration of the sensor, right heart catheterization, selective pulmonary catheterization, radiological supervision and interpretation, and pulmonary artery angiography, when performed
93264	Remote monitoring of a wireless pulmonary artery pressure sensor for up to 30 days, including at least weekly downloads of pulmonary artery pressure recordings, interpretation(s), trend analysis, and report(s) by a physician or other qualified health care professional

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid

☒	Medicare Advantage

BACKGROUND

NYHA Functional Classification for Heart Failure

The NYHA classes of heart failure is the most commonly used system to classify stages of heart failure. [8] Classes are based on physical activity limitations.

- Class I: No limitation of functional activity. Ordinary physical activity does not cause undue fatigue, heart palpitations, or shortness of breath
- Class II: Slight limitation of activity. Comfortable at rest but ordinary physical activity results in in fatigue, heart palpitations, shortness of breath or chest pain.
- Class III: Marked limitations on physical activity. Comfortable at rest, but less than ordinary activity causes fatigue, heart palpitations, shortness of breath or chest pain
- Class IV: Symptoms of HF at rest. Any physical activity increases discomfort

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

GDMT: Guideline-Directed Medical Therapy

HF: Heart Failure

NYHA: New York Heart Association

SUMMARY OF EVIDENCE

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure [6]

Study Design: This document is a clinical practice guideline by the American College of Cardiology/American Heart Association/Heart Failure Society of America (ACC/AHA/HFSA) for the management of heart failure. It includes recommendations based on systematic literature reviews and expert consensus.

Target Population: Patients with heart failure, including those with reduced ejection fraction (HFrEF), preserved ejection fraction (HFpEF), mildly reduced ejection fraction (HFmrEF), and improved ejection fraction (HFimpEF).

Key Factors:

- **Epidemiology:** The document provides data on the prevalence of heart failure and discusses risk factors such as hypertension, diabetes, obesity, and atherosclerotic cardiovascular disease.
- **Stages of Heart Failure:** It outlines the ACC/AHA stages of heart failure, emphasizing the development and progression of the disease.
- **Diagnostic Algorithm:** Recommendations for the classification of heart failure based on left ventricular ejection fraction (LVEF) and diagnostic criteria.
- **Management:** Guidelines for the use of guideline-directed medical therapy (GDMT), including ACE inhibitors, ARBs, ARNIs, beta blockers, MRAs, and SGLT2 inhibitors. Recommendations for nonpharmacological interventions such as exercise training, cardiac rehabilitation, and dietary sodium restriction.
- **Special Populations:** Management strategies for patients with comorbidities, including atrial fibrillation, coronary artery disease, and diabetes.

Hemodynamic Monitoring Devices in the Management of Outpatient Heart Failure [7]

Study Design: This document is a comprehensive review of hemodynamic monitoring devices in the management of outpatient heart failure. It includes evidence from clinical trials and studies on the efficacy and safety of various devices.

Target Population: Patients with heart failure, including those with New York Heart Association (NYHA) class II to IV symptoms.

Key Factors:

- **Historical Perspective:** The document discusses the development of implantable hemodynamic monitoring (IHM) devices and their role in heart failure management.
- **CardioMEMS HF System:** Detailed information on the FDA-approved CardioMEMS HF system, including its design, implantation procedure, and clinical trial results showing a reduction in heart failure hospitalizations.
- **Cordella PAP Sensor System:** Information on the investigational Cordella PAP sensor system, including its design, clinical trials, and potential benefits in heart failure management.
- **Vectorious LAP Monitor System:** Description of the Vectorious left atrial pressure (LAP) monitor system, its implantation procedure, and clinical trial results showing good correlation between LAP measurements and pulmonary capillary wedge pressures.
- **FIRE1 System:** Information on the FIRE1 device, which measures the inferior vena cava (IVC) area and its changes over time, and its potential role in heart failure management.
- **Noninvasive Hemodynamics:** Discussion on noninvasive hemodynamic monitoring

technologies, including Remote Dielectric Sensing (ReDS) and MicroCor, and their potential benefits in heart failure management.

ANAYLYSIS OF EVIDENCE

Shared Findings [6,7]

Both articles emphasize the importance of hemodynamic monitoring in managing HF and highlight the effectiveness of wireless PAP devices in reducing HF hospitalizations.

Clinical Benefits

- **Reduction in HF Hospitalizations**: Both studies report significant reductions in HF hospitalizations with the use of PAP devices. Heidenreich et al. (2022) mention that the CHAMPION trial showed a 37% reduction in HF-related hospitalizations 1. Similarly, Lundgren et al. (2023) note a 37% reduction in HF hospitalizations in the CHAMPION trial and a 44% reduction in the MONITOR-HF trial.
- **Improvement in Quality of Life**: Lundgren et al. (2023) highlight improvements in the Kansas City Cardiomyopathy Questionnaire scores, indicating better quality of life for patients using PAP devices 2. Heidenreich et al. (2022) also mention improvements in patient outcomes and quality of life.

Safety Profile

- **Safety and Efficacy**: Both articles confirm the safety and efficacy of PAP devices. Heidenreich et al. (2022) report a strong safety profile with 98.6% freedom from device-related complications 1. Lundgren et al. (2023) also emphasize the safety of PAP devices, noting no device-related complications in the SIRONA and SIRONA II trials.

Both articles provide strong evidence supporting the use of wireless PAP devices in HF management, particularly in reducing hospitalizations and improving patient outcomes. Lundgren et al. (2023) offer a more comprehensive overview of specific devices and their economic impact, while Heidenreich et al. (2022) focuses on the general clinical benefits and safety profile. Together, these findings underscore the potential of PAP devices to enhance HF management and patient quality of life.

POLICY HISTORY

Date	Summary
April 2026	• NYHA section in Background updated. • Acronyms/Abbreviations section added. • Added CPT code table with descriptions.
June 2025	• Updated citations

Date	Summary
	● Added third bullet to General Information ● Added Summary of Evidence and Analysis of Evidence

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

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Evolent Clinical Guideline 7347 for Venography, Venous Angioplasty and Stenting

Guideline Number: Evolent_CG_7347	**Applicable Codes**	
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Original Date: January 2027	**Last Revised Date:** June 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for venogram/invasive vein mapping and percutaneous iliocaval intervention of the inferior vena cava, iliac, and common femoral veins. Conventional venography is an invasive procedure that uses X-rays and a contrast dye to create images of vein(s) for anatomic localization and hemodynamic quantification when a non-invasive study like venous duplex ultrasound or computed tomography (CT) venous phase is limited.

Special Note

Providers must involve patients in a shared decision-making process involving reason(s) for, as well as the type of procedure(s) that could be used including continued conservative treatment, and their potential outcomes. If a stent is to be inserted, the potential for stent migration and death must be included. The possibility of continued symptoms despite therapy as well as the need for subsequent procedures must also be discussed. This process must be reflected in notes provided.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a

robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS FOR VENOGRAPHY [6]

When any **ONE** of the following are met:

- Diagnosis of deep vein thrombophlebitis, when **BOTH** of the following conditions are met:
  - Duplex ultrasound is limited or negative, but with a high clinical suspicion for deep vein thrombophlebitis
  - Patient is not a candidate for CT or magnetic resonance (MR) venogram or CT or MR venogram is limited
- Venous mapping before or during a procedure or dialysis access creation
- Evaluation of venous conditions, including any **ONE** of the following:
  - Perforator incompetency before sclerotherapy, thermal ablation, or subfascial endoscopic ligation
  - Venous stenosis (excluding a dialysis circuit), venous hypertension, venous malformations, or aneurysm
  - Valvular insufficiency before treatment (eg, thermal ablation, stripping, ligation) when duplex ultrasound is unavailable or unreliable
  - Anatomic entrapment (eg, Thoracic outlet syndrome (Paget-Schroetter Syndrome))
  - Deep pelvic, thoracic, or caval thrombosis in patients who are not candidates for CT or MR venogram or when CT or MR venogram is limited
  - Evaluation of acute iliofemoral thrombophlebitis or brachiocephalic venous thrombosis
- Preoperative evaluation for tumor involvement or encasement in patients that are not a candidate for CT or MR venogram or when CT or MR venogram is limited
- Evaluation for central venous catheter (CVC) placement or fibrin sheath, when anatomic landmarks or duplex ultrasound are not feasible, or in patients that are not a candidate for CT or MR venogram or when CT or MR venogram is limited
  - May also be reasonable to assess the patency of a CVC when malfunction is suspected
- Evaluation of possible iliac vein stenosis or obstruction prior to angioplasty/stent placement, when any **ONE** of the following criteria are met [6–11]:
  - Post-thrombotic syndrome (PTS) with limiting swelling or venous claudication
  - Prior inferior vena cava filter, iliocaval intervention, or CVC
  - Symptomatic unilateral C3 swelling, especially if left-sided

- Bilateral C3 swelling extending above the knee (or elbow for upper extremity) or severe calf swelling, if **NONE** of the following apply:
  - Obesity
  - Advanced age
  - Congestive heart failure (CHF)
  - Medications (eg, calcium channel blockers)
  - Water overload or retention
  - Renal dysfunction
  - Malignancy
  - Prior radiation
  - Lymph node involvement or surgery
  - Other causes of lymphedema
- Varicosities of the lower abdominal wall and groin
- Ipsilateral recurrent leg deep vein thrombophlebitis
- CEAP C5-6 (see **Definitions** section) with truncal, perforator, or superficial venous reflux absent or previously treated
- CEAP C3 or C4 (see **Definitions** section) and any **ONE** of the following:
  - Duplex ultrasound or CT or MR venogram suggestive of iliofemoral stenosis
- Pelvic congestion syndromes when interventional treatment is planned [12]

CONTRAINDICATIONS FOR VENOGRAPHY [6]

- Severe allergy to iodinated or other contrast media

INDICATIONS FOR VENOUS ANGIOPLASTY AND STENTS

Iliocaval

It is expected that before a request is made for Iliocaval angioplasty or stent there will be a full clinical evaluation including appropriate noninvasive studies. If, based on such a workup suspicion is high that there is a stenosis that warrants treatment, confirmatory venography and intravascular ultrasound should be performed concurrent with the angioplasty or stent.

- Venous stenosis ≥ 50% confirmed by **ALL** of the following [13]:
  - Intravascular ultrasound
  - Venography

- Performed in the anteroposterior (AP) as well as steep oblique views
- In a well hydrated patient

Subclavian and Brachiocephalic [14]

Interventions on the subclavian and brachiocephalic veins can usually be based on clinical information supplemented by CT angiography with venous phase or MR venography. Accordingly, intervention should usually be performed concurrent with the venogram. Subclavian and brachiocephalic interventions are indicated when **BOTH** of the following are met:

- Venous stenosis ≥ 50% confirmed by venography, or intravascular ultrasound if venography fails to adequately document the stenosis
- **AND** any **ONE** of the following:
  - Paget-Schroetter syndrome (ie, effort thrombosis)
  - Fibrin sheath via separate access from a central line catheter
  - Brachiocephalic vein thrombophlebitis or scarring secondary to phlebitis or catheterization

LIMITATIONS TO VENOUS ANGIOPLASTY AND STENTS [7,8,11]

The following criteria are rarely considered appropriate for stenting:

- Non-ambulatory patients
- Incidentally identified venous stenosis on imaging performed for other indications
- Non-thrombotic iliac vein lesions (NIVL)
  - In a patient with mild symptoms or findings (ie, CEAP ≤ 3) where swelling, if present, is limited to the calf and controlled with stockings
  - In the presence of bilateral leg swelling in patients with other causes for swelling
  - With dynamic venous lesions where the severity of stenosis varies with factors that include hydration, respiration, position, Valsalva maneuvers, phasicity, or other variation in intraabdominal pressure
  - In patients ≥ 80 years of age with bilateral leg swelling
  - Prophylactic stent placement in asymptomatic patients to prevent possible future venous thromboembolism events

CONTRAINDICATIONS TO VENOUS ANGIOPLASTY AND STENTS

- Active infection: Presence of systemic or local infections at the planned intervention site
- Severe comorbidities: Conditions that significantly increase procedural risk or limit life expectancy
- Uncorrected coagulopathy: Bleeding disorders that cannot be managed appropriately

CODING AND STANDARDS

Codes

Code	Description
36005	Injection procedure for extremity venography (including introduction of needle or intracatheter)
36010	Introduction of catheter, superior or inferior vena cava
36011	Selective catheter placement, venous system; first order branch (eg, renal vein, jugular vein)
36012	Selective catheter placement, venous system; second order, or more selective, branch (eg, left adrenal vein, petrosal sinus)
37238	Transcatheter placement of an intravascular stent(s), open or percutaneous, including radiological supervision and interpretation and including angioplasty within the same vessel, when performed; initial vein
75820	Venography, extremity, unilateral, radiological supervision and interpretation
75822	Venography, extremity, bilateral, radiological supervision and interpretation
75825	Venography, caval, inferior, with serialography, radiological supervision and interpretation
75827	Venography, caval, superior, with serialography, radiological supervision and interpretation
+37239	Transcatheter placement of an intravascular stent(s), open or percutaneous, including radiological supervision and interpretation and

Code	Description
	including angioplasty within the same vessel, when performed; each additional vein (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Definitions

Conventional venography is an invasive procedure that uses X-rays and a contrast dye to create images of vein(s) for anatomic localization and hemodynamic quantification when non-invasive study like venous duplex is limited.

- **Chronic iliofemoral venous obstruction** is a medical condition related to chronic narrowing or occlusion of the iliac or common femoral veins usually as a result of a prior deep vein thrombophlebitis but also non-thrombotic iliac vein lesions
- **Non-thrombotic iliac vein lesions** are related to external compression of the iliac veins usually by iliac arteries
- **May Thurner or Crockett syndrome** involves left iliac vein stenosis as a result of the left iliac vein being crossed by the right iliac artery
- A **fixed Non-Dynamic iliac vein stenosis/occlusion** is a stenosis which does not vary dependent on the patient's position, state of hydration, breathing, or changes in intra-abdominal pressure. It is usually a result of a post thrombotic event but can also be due to an NIVL. It is generally considered safer to stent a fixed non-dynamic lesion since stent migration is less likely and it is more likely that the lesion will be responsible for symptoms.

CEAP Classification (Clinical Class, Etiology, Anatomy, Pathology) [15]

CEAP categories; Clinical (C), Etiological (E), Anatomical (A), and Pathophysiological (P)

Clinical (C) Classifications (C Classes present in Limb)

- C_0 – No visible or palpable signs of venous disease
- C_1 – Telangiectasias or reticular veins (< 3mm)
- C_2 – Simple varicose veins (≥ 3mm diameter)
  - C_{2r} – Recurrent varicose veins
- C_3 – Ankle edema of venous origin (not foot edema)
- C_4 – Changes in skin and subcutaneous tissue secondary to CVD
  - C_{4a} – Pigmentation or eczema
  - C_{4b} – Lipodermatosclerosis or atrophie blanche
  - C_{4c} – Corona phlebectatica
- C_5 – Healed venous ulcer
- C_6 – Open venous ulcer
  - C_{6r} – Recurrent active venous ulcer

Subscripts of C Classes Indicating presence or absence of symptoms

- **S - Symptomatic**
  - Ache
  - Pain
  - Tightness
  - Skin irritation
  - Heaviness
  - Muscle cramps
  - Other complaints attributable to venous dysfunction
- **A – Asymptomatic**

Etiologic (E) Classification

- E_c – Congenital
- E_p – Primary
- E_s – Secondary
  - E_{si} – Secondary – intravenous
  - E_{se} – Secondary – extravenous

- E_n – No cause identified

Anatomic (A) Classification

- A_s – Superficial veins
  - Telangiectasia
  - Reticular Veins
  - Great saphenous vein above knee
  - Great saphenous vein below knee
  - Small saphenous vein
  - Anterior accessory saphenous vein
  - Nonsaphenous vein
- A_p – Perforator veins
  - Thigh perforator vein
  - Calf perforator vein
- A_d – Deep veins
  - Inferior vena cava
  - Common iliac vein
  - Internal iliac vein
  - External iliac vein
  - Pelvic veins
  - Common femoral vein
  - Deep femoral vein
  - Femoral vein
  - Popliteal vein
  - Crural (tibial) vein
  - Peroneal vein
  - Anterior tibial vein
  - Posterior tibial vein
  - Muscular veins
  - Gastrocnemius vein
  - Soleal vein
- A_n – No venous anatomic location identified

Pathophysiologic (P) Classification

- P_r – Reflux

- P_o – Obstruction
- $P_{r,o}$ – Reflux and obstruction
- P_n – No venous pathophysiology

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [3]

- Appropriate Care - Median Score 7-9
- May be Appropriate Care - Median Score 4-6
- Rarely Appropriate Care - Median Score 1-3

Acronyms/Abbreviations

ACR: American College of Radiology

AP: Anteroposterior

AUC: Appropriate use criteria

CDT: Catheter-directed therapy

CEAP: Clinical (C), Etiological (E), Anatomical (A), and Pathophysiological (P)

CHF: Congestive heart failure

CT: Computed tomography

CVC: Central venous catheter

DVT: Deep vein thrombosis

IVUS: Intravascular ultrasound

MR: Magnetic resonance

NIVL: Non thrombotic iliac vein lesion

PTS: Post-thrombotic syndrome

SUMMARY OF EVIDENCE

PRACTICE PARAMETER FOR THE PERFORMANCE OF DIAGNOSTIC INFUSION VENOGRAPHY [6]

Study Design: This document is a practice parameter revised collaboratively by the American College of Radiology (ACR) and the Society of Interventional Radiology (SIR). It provides guidelines for the performance of diagnostic infusion venography, including indications, contraindications, and qualifications of personnel.

Target Population: The guidelines are intended for practitioners performing diagnostic infusion venography on patients with suspected venous thrombosis, venous insufficiency, or other venous disorders.

Key Factors: The document emphasizes the importance of patient selection, preparation, and education, as well as the technical aspects of performing and interpreting the procedure. It also highlights the need for monitoring and managing complications, and the qualifications required for physicians, medical physicists, and other personnel involved in the procedure

Consensus Statement on the Management of Non-thrombotic Iliac Vein Lesions From the VIVA Foundation, the American Venous Forum, and the American Vein and Lymphatic Society [8]

Study Design: This consensus statement was developed by the VIVA Foundation, the American Venous Forum, and the American Vein and Lymphatic Society. It provides recommendations for the management of NIVL, including patient selection, imaging for diagnosis, technical considerations for stent placement, and post-procedure management.

Target Population: The guidelines are intended for healthcare providers treating patients with NIVL, which is characterized by extrinsic compression of the iliac vein leading to symptoms such as lower extremity chronic venous insufficiency or pelvic venous disease.

Key Factors: The document discusses the importance of patient selection based on symptoms, the use of venography and intravascular ultrasound (IVUS) for diagnosis, and the technical considerations for stent placement. It also addresses the need for post-procedure medical therapy and surveillance, and highlights future research and educational needs.

ACR Appropriateness Criteria® Radiologic Management of Iliofemoral Venous Thrombosis [9]

Study Design: This document is part of the ACR Appropriateness Criteria, which are evidence-based guidelines for the management of specific clinical conditions. It provides recommendations for the radiologic management of iliofemoral venous thrombosis (DVT), including anticoagulation, catheter-directed therapy (CDT), and surgical thrombectomy.

Target Population: The guidelines are intended for patients with iliofemoral DVT, which carries a high risk for pulmonary embolism, recurrent DVT, and post-thrombotic syndrome.

Key Factors: The document outlines the appropriateness of various treatment options based on the severity of symptoms and the presence of underlying conditions such as May-Thurner syndrome. It emphasizes the importance of anticoagulation as the standard of care, while also discussing the potential role of more aggressive therapies in select cases.

Editor's Choice – A Systematic Review and Meta-analysis of 24 Month Patency After Endovenous Stenting of Superior Vena Cava, Subclavian, and Brachiocephalic Vein Stenosis [14]

Study Design: This document is a systematic review and meta-analysis that included randomized controlled trials, observational studies, and case series reporting patency outcomes

after endovenous stenting of central veins (superior vena cava, subclavian, and brachiocephalic veins).

Target Population: 1,539 patients studied across 39 studies exhibiting symptomatic central venous stenosis or obstruction. The study included a mix of gender and age groups; as well as both malignant and benign causes of central venous stenosis. All patients underwent endovenous stenting (with or without angioplasty) of superior vena cava, subclavian, and/or brachiocephalic veins

Key Factors & Outcomes

- **Measured Outcomes:** Technical success rate, primary patency, primary assisted patency, secondary patency at various time points (1–3, 3–6, 6–12, 12–24, and 24 months)
- **Results:**
  - **Primary Patency:** 81.5% at 6–12 months, declining to 63.2% at 12–24 months
  - **Primary Assisted Patency:** 81.6% at 12–24 months, 72.7% at 24 months
  - **Secondary Patency:** 89.3% at 12–24 months, 76.6% at 24 months
  - **Malignant vs. Benign:** Higher primary patency for malignant stenosis at 1–3 and 12–24 months; no significant difference in secondary patency
  - **Technical Success:** Generally high across studies

ANALYSIS OF EVIDENCE

Analysis [6,8,9,14]:

The articles collectively provide a comprehensive overview of venogram invasive vein mapping, highlighting its diagnostic accuracy, indications for use, and the role of complementary imaging modalities. While they share common findings, they differ in their emphasis on non-invasive methods, technical considerations, and outcomes. The **ACR-SIR Practice Parameter** focuses on the established safety and accuracy of diagnostic infusion venography, suggesting that non-invasive methods are often preferable. The **Desai et al.** article advocates for the use of venography and IVUS in diagnosing and treating NIVL, emphasizing the technical considerations for stent placement. The **Farsad et al.** article discusses various therapeutic options for iliofemoral venous thrombosis, highlighting the role of venography in specific clinical scenarios.

Venography:

- **Diagnostic Accuracy and Utility**: Venography is essential for evaluating venous anatomy, stenosis, malformations, and planning interventions, but is increasingly complemented or replaced by ultrasound, CT, and MR in routine practice. The **ACR-SIR Practice Parameter** emphasizes that diagnostic infusion venography is an established, safe, and accurate method for venous imaging. Similarly, the **Desai et al.** article highlights the use of venography and intravascular ultrasound (IVUS) for diagnosing NIVL. The **Farsad et al.** article also discusses the role of venography in managing iliofemoral venous thrombosis.

- **Indications for Use**: The articles concur on the indications for venography. The **ACR-SIR Practice Parameter** lists various indications, including diagnosing deep vein thrombosis (DVT), evaluating valvular insufficiency, and venous mapping before surgical or interventional procedures. The **Desai et al.** article mentions stent placement for NIVL based on venography finding. The **Farsad et al.** article discusses the use of venography in patients with iliofemoral venous thrombosis.

Central Venous Stenting:

- Stenting is effective for symptomatic venous obstruction, especially in central veins and iliofemoral DVT with moderate/severe symptoms or underlying compression. However, patient selection is critical, as stenting is not appropriate for asymptomatic or minimally symptomatic patients. Whereas **Chawla et al.** focus on the efficacy of stenting the subclavian and brachiocephalic veins, **Farsad et al.** and **Desai et al** focus on iliofemoral DVT and nonthrombotic iliac vein lesions.

POLICY HISTORY

Date	Summary
June 2026	• This guideline merges and replaces the guidelines listed below to Evolent Clinical Guideline 7347 for Venography, Venous Angioplasty, and Stenting: ○ ECG 7319 for Percutaneous Iliocaval Interventions ○ ECG 7341 for Venogram Invasive Vein Mapping • This guideline also merges the procedure codes from the above Evolent guidelines

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

Evolent Clinical Guidelines do not constitute medical advice. Treating health care professionals are solely responsible for diagnosis, treatment, and medical advice. Evolent uses Clinical Guidelines in accordance with its contractual obligations to provide utilization management. Coverage for services varies for individual members according to the terms of their health care coverage or government program. Individual members' health care coverage may not utilize some Evolent Clinical Guidelines. Evolent clinical guidelines contain guidance

that requires prior authorization and service limitations. A list of procedure codes, services or drugs may not be all inclusive and does not imply that a service or drug is a covered or non-covered service or drug. Evolent reserves the right to review and update this Clinical Guideline in its sole discretion. Notice of any changes shall be provided as required by applicable provider agreements and laws or regulations. Members should contact their Plan customer service representative for specific coverage information.

Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7348 for Aortic Valve Replacement

Guideline Number: Evolent_CG_7348	**Applicable Codes**	
"Evolent" refers to Evolent Health LLC and Evolent Specialty Services, Inc. ***© 2027 Evolent. All rights Reserved.***		
Original Date: January 2027	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Aortic Valve Replacement. Aortic valve replacement is a cardiac surgery in which a patient's failing aortic valve is replaced with an alternate healthy valve.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Surgical Aortic Valve Replacement

Asymptomatic

- Severe aortic stenosis (AS) (see **Definition**) and left ventricular ejection fraction (LVEF) < 50%, and ≤ 80 years of age as an alternative to Transcatheter Aortic Valve Replacement (TAVR) after shared decision-making related to valve durability and

expected longevity, including the following situations [6,7]:

- AVA (aortic valve area) ≤ 1.0 cm^2 (or AVA index ≤ 0.6 cm^2/m^2) on resting echo, LVEF < 20%, high or intermediate risk for surgery (see **Definition**):
  - Aortic valve peak velocity ≥ 4 m/s or mean gradient ≥ 40 mmHg on resting echo **(AUC Score 7)**
- AVA ≤ 1.0 cm^2 (or AVA index ≤ 0.6 cm^2/m^2) on resting echo, LVEF < 20%, low flow/low gradient with flow reserve on dobutamine echocardiogram (i.e., truly severe AS):
  - High or intermediate surgical risk **(AUC Score 7)**
- AVA ≤ 1.0 cm^2 (or AVA index ≤ 0.6cm^2/m^2) on resting echo, LVEF 20%-49%, low flow/low gradient with flow reserve on dobutamine echocardiogram (i.e., truly severe AS):
  - High or intermediate surgical risk **(AUC Score 8)**
  - Low surgical risk **(AUC Score 9)**
- AVA ≤ 1.0 cm^2 (or AVA index ≤ 0.6 cm^2/m^2) on resting echo, LVEF 20%-49%, low flow/low gradient with no flow reserve on dobutamine echocardiogram but with very calcified valve on imaging (Transthoracic echocardiogram (TTE) or Computed tomography (CT)) or projected valve area calculation suggesting truly severe AS:
  - High or intermediate surgical risk **(AUC Score 7)**

- Very severe AS (defined as an aortic velocity ≥ 5 ms), LVEF ≥ 50%, as an alternative to TAVR [6,7]:
  - High or intermediate surgical risk **(AUC Score 7)**
  - Low surgical risk **(AUC Score 8)**
- Severe AS with low surgical risk and exercise test demonstrating decreased exercise tolerance or a fall in systolic blood pressure of ≥ 10 mmHg from baseline to peak exercise [6]
- Severe AS and LVEF ≥ 50% with low surgical risk, with a high-risk profession (e.g., airline pilot), lifestyle (competitive athlete), or anticipated prolonged period away from medical supervision (**AUC Score 7**) [7]
- Severe AS, LVEF ≥ 50%, with ≥ 1 predictor(s) of symptom onset or of rapid progression such as: rapid progression (peak velocity increasing > 0.3 m/s per year, severe valve calcification, elevated B-type natriuretic peptide (BNP > 3 times normal [6]), significant left ventricular hypertrophy (LVH) in the absence of hypertension), and a negative exercise stress test (ETT), as an alternative to TAVR [7]:
  - High or intermediate surgical risk **(AUC Score 7)**
  - Low surgical risk **(AUC Score 8)**
- Chronic severe aortic regurgitation (AR) and LV systolic dysfunction (LVEF < 50%) [6]
- Severe AR with normal LV systolic function (LVEF > 55%) but with severe LV dilation (left ventricular end-systolic dimension (LVESD) > 50 mm) [6]

- Moderate AS/AR with jet velocity of ≥ 4 m/s with LVEF < 50% [6]
- Severe AS undergoing another cardiac surgery/ascending aortic surgery (**AUC Score 9**) [6,7]
- Severe AR undergoing another cardiac surgery [6]

Symptomatic [8,9]

- Severe high-gradient AS (see **Definition**) with symptoms by history or on exercise testing
- Patients with **all** of the following:
  - Low-flow/low-gradient severe AS with reduced LVEF
  - With a low dose Dobutamine stress study that shows an aortic velocity > 4.0 m/s (or mean pressure gradient > 40 mmHg)
  - With a valve area > 1.0 cm^2 at any Dobutamine dose
- Patients with severe AR regardless of LV systolic function

Congenital Valvular Aortic Stenosis [6,10]

Note: Includes bicuspid aortic valve (BAV), unicuspid aortic valve and hypoplastic aortic annulus. Intervention may require annular enlargement and other surgical techniques not typically used in valvular aortic stenosis.

See **Definition** for information on AS severity based on valve hemodynamics.

- AV replacement (or balloon valvuloplasty for noncalcified BAV stenosis with ≤ mild aortic regurgitation) for patients with:
  - Symptomatic severe high-gradient AS
  - Symptomatic low-flow, low gradient severe AS with reduced LVEF (<50%)
  - Symptomatic low-flow, low-gradient severe AS with normal LVEF (≥50%) if AS is most likely cause of symptoms
  - Asymptomatic severe AS with LVEF <50%
  - Apparently asymptomatic severe AS and low surgical risk when exercise treadmill test demonstrates decreased exercise capacity or a ≥ 10 mm Hg fall in systolic blood pressure from baseline to peak exercise
  - Apparently asymptomatic severe AS with low surgical risk (see Definitions sections) and B-type naturetic protein (BNP) > 3 times normal
  - Asymptomatic high-gradient severe AS with low surgical risk when serial testing shows an increase in aortic velocity ≥ 0.3 m/s per year
  - Asymptomatic high-gradient severe AS and progressive decrease in LVEF to <60% on at least 3 serial imaging studies

- Asymptomatic with very severe AS and low surgical risk
    - Asymptomatic moderate or severe AS undergoing cardiac surgery for other indications

Transcatheter Aortic Valve Replacement

Asymptomatic

- Severe AS (see **Definition**) and left ventricular ejection fraction (LVEF) < 50%, and ≤ 80 years of age as an alternative to Surgical Aortic Valve Replacement (SAVR) after shared decision-making related to valve durability and expected longevity, including the following situations [6,7]:
    - AVA (aortic valve area) ≤ 1.0 cm^2 (or AVA index ≤ 0.6 cm^2/m^2) on resting echo, LVEF < 20%, high or intermediate risk for surgery (see **Definition**):
        - Aortic valve peak velocity ≥ 4 m/s or mean gradient ≥ 40 mmHg on resting echo **(AUC Score 7)**
    - AVA ≤ 1.0 cm^2 (or AVA index ≤ 0.6 cm^2/m^2) on resting echo, LVEF < 20%, low flow/low gradient with flow reserve on dobutamine echocardiogram (i.e., truly severe AS):
        - High or intermediate surgical risk **(AUC Score 7)**
    - AVA ≤ 1.0 cm^2 (or AVA index ≤ 0.6 cm^2/m^2) on resting echo, LVEF 20%-49%, low flow/low gradient with flow reserve on dobutamine echocardiogram (i.e., truly severe AS):
        - High or intermediate surgical risk **(AUC Score 8)**
        - Low surgical risk **(AUC Score 9)**
    - AVA ≤ 1.0 cm^2 (or AVA index ≤ 0.6 cm^2/m^2) on resting echo, LVEF 20%-49%, low flow/low gradient with no flow reserve on dobutamine echocardiogram but with very calcified valve on imaging (TTE or CT) or projected valve area calculation suggesting truly severe AS:
        - High or intermediate surgical risk **(AUC Score 7)**
- Severe AS and LVEF ≥ 50% with low surgical risk, with a high-risk profession (e.g., airline pilot), lifestyle (competitive athlete), or anticipated prolonged period away from medical supervision [7] **(AUC Score 7)**
- Very severe AS, LVEF ≥50% [7]:
    - High or intermediate surgical risk **(AUC Score 7)**
    - Low surgical risk **(AUC Score 8)**
- Severe AS prior to non-cardiac surgery with nonobstructive CAD, as an alternative to SAVR [7]:
    - Severe/very severe AS, elective major surgery planned **(AUC Score 7)**
    - Severe/very severe AS, urgent major surgery planned **(AUC Score 5)**

- Severe AS, LVEF ≥ 50%, with ≥ 1 predictor(s) of symptom onset or of rapid progression such as: rapid progression (peak velocity increasing > 0.3 m/s per year, severe valve calcification, elevated BNP, significant LVH in the absence of hypertension), and a negative ETT, as an alternative to SAVR [7]:
    - High or intermediate surgical risk **(AUC Score 7)**
    - Low surgical risk **(AUC Score 8)**

Symptomatic

- Symptoms or signs with activities of daily living or with physiologic testing (i.e., exercise treadmill test) include exertional dyspnea, decreased exercise tolerance, exertional angina, heart failure, exertional syncope, pre-syncope, or abnormal blood pressure response on exercise treadmill test (see **Definition**) [6,7]
- Severe AS (see **Definition**) in patients of any age with **all** of the following [6]:
    - High or prohibitive surgical risk (see **Definition**) for SAVR
    - Predicted post-TAVR survival > 12 months
    - Acceptable quality of life (> 1 year)
- Severe AS, > 80 years of age or for younger patients with life expectancy < 10 years [6]
- Severe AS, 65 to 80 years of age, as an alternative to SAVR after shared decision-making related to valve durability and expected longevity [6]

  Note: Surgical aortic valve replacement (SAVR) recommended if patient is < 65 years of age or has life expectancy > 20 years [6]
- Severe AS with multiple comorbidities (high or extreme risk patients) [7]:
    - Frail (see **Definition**) with fatigue but no chest pain or shortness of breath
        - Severe AS, high surgical risk
            - B-type Natriuretic Peptide (BNP) elevated **(AUC Score 7)**
            - Normal BNP **(AUC Score 5)**
        - Very severe AS, high surgical risk
            - Normal BNP **(AUC Score 7)**
            - BNP elevated **(AUC Score 8)**
    - Oxygen dependent pulmonary disease with dyspnea
        - High surgical risk
            - BNP normal **(AUC Score 7)**
            - BNP elevated **(AUC Score 8)**
    - End-stage renal disease on dialysis with symptomatic AS
        - Extreme surgical risk, multiple comorbidities, not a renal transplant candidate, longstanding dialysis **(AUC Score 6)**

        - High surgical risk, nondiabetic/nonhypertensive etiology, renal transplant candidate, short time on dialysis **(AUC Score 7)**
    - Cirrhosis (high surgical risk) **(AUC Score 7)**
    - Malignancy with high surgical risk
        - Life expectancy > 1 year **(AUC Score 7)**
- Severe AS with additional anatomical risks not captured in the STS-PROM such as hostile chest or porcelain aorta (see **Definition**); and otherwise, low, intermediate or high surgical risk by STS-PROM score **(AUC Score 8)** [7]
- Prior to non-cardiac surgery with nonobstructive coronary artery disease (CAD), as an alternative to SAVR [7]:
    - Severe/very severe AS, elective major surgery planned **(AUC Score 8)**
    - Severe/very severe AS, urgent major surgery planned **(AUC Score 7)**
- Severe AS with associated CAD (i.e., TAVR plus percutaneous coronary intervention (PCI) as an alternative to SAVR plus CABG) [7]
    - 1 or 2 vessel CAD, with or without proximal left anterior descending artery (LAD) involvement:
        - High or intermediate surgical risk **(AUC Score 7)**
    - 3-vessel CAD:
        - Low (< 22) SYNTAX score and
            - High or intermediate surgical risk **(AUC Score 7)**
        - Intermediate or high (≥ 22) SYNTAX score:
            - High or intermediate surgical risk **(AUC Score 6)**
    - Left main coronary artery:
        - Intermediate or low (< 33) SYNTAX score:
            - High or intermediate surgical risk **(AUC Score 7)**
        - High (≥ 33) SYNTAX score:
            - High or intermediate surgical risk **(AUC Score 6)**
- Severe AS with other valve or anatomical pathology [7]:
    - Severe rheumatic mitral stenosis (MS) and no contraindication to balloon mitral valvuloplasty (i.e., TAVR plus balloon mitral valvuloplasty):
        - High surgical risk **(AUC Score 7)**
    - Severe primary mitral regurgitation (i.e., TAVR plus mitral transcatheter edge-to-edge repair (TEER))
        - High surgical risk **(AUC Score 6)**
    - Severe secondary tricuspid regurgitation with dilated right ventricle and/or tricuspid valve annulus ≥ 40mm, moderate to severe right ventricular dysfunction and:

        - Moderate to severe pulmonary hypertension, high surgical risk **(AUC Score 7)**
        - Minimal pulmonary hypertension, intermediate surgical risk **(AUC Score 5)**
    - Prominent basal left ventricular hypertrophy with left ventricular outflow tract (LVOT) obstruction (narrowing with flow acceleration) and intermediate or high surgical risk **(AUC Score 6)**
- Failing aortic valve bioprosthesis (i.e., valve-in-valve procedure for severe AS or aortic regurgitation (AR) and degenerative surgical bioprosthesis) [7]
    - Bioprosthesis size ≥ 23 mm:
        - High surgical risk **(AUC Score 8)**
        - Intermediate surgical risk **(AUC Score 7)**
    - Bioprosthesis size 21 mm:
        - High surgical risk **(AUC Score 6)**
        - Intermediate surgical risk **(AUC Score 5)**
    - Bioprosthesis size ≤ 19 mm:
        - High surgical risk **(AUC Score 5)**
- AVA (aortic valve area) ≤ 1.0 cm^2 (or AVA index ≤ 0.6 cm^2/m^2) on resting echo, low flow/low gradient, with severely calcified valve, and clinical, hemodynamic and anatomic data support valve obstruction as the most likely cause of symptoms, as an alternative to SAVR [7]:
    - High or intermediate surgical risk **(AUC Score 8)**
    - Low surgical risk **(AUC Score 9)**

CODING AND STANDARDS

Codes

Code	Description
33405	Replacement, aortic valve, open, with cardiopulmonary bypass; with prosthetic valve other than homograft or stentless valve
33406	Replacement, aortic valve, open, with cardiopulmonary bypass; with allograft valve (freehand)
33410	Replacement, aortic valve, open, with cardiopulmonary bypass; with stentless tissue valve
33411	Replacement, aortic valve; with aortic annulus enlargement, noncoronary sinus

Code	Description
33412	Replacement, aortic valve; with transventricular aortic annulus enlargement (Konno procedure)
33413	Replacement, aortic valve; by translocation of autologous pulmonary valve with allograft replacement of pulmonary valve (Ross procedure)
33361	Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; percutaneous femoral artery approach
33362	Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; open femoral artery approach
33363	Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; open axillary artery approach
33364	Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; open iliac artery approach
33365	Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; transaortic approach (eg, median sternotomy, mediastinotomy)
33366	Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; transapical exposure (eg, left thoracotomy)
+33367	Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; cardiopulmonary bypass support with percutaneous peripheral arterial and venous cannulation (eg, femoral vessels) (List separately in addition to code for primary procedure)
+33368	Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; cardiopulmonary bypass support with open peripheral arterial and venous cannulation (eg, femoral, iliac, axillary vessels) (List separately in addition to code for primary procedure)
+33530	Reoperation, coronary artery bypass procedure or valve procedure, more than 1 month after original operation (List separately in addition to code for primary procedure)
+35500	Harvest of upper extremity vein, 1 segment, for lower extremity or coronary artery bypass procedure (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Abnormal Exercise Stress Test Definition [7]

- In relation to the functional assessment of seemingly asymptomatic aortic stenosis (AS), an abnormal exercise stress test is characterized by:
  - Exercise-induced angina
  - Excessive dyspnea early in exercise
  - Dizziness, or syncope
  - Limited exercise capacity (below age and sex-specific predicted metabolic equivalent of task, or MET)
  - Abnormal blood pressure response (e.g., hypotension during exercise or failure to increase blood pressure with exercise)
  - Increase in the mean gradient with exercise ≥18 mmHg (i.e., on stress echocardiogram)

Anatomical Factors Favoring TAVR Over Surgical Valve Replacement

Note: These anatomical factors increase surgical risk and are not captured in the STS-PROM risk calculator [7]

- Porcelain aorta: severe calcification of the ascending aorta extending to the aortic arch preventing safe cannulation or cross-clamping during cardiac surgery [11]
- Hostile chest: condition(s) that make chest surgery prohibitively risky such as radiation damage, abnormal chest wall anatomy (i.e. severe kyphoscoliosis), complications from prior surgery [12]

Aortic Stenosis

- Aortic Stenosis (AS) Severity [6]:
  - Mild AS: aortic V_{max} 2.0-2.9 m/s or mean gradient <20 mm Hg
  - Moderate AS: aortic V_{max} 3.0-3.9 m/s or mean gradient 20-39 mm Hg
  - Severe AS: Aortic peak velocity (Vmax) ≥ 4 m/s or mean gradient ≥ 40 mm Hg
    - Aortic valve area (AVA) typically is ≤ 1.0 cm^2 (or valve index (AVAi) 0.6 cm^2/m^2) but is not required to define severe AS [6]
  - Very severe AS: aortic Vmax ≥ 5 m/s or mean gradient ≥ 60 mm Hg
  - Low flow/low gradient severe AS: defined by a mismatch between reduced aortic valve area (AVA, < 1 cm^2) and a non-severe increase mean valve pressure gradient (i.e., < 40 mmHg) with an impaired left ventricular stroke volume (volume of blood pumped with each beat, similar to LVEF) at rest. This creates a diagnostic and therapeutic dilemma: choosing between aortic valve replacement (AVR) and medical therapy vs optimal medical therapy alone. Low dose dobutamine stress echo (DSE) is recommended as a means of increasing stroke volume with a simultaneous reassessment of aortic valve indices. **Flow reserve** is defined as a 20% increase in stroke volume demonstrated by DSE. DSE can yield three possible results in this situation:
    - Truly severe AS: Significant increase in stroke volume (i.e. flow reserve is demonstrated) and mean valve gradient (>40 mmHg). Aortic valve is severely stenotic, and the low gradient measured at rest is a consequence of the LV contractile dysfunction.
    - Pseudo-severe AS: Significant increase in stroke volume and persistent low mean valve gradient (< 40 mmHg) and AS does not meet the hemodynamic criteria to be defined as severe.
    - Undetermined AS severity: Absence of significant increase in stroke volume and mean valve gradient (< 40 mmHg): In this case, DSE fails to demonstrate an increase in stroke volume (lack of flow reserve) and the AS severity grade remains undetermined. In this situation clinicians must rely on the morphologic features of the valve on imaging (such as cardiac CT). [13]

Frailty

- Frailty is not always well-estimated by risk calculators but is an important factor in assessing patient reported symptoms, procedural risk, and anticipated benefit after the various treatment options. [7]
- Frailty falls along a spectrum and is characterized as impaired resilience to stressors. There is no universal definition of frailty, and many criteria have been proposed. The Fried criteria [14] are commonly used:
  - Slow gait speed
  - Weak handgrip

- Exhaustion
- Physical inactivity
- Weight loss

Society of Thoracic Surgeons Risk Calculations

- The Society of Thoracic Surgeons (STS) provides a range of risk calculators to evaluate the short-term (30 day) mortality risk for adult operative patients. Calculator types include:
  - Adult Cardiac Surgery Database Operative Risk Calculator
  - Mitral Regurgitation Risk Calculator
  - Isolated Tricuspid Valve Surgery Risk Calculator
  - SAVR After TAVR Risk Calculator
  - Multi-Valve Surgery Risk Calculator
  - Ascending Aorta & Aortic Root Surgery Risk Calculators
- The Society of Thoracic Surgeons Predicted Risk of Surgical Mortality (STS-PROM) uses a scoring system to provide an estimate of 30-day surgical mortality [7]:
  - Low risk: STS score < 3%
  - Intermediate risk: STS score 3% - 8%
  - High risk: STS score >8%
- Results from risk calculators should play a role in informed decision making, but do not take all factors into account and should not be used as sole decision-making tools. You can find the risk calculators and additional info at the Society of Thoracic Surgeons website.

AUC Score

A reasonable diagnostic or therapeutic procedure can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [4]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AR: Aortic regurgitation

AS: Aortic stenosis

AUC: Appropriate use criteria

AVA: Aortic valve area

cm: centimeter

CT: Computed tomography

ETT: Exercise Treadmill Test

LVEF: Left ventricular ejection fraction

LVESD: Left ventricular end-systolic dimension

m: meter

mm: millimeter

SAVR: Surgical aortic valve replacement

STS-PROM: Society of Thoracic Surgeons predicted risk of mortality score

TAVR: Transcatheter Aortic Valve Replacement

TTE: Transthoracic echocardiogram

SUMMARY OF EVIDENCE

ACC/AATS/AHA/ASE/EACTS/HVS/SCA/SCAI/SCCT/SCMR/STS 2017 Appropriate Use Criteria for the Treatment of Patients With Severe Aortic Stenosis [7]

Study Design: This study developed Appropriate Use Criteria (AUC) for the treatment of patients with severe aortic stenosis (AS). It involved a multidisciplinary writing group and an independent rating panel that scored various clinical scenarios based on guidelines, clinical trial data, and expert opinion.

Target Population: Patients with severe AS, including those with asymptomatic, symptomatic, high-gradient, low-flow, and low-gradient AS. The study also considered patients with associated conditions such as coronary artery disease (CAD) and other valve pathologies.

Key Factors: The study identified 95 clinical scenarios and up to six potential treatment options for each. The rating panel scored each indication from 1 to 9, categorizing them as "Rarely Appropriate," "May Be Appropriate," or "Appropriate." The criteria considered factors such as symptom status, left ventricular (LV) function, surgical risk, and the presence of concomitant coronary or other valve disease.

2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease [6]

Study Design: This guideline report by the American College of Cardiology (ACC) and American Heart Association (AHA) provides recommendations for the management of patients with valvular heart disease, including aortic stenosis.

Target Population: Adult patients with valvular heart disease, specifically those with aortic stenosis. The guidelines cover both symptomatic and asymptomatic patients, as well as those with low-flow, low-gradient AS.

Key Factors: The guidelines emphasize the importance of accurate diagnosis, timing of intervention, and risk assessment. They recommend intervention for symptomatic patients with severe AS and for asymptomatic patients with severe AS and impaired LV function. The guidelines also discuss the use of exercise testing, biomarkers, and imaging techniques such as echocardiography and cardiac computed tomography (CT) to assess the severity of AS and guide treatment decisions.

2021 ESC/EACTS Guidelines for the management of valvular heart disease [9]

Study Design: This guideline report by the European Society of Cardiology (ESC) and European Association for Cardio-Thoracic Surgery (EACTS) provides recommendations for the management of valvular heart disease, including aortic stenosis.

Target Population: Patients with aortic stenosis, including those with symptomatic and asymptomatic severe AS. The guidelines also address patients with associated conditions such as CAD and other valve pathologies.

Key Factors: The guidelines recommend intervention for symptomatic patients with severe AS and for asymptomatic patients with severe AS and impaired LV function. They emphasize the importance of a multidisciplinary Heart Team approach and the use of imaging techniques such as echocardiography, CT, and cardiac magnetic resonance (CMR) to assess the severity of AS and guide treatment decisions. The guidelines also discuss the role of biomarkers and exercise testing in risk stratification

ANALYSIS OF EVIDENCE

Shared Findings [6,7,9]

All three guidelines emphasize the importance of a multidisciplinary team for decision-making, integrating clinical, anatomical, and procedural factors, and patient preferences. Treatment recommendations should be tailored to individual patient risk profiles, comorbidities, anatomical suitability, and life expectancy - surgical risk is assessed using scores like STS-PROM and EuroSCORE II, but frailty and other factors are also considered.

Choosing between SAVR and TAVR

SAVR is recommended for patients at low surgical risk (STS or EuroSCORE II <4%) and younger patients (<75 years), or those unsuitable for transfemoral TAVR. [6,9] TAVR is recommended for patients at high surgical risk (STS-PROM >8%), elderly patients (≥75 years), or those unsuitable for surgery. [6,9] TAVR is less invasive, with shorter recovery times and lower perioperative risk in selected populations. [6,7,9]

SAVR is favored when valve durability is a priority, especially in younger patients. Recent evidence supports TAVR in intermediate-risk and even some low-risk patients, but durability concerns remain for younger populations. [6]

SAVR is preferred in cases of bicuspid aortic valve, ascending aortic aneurysm, or when concomitant cardiac surgery is needed (All). TAVR is favored when transfemoral access is feasible; non-transfemoral TAVR may be considered for inoperable patients. [6,7]

Conclusion

SAVR remains the standard for younger, low-risk patients. [7] Although TAVR is becoming more common for these patient populations, concerns regarding durability and long-term outcomes remain unresolved, due to a lack of data. [6] The choice of valve should be guided by patient-centered discussions that emphasize surgical risk, anatomy, and evaluation by a multi-disciplinary medical team. Early intervention in asymptomatic patients may be appropriate if they demonstrate left ventricular systolic dysfunction, severe aortic stenosis or calcification, severe pulmonary hypertension, or elevated BNP levels. [9]

POLICY HISTORY

Date	Summary
May 2026	● This is a new guideline that merges the clinical indications of ECG 7255 for Aortic Valve Replacement and ECG 7334 for Transcatheter Aortic Valve Replacement (TAVR) ● This guideline also merges the codes from these guidelines

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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Evolent Clinical Guidelines are comprehensive and inclusive of various procedural applications for each service type. Our guidelines may be used to supplement Medicare criteria when such

criteria is not fully established. When Medicare criteria is determined to not be fully established, we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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Evolent Clinical Guideline 7349 for Mitral Valve Replacement

Guideline Number: Evolent_CG_7349	**Applicable Codes**	
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Original Date: January 2027	**Last Revised Date:** May 2026	**Implementation Date:** January 2027

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STATEMENT

General Information

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

Purpose

Indications for determining medical necessity for Mitral Valve Replacement, which includes repair or replacement of a mitral valve.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care. [1–5]

INDICATIONS

Open Mitral Valve Repair or Replacement

Mitral Regurgitation (MR)

Primary MR

- Acute severe MR [6]

- Symptomatic chronic severe MR (regardless of left ventricular (LV) systolic function) [6]
- Asymptomatic Patients [6–8]
    - Severe MR with LV dysfunction (LV ejection fraction (LVEF) ≤ 60% and/or LV end-systolic dimension (LVESD) ≥ 40 mm)
    - Severe MR with preserved LV function (LVEF > 60%, LVESD <40 mm) and
        - Atrial fibrillation (AF) secondary to MR **or**
        - Pulmonary hypertension (systolic pulmonary artery pressure (SPAP) at rest >50 mmHg)
    - Surgical MV **repair** can be considered in severe MR with preserved LV function (LVEF > 60%, LVESD <40 mm) and
        - > 95% likelihood of successful and durable repair without residual regurgitation **and**
        - Mortality < 1%
    - Severe MR with preserved LV function (LVEF > 60 %, LVESD < 40%) but with progressive increase in LV size or decrease in LVEF on at least 3 serial imaging studies, irrespective of likelihood of successful repair.
- Surgical repair for severe left atrioventricular (AV) valve regurgitation per guideline directed indications for mitral regurgitation (MR) [9]:
    - Acute severe MR
    - Symptomatic chronic severe MR regardless of LV systolic function
    - Asymptomatic Patients:
        - Severe MR with LV dysfunction (LV ejection fraction (LVEF) ≤ 60% and/or LV end-systolic dimension (LVESD) ≥ 40 mm)
        - Severe MR with preserved LV function (LVEF > 60%, LVESD <40 mm) and
            - Atrial fibrillation (AF) secondary to MR **or**
            - Pulmonary hypertension (SPAP at rest >50 mmHg)
        - Surgical MV **repair** can be considered in severe MR with preserved LV function (LVEF > 60%, LVESD <40 mm) and:
            - 95% likelihood of successful and durable repair without residual regurgitation
            - mortality < 1%
        - Severe MR with preserved LV function (LVEF > 60 %, LVESD < 40%) but with progressive increase in LV size or decrease in LVEF on at least 3 serial imaging studies, irrespective of likelihood of successful repair

Secondary MR [6,7]

Chronic secondary mitral regurgitation typically develops because of LV systolic dysfunction. Therefore, Guideline Directed Medical Therapy (GDMT) for heart failure, including standard medication (and, as indicated, coronary revascularization and biventricular pacing) should be the foundation of treatment. Surgical or transcatheter therapies should only be contemplated in those patients who are genuinely refractory to full GDMT.

- Chronic severe MR with LV systolic dysfunction (LVEF < 50%) with persistent severe symptoms (New York Heart Association (NYHA) class III or IV, see **Definition**) despite GDMT for HF
- Chronic severe MR in patients undergoing another cardiac surgery such as coronary artery bypass graft (CABG)
- Chronic severe MR from annular dilatation with preserved LVEF (>/= 50%) with persistent severe symptoms (NYHA class III or IV) despite therapy for heart failure (HF) and therapy for AF or other comorbidities

Mitral Stenosis (MS)

Congenital Mitral Stenosis (MS) [6]

- Surgical valve replacement for patients with symptomatic severe MS (mitral valve area (MVA) ≤ 1.5 cm^2)

Rheumatic MS [6,7]

- Severely symptomatic (NYHA class III or IV, see **Definition**) severe MS with any of the following:
  - not a candidate for Percutaneous Mitral Balloon Commissurotomy (PMBC)
  - failed previous PMBC
  - no access to PMBC
  - undergoing another cardiac surgery

Non-rheumatic (calcific) MS [6]

- Intervention for severe calcific MS may be considered in severely symptomatic patients (NYHA class III or IV) only after shared decision making regarding high procedural risk (see **Definition**).

Transcatheter Edge to Edge Mitral Valve Replacement

Primary Mitral Regurgitation (MR)

- Severe chronic MR with severe symptoms (NYHA class III or IV, see **Definition**) for all of the following [6,7]:
  - surgical risk is high or prohibitive
  - patient life expectancy is at least 1 year
  - mitral valve anatomy favorable for repair

Secondary MR

Chronic secondary mitral regurgitation typically develops because of left ventricular (LV) systolic dysfunction. Therefore, Guideline-Directed Medical Therapy (GDMT) for heart failure, including

standard medication (and, as indicated, coronary revascularization and biventricular pacing) should be the foundation of treatment. Surgical or transcatheter therapies should only be contemplated in those patients who are genuinely refractory to full GDMT.

- Severe chronic MR related to LV systolic dysfunction (LV ejection fraction (LVEF) < 50%) with persistent symptoms (NYHA class II, III or IV, see **Definition**) despite optimal GDMT for heart failure (HF) when [6,7,10]:
  - patient anatomy is appropriate (as defined on transesophageal echo (TEE)) AND
  - LVEF between 20% and 50% AND
  - LV end-systolic dimension (LVESD) less than or equal to 70 mm AND
  - pulmonary artery systolic pressure is less than or equal to 70 mmHg

Mixed Valvular Heart Disease [6]

A statement of estimated surgical risk or a surgical risk score (see **Definition**) must be provided.

- Combined severe aortic stenosis (AS) and severe primary MR:
  - Transcatheter aortic valve implantation (TAVI) candidate with **prohibitive surgical risk** and MV is repairable:
    - TAVI and mitral TEER (possibly as a staged procedure if severe symptomatic MR persists after TAVI)
- Combined severe AS and severe secondary MR:
  - TAVI candidate with **acceptable surgical risk** and MV is repairable:
    - Surgical aortic valve replacement (SAVR) and surgical mitral valve repair/replacement
    - TAVI and mitral TEER (possibly as a staged procedure if severe symptomatic MR persists after TAVI)
  - TAVI candidate with **prohibitive surgical risk** and MV is repairable:
    - TAVI and mitral TEER (possibly as a staged procedure if severe symptomatic MR persists after TAVI)

Limitations

Some anatomical features make TEER less favorable than surgical repair and require additional documentation as to why TEER is still recommended over surgical repair. That list includes [8]:

- Leaflet pathology involving commissural segments, or leaflet clefts or perforations
- Severe leaflet or annular calcification (or calcification in area of grasping zone)
- Mitral stenosis (rheumatic or calcific)
  - mean mitral gradient > 5mmHg
  - mitral valve area (MVA) < 4.0 cm^2

- Grasping zone length < 7mm
- Primary MR
  - flail width > 15 mm and flail gap > 10 mm
  - multisegment pathology, highly mobile flail leaflet with multiple ruptured chords
  - severely and diffusely thickened and redundant leaflets
  - LVESD > 55 mm
- Secondary MR
  - LVESD > 70 mm

CODING AND STANDARDS

Codes

Code	Description
33418	Transcatheter mitral valve repair, percutaneous approach, including transseptal puncture when performed; initial prosthesis
33422	Valvotomy, mitral valve; open heart, with cardiopulmonary bypass
33425	Valvuloplasty, mitral valve, with cardiopulmonary bypass;
33426	Valvuloplasty, mitral valve, with cardiopulmonary bypass; with prosthetic ring
33427	Valvuloplasty, mitral valve, with cardiopulmonary bypass; radical reconstruction, with or without ring
33430	Replacement, mitral valve, with cardiopulmonary bypass
+33419	Transcatheter mitral valve repair, percutaneous approach, including transseptal puncture when performed; additional prosthesis(es) during same session (List separately in addition to code for primary procedure)
+33530	Reoperation, coronary artery bypass procedure or valve procedure, more than 1 month after original operation (List separately in addition to code for primary procedure)

Applicable Lines of Business

☒	CHIP (Children's Health Insurance Program)
☒	Commercial
☒	Exchange/Marketplace
☒	Medicaid
☒	Medicare Advantage

BACKGROUND

Calcific Mitral Stenosis

Calcific (or degenerative) MS is a distinct condition that differs from rheumatic mitral stenosis. It results from calcification of the mitral annulus extending into the leaflet bases, causing narrowing of the annulus and rigidity of the leaflets. These patients are usually elderly and may have co-morbidities, including disease of other valves, making surgical intervention high-risk. Intervention for severe mitral annular calcification also presents technical challenges due to the difficulty in securely attaching the prosthetic valve, and the valve may further narrow the orifice. Therefore, intervention should be delayed until symptoms are severely limiting and are refractory to aggressive medical therapy.

NYHA Functional Classification for Heart Failure

The New York Heart Association (NYHA) classes of heart failure is the most commonly used system to classify stages of heart failure [(11)]. Classes are based on physical activity limitations.

- Class I: No limitations on physical activity Ordinary physical activity does not cause undue fatigue, heart palpitations, or shortness of breath
- Class II: Slight limitations on physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, heart palpitations, shortness of breath or chest pain.
- Class III: Marked limitations on physical activity. Comfortable at rest, but less than ordinary activity causes fatigue, heart palpitations, shortness of breath or chest pain.
- Class IV: Symptoms of heart failure at rest. Any physical activity increases discomfort.

Society of Thoracic Surgeons Risk Calculations

- The Society of Thoracic Surgeons (STS) provides a range of risk calculators to evaluate the short-term (30 day) mortality risk for adult operative patients. Calculator types

include:

- Adult Cardiac Surgery Database Operative Risk Calculator
- Mitral Regurgitation Risk Calculator
- Isolated Tricuspid Valve Surgery Risk Calculator
- SAVR After TAVR Risk Calculator
- Multi-Valve Surgery Risk Calculator
- Ascending Aorta & Aortic Root Surgery Risk Calculators

- The Society of Thoracic Surgeons Predicted Risk of Surgical Mortality (STS-PROM) uses a scoring system to provide an estimate of 30-day surgical mortality [12]:
  - Low risk: STS score < 3%
  - Intermediate risk: STS score 3% - 8%
  - High risk: STS score >8%
- Results from risk calculators should play a role in informed decision making, but do not take all factors into account and should not be used as sole decision-making tools. You can find the risk calculators and additional info at the Society of Thoracic Surgeons website.

AUC Score

A reasonable diagnostic or therapeutic procedure care can be defined as that for which the expected clinical benefits outweigh the associated risks, enhancing patient care and health outcomes in a cost-effective manner. [2]

- Appropriate Care- Median Score 7-9
- May be Appropriate Care- Median Score 4-6
- Rarely Appropriate Care- Median Score 1-3

Acronyms/Abbreviations

AF: Atrial fibrillation

CABG: Coronary artery bypass graft

EF: Ejection fraction

GDMT: Guideline-directed medical therapy

HF: Heart failure

LV: Left ventricle

LVEF: Left ventricular ejection fraction

LVESD: Left ventricular end-systolic dimension

MR: Mitral regurgitation

MS: Mitral stenosis

NYHA: New York Heart Association

PMBC: Percutaneous mitral balloon commissurotomy

SPAP: Systolic pulmonary artery pressure

SUMMARY OF EVIDENCE

2020 ACC/AHA Guideline for the Management of Patients with Valvular Heart Disease [6]

Study Design: The guidelines were developed by the American College of Cardiology (ACC) and the American Heart Association (AHA) Joint Committee on Clinical Practice Guidelines. The document is based on systematic methods to evaluate and classify evidence, including literature reviews, randomized controlled trials (RCTs), registries, nonrandomized comparative and descriptive studies, case series, cohort studies, systematic reviews, and expert opinion.

Target Population: The guidelines focus on the diagnosis and management of adult patients with valvular heart disease (VHD). The recommendations are applicable to patients with or at risk of developing cardiovascular disease, with a particular emphasis on those in the United States but relevant to patients worldwide.

Key Factors:

Evaluation and Management: The guidelines provide detailed recommendations for the evaluation and management of various types of VHD, including aortic stenosis (AS), aortic regurgitation (AR), bicuspid aortic valve (BAV), mitral stenosis (MS), mitral regurgitation (MR), tricuspid valve disease, and mixed valve disease.

Diagnostic Testing: The guidelines emphasize the importance of diagnostic testing, including transthoracic echocardiography (TTE), transesophageal echocardiography (TEE), cardiac magnetic resonance (CMR) imaging, computed tomography (CT) angiography, and cardiac catheterization.

Medical Therapy: Recommendations for medical therapy include the use of anticoagulants, antiplatelet agents, and other medications for managing symptoms and preventing complications.

Intervention: The guidelines provide criteria for surgical and transcatheter interventions, including valve repair and replacement, based on the severity of the disease and patient-specific factors.

Follow-Up and Monitoring: The document outlines the importance of regular follow-up and monitoring of patients with VHD, including periodic imaging and assessment of ventricular function.

2020 Focused Update of the 2017 Expert Consensus Decision Pathway on the Management of Mitral Regurgitation: A Report of the American College of Cardiology Solution Set Oversight Committee [8]

Study Design: The guidelines were developed by the American College of Cardiology (ACC) Solution Set Oversight Committee. The document is based on systematic methods to evaluate and classify evidence, including literature reviews, randomized controlled trials (RCTs), registries, nonrandomized comparative and descriptive studies, case series, cohort studies, systematic reviews, and expert opinion.

Target Population: The guidelines focus on the diagnosis and management of adult patients with mitral regurgitation (MR). The recommendations are applicable to patients with or at risk of developing cardiovascular disease, with a particular emphasis on those in the United States but relevant to patients worldwide.

Key Factors:

Evaluation and Management: The guidelines provide detailed recommendations for the evaluation and management of various types of MR, including primary and secondary MR.

Diagnostic Testing: The guidelines emphasize the importance of diagnostic testing, including transthoracic echocardiography (TTE), transesophageal echocardiography (TEE), cardiac magnetic resonance (CMR) imaging, computed tomography (CT) angiography, and cardiac catheterization.

Medical Therapy: Recommendations for medical therapy include the use of anticoagulants, antiplatelet agents, and other medications for managing symptoms and preventing complications.

Intervention: The guidelines provide criteria for surgical and transcatheter interventions, including valve repair and replacement, based on the severity of the disease and patient-specific factors.

Follow-Up and Monitoring: The document outlines the importance of regular follow-up and monitoring of patients with MR, including periodic imaging and assessment of ventricular function.

2021 ESC/EACTS Guidelines for the Management of Valvular Heart Disease [7]

Study Design: The study involved the development of guidelines for the management of valvular heart disease (VHD) by the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). The guidelines were developed by a task force of selected experts in the field, representing various ESC sub-specialty groups. The process included a comprehensive review of published evidence, diagnostic and therapeutic procedures, and assessment of the risk-benefit ratio.

Target Population: The guidelines focus on patients with valvular heart disease (VHD), including those with aortic regurgitation, aortic stenosis, mitral regurgitation, mitral stenosis, tricuspid regurgitation, tricuspid stenosis, and prosthetic heart valves. The target population encompasses a wide range of valvular heart conditions and patient demographics.

Key Factors:

Recommendations: The guidelines provide evidence-based recommendations for the diagnosis, management, and treatment of VHD, including surgical and transcatheter interventions, medical therapy, and follow-up care.

Diagnostic Testing: The guidelines emphasize the importance of accurate diagnosis, risk assessment, and selection of the most suitable type of intervention. Diagnostic testing includes echocardiography, cardiovascular magnetic resonance imaging (CMR), cardiovascular computed tomography (CCT), and cardiac catheterization.

Medical Therapy: The guidelines recommend medical therapy for heart failure, arrhythmias, pulmonary hypertension, and other related conditions. Specific therapies include beta blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), and pulmonary vasodilators.

Surgical and Transcatheter Interventions: The guidelines provide detailed recommendations for surgical and transcatheter interventions for various valvular heart conditions, including aortic regurgitation, aortic stenosis, mitral regurgitation, mitral stenosis, tricuspid regurgitation, and tricuspid stenosis.

Follow-up Care: The guidelines emphasize the importance of lifelong follow-up care for VHD patients, including regular imaging, exercise testing, and monitoring for complications.

ANALYSIS OF EVIDENCE

Shared Findings [6–8]

All guidelines emphasize the importance of a multidisciplinary team for decision-making, integrating clinical, anatomical, and procedural factors, and patient preferences. Recommendations are tailored to individual patient risk profiles, comorbidities, anatomical suitability, and life expectancy. Surgical mitral valve replacement (MVR) remains the standard for patients who are not candidates for repair or transcatheter intervention, especially in primary mitral regurgitation (MR). Transcatheter edge-to-edge mitral valve replacement (TEER) is an evolving field, with most guidelines recommending it only in selected cases or clinical trials, particularly for patients at high surgical risk or with contraindications to surgery.

Choosing Between Surgical MVR and TEER

Surgical repair is preferred over replacement whenever feasible for primary MR, due to better outcomes and durability. Replacement is reserved for cases where repair is not possible or has failed. For secondary MR, surgical repair or replacement may be considered in patients with severe symptoms when guideline-directed medical therapy has failed, but evidence demonstrating survival benefit is limited. Surgical risk evaluation is crucial to shared decision-making [6–8].

TEER may be appropriate for patients with primary MR or secondary MR that meet criteria for surgical repair but are poor surgical candidates. Echocardiographic assessment and multidisciplinary team consensus are necessary to adequately determine eligibility for transcatheter interventions [8].

In Conclusion [6–8]

Surgical approaches remain the standard for most patients, with repair preferred over replacement when possible. Evaluation by a multi-disciplinary heart team and patient-centered decision-making are essential for selecting a treatment option. TEER is appropriate for select patients that are not suited for surgical techniques, but the strength of recommendations for other transcatheter approaches vary across sources, due to the limited but evolving evidence base for this emerging option.

POLICY HISTORY

Date	Summary
May 2026	• This guideline merges and replaces clinical indications from ECG 7310 for Mitral Valve Surgery and ECG 7335 for Transcatheter Edge to Edge Repair (TEER) of Mitral Valve • This guideline also merges codes from these guidelines

LEGAL AND COMPLIANCE

Guideline Approval

Committee

Reviewed / Approved by Evolent Specialty Services Clinical Guideline Review Committee

Disclaimer

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we only reference the relevant portion of the corresponding Evolent Clinical Guideline that is applicable to the specific service or item requested in order to determine medical necessity.

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