

Percutaneous Revascularization, Lower Extremity

ORG: S-1310 (ISC)

[Link to Codes](#)

MCG Health

Inpatient & Surgical Care
30th Edition

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Care Planning - Inpatient Admission and Alternatives

Clinical Indications for Procedure

- Procedure is indicated for **1 or more** of the following: **NNNNNN**
 - ☐ Intermittent claudication[A] and **ALL** of the following(1)(2)(12)(16):
 - Significant functional or lifestyle-altering impairment from pain despite maximally tolerated nonoperative therapy (eg, medication, smoking cessation, exercise program)(1)(2)(12)(17)
 - Patient has sufficient mobility to benefit from treatment and is without other disease that further precludes walking (eg, severe heart failure).(1)
 - Documentation of significant occlusive arterial disease (eg, ankle-brachial index, imaging, angiography)(1)

- Lesion(s) thought to be hemodynamically significant and likely limiting perfusion[B](1)(2)
- Lesion(s) amenable to percutaneous intervention[C](1)(18)
- ☐ Chronic limb-threatening ischemia (also known as critical limb ischemia)[D] and **ALL** of the following(1)(2)(12):
 - Severe limb ischemia, as indicated by **1 or more** of the following:
 - Pain at rest(1)(2)(3)
 - Nonhealing wound or ulcer from ischemia (eg, wound progresses or fails to reduce in size by 50% or more despite 4 weeks of appropriate medical therapy)(1)(2)
 - Gangrene(1)(2)(3)
 - Documentation of significant occlusive arterial disease (eg, ankle-brachial index, imaging, angiography)(1)(2)(13)
 - Lesion(s) thought to be hemodynamically significant and likely limiting perfusion[B](1)(2)(13)
 - Lesion(s) amenable to percutaneous intervention(1)(2)(13)
- Procedure performed as part of staged revascularization strategy (eg, surgical bypass performed recently, with clinical indications criteria met at that time)(1)(2)(20)
- Acute limb ischemia[E] and procedure performed concomitantly to address additional chronically obstructive lesions (ie, catheter-based thrombolysis to treat acute thromboembolic lesion, and angioplasty with or without stenting to address chronically stenotic lesion(s) causing pre-existing critical limb ischemia)[D](1)(2)(3)
- In-stent restenosis in previously stented patient(12)(14)(21)
- Graft failure (eg, restenosis, thrombosis) in previously revascularized patient(3)(12)(14)
- Patient with lower extremity arterial stenosis who requires large-diameter vascular access for coronary, large vascular (eg, aortic) or valvular intervention (eg, transcatheter aortic valve replacement), and alternative access is unsuitable or unavailable(1)(12)
- Peripheral artery aneurysm at risk for rupture or thromboembolic complications (eg, popliteal artery aneurysm) and amenable to stent placement(15)(22)

Alternatives to Procedure

- Alternatives include:[NN](#)
 - Medical therapy (eg, platelet inhibitor, smoking cessation, diabetes control, antihypertensive therapy, statins, cilostazol, antibiotics for infection)(1)(2)(17)(19)(27)
 - Multimodal pain management(28)
 - Supervised or structured exercise rehabilitation(1)(2)(29)(30)(31)
 - Peripheral artery bypass surgery. See Femoral Popliteal Bypass [ISC](#) or Aortofemoral or Aortoiliac Bypass [ISC](#) guideline.(1)(2)(26)(32)
 - Aortoiliac, ileofemoral, or common femoral endarterectomy(1)(2)(33)(34)
 - Femoral thromboendarterectomy with patch angioplasty(19)(35)
 - Hybrid open endarterectomy and stent procedure(36)
 - Hybrid femoral-femoral bypass with endovascular iliac angioplasty, with or without stent(37)
 - Anticoagulation or catheter-directed intra-arterial thrombolysis with thrombectomy (for acute limb ischemia)(2)(38)
 - Spinal cord stimulation (eg, symptom relief for nonreconstructible disease)(19)(39)
 - Open popliteal artery aneurysm repair(15)
 - Amputation. See Foot: Transmetatarsal Amputation [ISC](#) or Leg Amputation, Above or Below Knee [ISC](#) guideline.(1)(2)(19)
 - Palliative care(40)

Operative Status Criteria

Goal Length of Stay: Ambulatory

Note: The definition of an ambulatory procedure depends on payer-provider contractual agreement or regulatory language (eg, CMS' Two-Midnight Rule). An ambulatory procedure may include one postoperative overnight stay in a facility; therefore, MCG's ambulatory Goal Length of Stay (GLOS) attainment calculation reports the sum of same-day and next-day postoperative discharges. Depending on various patient and procedural factors, some patients undergoing a procedure with an ambulatory GLOS require inpatient care (eg, medical necessity for hospital-based care across 2 or more postoperative midnights). Some of these factors are described in the Extended Stay section of this guideline.

- Ambulatory
- Inpatient (eg, medical necessity for hospital-based care across 2 or more postoperative midnights)
- Inpatient (Medicare patient, and specific procedure is on CMS Inpatient Only List)

Hospitalization

Optimal Recovery Course

Day	Level of Care	Clinical Status	Activity	Routes	Interventions	Medications
1	• Social Determinants of Health Assessment • OR, catheterization lab, or radiology suite to recovery to discharge[F] • Discharge planning	• Hemodynamic stability • Arterial puncture site without evidence of infection, aneurysm, or growing hematoma • Distal perfusion acceptable • No evidence of infection at catheterization site • No new neurologic deficits • Pain absent or managed • Lower extremity ulcer or infection absent or wound care needs acceptable for next level of care • Discharge plans and education understood	• Ambulatory or acceptable for next level of care	• IV fluids for procedure • IV medications for procedure • Oral hydration[G] • Oral medications or regimen acceptable for next level of care • Oral diet or acceptable for next level of care	• Vascular sheath removed • Possible lower extremity wound care • Vascular checks	• Antithrombotic therapy[H] • Possible prophylactic antibiotics[I]

(1)(5)(42)NN

Recovery Milestones are indicated in **bold**.

Goal Length of Stay: Ambulatory

Note: Goal Length of Stay assumes optimal recovery, decision making, and care. Patients may be discharged to a lower level of care (either later than or sooner than the goal) when it is appropriate for their clinical status and care needs.

Extended Stay

Minimal (a few hours to 1 day), Brief (1 to 3 days), Moderate (4 to 7 days), and Prolonged (more than 7 days).

- Inpatient stay (eg, need for hospital-based care beyond postoperative day 1) may be needed for(44):
 - Failure to meet discharge criteria (recovery milestones in Optimal Recovery Course)
 - Expect brief stay extension.
 - Failed angioplasty or stenting procedure or procedural complications, such as acute vessel closure, vessel perforation, stent embolization, major hematoma, thrombosis, or vessel dissection(2)(45)(46)
 - Anticipate urgent repeat intervention or surgery.
 - Expect brief stay extension.
 - Acute kidney injury (eg, contrast-induced nephrotoxicity)
 - Anticipate IV hydration and repeat renal function tests.
 - Expect brief stay extension.
 - Serious infection (eg, wet gangrene, infected graft, sepsis)
 - Anticipate IV hydration and IV antibiotic therapy.
 - Anticipate need for extensive and ongoing debridement or reintervention.
 - Expect brief to moderate stay extension.
 - Acute limb ischemia(47)
 - Anticipate possible need for catheter-directed infusion.
 - Expect brief stay extension.
 - Acute venous thromboembolism(48)(49)
 - Anticipate inpatient anticoagulation and arrangements for outpatient anticoagulation.
 - Expect brief stay extension.
 - Unstable comorbidities that require inpatient treatment (eg, heart failure, renal insufficiency, COPD)
 - Anticipate treatment of specific comorbidity.
 - Expect brief stay extension.
 - Postreperfusion compartment syndrome(50)
 - Anticipate tissue pressure monitoring and possible fasciotomy.
 - Expect brief to moderate stay extension.
 - Periprocedural cardiovascular adverse event (eg, myocardial infarction, stroke)
 - Anticipate cardiac monitoring, biomarkers, and anti-ischemic and antithrombotic therapy.
 - Expect brief to moderate stay extension.

See Common Complications and Conditions [ISC](#) for further information.

Discharge

Discharge Planning

- Discharge planning includes[J]:
 - Assessment of needs and planning for care, including(52)(53):
 - Develop and modify treatment plan (involving multiple providers) as needed.
 - Evaluate and address preadmission functioning as needed.

- Evaluate and address psychosocial status issues as indicated. See Psychosocial Assessment [SR](#) for further information.
- Evaluate and address social determinants of health (eg, housing, food). See Social Determinants of Health Screening Tool [SR](#) for further information.(54)(55)(56)
- Evaluate and address patient or caregiver preferences as indicated.
- Identify skilled services needed at next level of care, with specific attention to:
 - Cardiovascular status assessment(57)(58)
 - Medication management, adherence instruction, and side effects assessment(59)
 - Significant chronic condition exacerbation with need for clinical intervention and monitoring
 - Wound or dressing management(60)(61)
- Early identification of anticipated discharge destination; options include(53)(62):
 - Home; considerations include:
 - Home safety assessment. See Home Safety Assessment [SR](#) for further information.
 - ☐ Patient safe to go home; examples include(63)(64)(65):
 - Medical status stable for patient's condition
 - Functional care can safely be provided with available resources.
 - Mental status stable for patient's condition
 - Medication availability confirmed and reconciliation complete
 - Patient/caregiver education completed with written discharge instructions provided
 - Community resources identified and referrals made, as needed
 - Home care arranged, if indicated
 - Necessary medical equipment delivery arranged or available in home, if indicated
 - Necessary medical supplies ordered, or patient/caregiver can obtain, if indicated
 - Access to follow-up care
 - Self-management ability if appropriate. See Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) Assessment [SR](#) for further information.
 - Caregiver need, ability, and availability
 - Post-acute skilled care or custodial care as indicated. See Discharge Planning Tool [SR](#) for further information.
- Transitions of care plan complete, including(53)(62)(66):
 - Patient and caregiver education complete.
 - See Teach-Back Tool [SR](#) for further information.
 - See Percutaneous Revascularization, Lower Extremity: Patient Education for Clinicians [SR](#) for further information.
 - ☐ Medication reconciliation completion includes(59)(67):
 - Compare patient's discharge list of medications (prescribed and over-the-counter) against provider's admission or transfer orders.
 - Assess each medication for correlation to disease state or medical condition.
 - Report medication discrepancies to prescribing provider, attending physician, and primary care provider, and ensure accurate medication order is identified.
 - Provide reconciled medication list to all treating providers.
 - Confirm that patient or caregiver can acquire medication.
 - Educate patient and caregiver.
 - Provide complete medication list to patient and caregiver.

- Importance of presenting personal medication list to all providers at each care transition, including all provider appointments
 - Reason, dosage, and timing of medication (eg, use "teach-back" techniques)(68)
- Encourage communication between patient, caregiver, and pharmacy for obtaining prescriptions, setting up home medication delivery, and reviewing for drug-drug interactions.
- See Medication Reconciliation Tool [SR](#) for further information.
- Plan communicated to patient, caregiver, and all members of care team, including(69):
 - Inpatient care and service providers
 - Primary care provider
 - All post-discharge care and service providers
- Appointments planned or scheduled, which may include:
 - Primary care provider(70)
 - Cardiologist
 - Specialists for management of comorbidities as needed
 - Vascular surgeon(71)
 - Other
- Outpatient testing and procedure plans made, which may include:
 - Other
- Referrals made for assistance or support, which may include:
 - Alcohol and other drug abuse or dependence treatment(72)(73)
 - Educational program (eg, chronic condition management, self-management)(70)(74)
 - Financial, for follow-up care, medication, and transportation(54)
 - Self-help or support groups(58)
 - Social services (eg, social programs, advance directives)
 - Tobacco use treatment(2)(75)(76)
 - Other
- Medical equipment and supplies coordinated (ie, delivered or delivery confirmed), which may include:
 - Blood pressure cuff(77)
 - Wound care equipment and supplies(78)
 - Other

Discharge Destination

- Post-hospital levels of admission may include:
 - Home.
 - Home healthcare. See Home Care Indications for Admission Section [HC](#) in Percutaneous Revascularization, Lower Extremity guideline in Home Care.
 - Recovery facility care. See Recovery Facility Care Indications for Admission Section [RFC](#) in Percutaneous Revascularization, Lower Extremity guideline in Recovery Facility Care.

Evidence Summary

Background

Percutaneous revascularization may be performed by angioplasty with either an uncoated or drug-eluting balloon; with placement of a bare metal, covered, or drug-eluting stent; by mechanical atherectomy; or by intravascular lithotripsy.(1)(2)(3)(4)(5) **(EG 2)** The use of paclitaxel-coated balloons and stents for percutaneous revascularization has recently been called into question and defended.(6)(7)(8)(9)(10) **(EG 2)** A network meta-analysis of 19 randomized controlled trials comparing primary nitinol stents (a type of bare metal stent) with drug-coated balloon angioplasty and plain balloon angioplasty in the treatment of femoropopliteal atherosclerotic disease found that both the primary nitinol stent and drug-coated balloon angioplasty were associated with superior outcomes to a plain balloon angioplasty in terms of freedom from binary restenosis as well as need for target lesion revascularization at 6, 12, and 24 months post procedure.(8) **(EG 2)** A systematic review and meta-analysis of patients undergoing endovascular therapy comparing drug-coated balloons with drug-eluting stents (2 randomized controlled trials, 5 cohort studies, 4237 patients with drug-eluting stent, 9234 patients with drug-coated balloon) found no significant difference in all-cause mortality, primary vessel patency, and freedom from target lesion revascularization at 12 months.(11) **(EG 2)**

Criteria

The evidence for the clinical indications found in this guideline includes 18 published peer reviewed articles, 2 specialty society or other evidence-based guidelines, and 2 book sections.

For intermittent claudication, appropriate-use criteria endorsed by several specialty societies and a cardiovascular medicine textbook recommend lower extremity percutaneous revascularization for patients with significant occlusive arterial disease that is amenable to percutaneous intervention when there is intermittent claudication despite maximally tolerated nonoperative therapy.(2)(12) **(EG 2)**

For chronic limb-threatening ischemia, appropriate-use criteria endorsed by several specialty societies and a cardiovascular medicine textbook recommend lower extremity percutaneous revascularization when symptoms are severe and lesions are hemodynamically significant and amenable to percutaneous intervention.(2) (12) **(EG 2)** A narrative review notes that patients with chronic limb-threatening ischemia may be candidates for percutaneous revascularization if they have discrete occlusive disease and high surgical risk.(13) **(EG 2)**

For patients with recent revascularization, a specialty society guideline supports lower extremity percutaneous revascularization procedure if it is performed as part of a staged revascularization strategy.(1) **(EG 2)**

For in-stent restenosis in a lower extremity that was previously stented, appropriate-use criteria endorsed by multiple specialty societies support percutaneous revascularization for focal or diffuse stenosis.(12) **(EG 2)**

For venous or prosthetic graft failure from a prior surgical revascularization procedure, a consensus statement supports endovascular intervention as a first-line treatment for restenosis or occlusion.(14) **(EG 2)**

A retrospective review of a national database of adult Medicare patients with popliteal artery aneurysm who underwent either endovascular or open surgical repair found that, after propensity score matching (396 pairs), there were no differences in 30-day mortality, reintervention, or major amputation within 5 years of follow-up; however, patients who underwent endovascular repair had a shorter length of stay and were more likely to be discharged to home.(15) **(EG 2)**

Alternatives

A specialty society guideline, based upon a systematic review of the published evidence, recommends medical management, including supervised or structured exercise programs, smoking cessation, glycemic control, antihypertensive therapy, platelet inhibitors, statins, and cilostazol, as first-line therapy for intermittent claudication.(1) **(EG 2)**

Analysis of pooled data of 6 randomized controlled trials of adult patients who underwent either endovascular therapy with stent implantation or bypass surgery for symptomatic femoropopliteal peripheral arterial disease (639 patients, mean age 68 years) found, after controlling for covariates, that there was no significant

difference between the 2 approaches in major adverse limb events and amputation-free survival after 2 years of follow-up; however, endovascular therapy with stent placement was associated with lower rates of complications within 30 days of the procedure but also with lower rates of primary patency of the vessel.(23) **(EG 1)** A retrospective review of a national database of adult patients with critical limb ischemia who underwent either endovascular revascularization or surgical revascularization (66,277 patients) found, after propensity score matching (11,106 pairs), that results were equivalent for mortality at 6 months and endovascular revascularization was associated with lower risk of complications but an increased risk of major amputation when compared with surgical revascularization; however, the risk of amputation was similar between the 2 procedures when both procedures were performed at high-volume centers.(24) **(EG 2)** A meta-analysis encompassing 42 randomized controlled trials (6867 patients) comparing the safety and efficacy of drug-coated devices (stents and balloons) with bypass surgery with saphenous vein graft in the treatment of femoropopliteal arterial occlusive disease found, after Bayesian analysis and indirect comparisons, that there was no significant difference between bypass with saphenous vein graft and drug-coated devices in short-term efficacy or short-term and long-term mortality.(25) **(EG 1)** A randomized controlled trial of 1434 patients (mean age 67 years) with chronic limb-threatening ischemia found, after a median follow-up of 2.7 years, that in patients who had an adequate great saphenous vein for use in bypass, surgical revascularization resulted in lower mortality and adverse limb events (including amputation, thrombectomy, thrombolysis, or requirement of a new graft or graft revision) (hazard ratio 0.68, 95% confidence interval 0.59 to 0.79) when compared with patients who had received endovascular therapy.(26) **(EG 1)**

Hospitalization

A study of 6564 patients (median age 67 years) with peripheral arterial disease undergoing lower extremity revascularization (35% surgical bypass, 65% endovascular) and randomized to postprocedure rivaroxaban plus antiplatelet therapy or placebo plus antiplatelet therapy found that the rivaroxaban group had a lower 3-year composite outcome of acute limb ischemia, amputation, myocardial infarction, stroke, or cardiovascular mortality (17.3% vs 19.9%), as well as fewer unplanned subsequent index limb revascularization procedures (17.8% vs 20.0%); however, International Society on Thrombosis and Haemostasis (ISTH)-defined major bleeding events were higher (5.9% vs 4.1%).(43) **(EG 1)**

Length of Stay

Analysis of procedure data for a commercially insured population shows 76% of patients undergoing lower extremity percutaneous revascularization were discharged the day of or the day after surgery.(42) **(EG 3)** Analysis of procedure data for a Medicare-insured population shows 77% of patients undergoing lower extremity percutaneous revascularization were discharged the day of or the day after surgery.(42) **(EG 3)**

Rationale

Use of this MCG care guideline helps the clinician identify, for a given procedure, which patient-specific factors and clinical conditions are appropriate for that procedure. The evidence-based clinical criteria assist the clinician in the decision to appropriately perform a procedure, evaluating whether the potential benefits of a procedure outweigh the potential risks. For Medicare enrollees, surgical MCG care guidelines also identify which procedures CMS has designated as inpatient only.

Use of these evidence-based clinical criteria to support decision making around the need for a given procedure is of benefit to the patient, as all procedures come with inherent risk that must be balanced by anticipated clinical benefit. Utilizing evidence-based clinical criteria enables a more accurate and patient-specific decision-making process. In addition, the use of evidence-based guidelines can help reduce unwarranted variation in care, such as divergent clinical thresholds to perform a procedure for clinically similar patients that vary across geographic regions, between facilities, and among individual clinicians.

Related CMS Coverage Guidance

This guideline supplements but does not replace, modify, or supersede existing Medicare regulations or applicable National Coverage Determinations (NCDs) or Local Coverage Determinations (LCDs).

Code of Federal Regulations (CFR): 42 CFR 412.3(79); 42 CFR 419.22(80); 42 CFR 422.101(81)

Internet-Only Manual (IOM) Citations: CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 1 - Inpatient Hospital Services Covered Under Part A(82); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 6 - Hospital Services Covered Under Part B(83); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 15 - Covered Medical and Other Health Services(84); CMS IOM Publication 100-08, Medicare Program Integrity Manual, Chapter 6, Section 6.5 - Medical Review of Inpatient Hospital Claims for Part A Payment(85)

Medicare Coverage Determinations: Medicare Coverage Database(86)

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Footnotes

[A] Claudication is defined as fatigue, discomfort, cramping, or pain of vascular origin in the muscles of the lower extremities that is consistently induced by exercise and consistently relieved by rest (within 10 minutes).(1) [A in Context Link 1, 2]

[B] A stenotic lesion seen by angiography (ie, lumen occluded 50% to 70%) may not be hemodynamically significant (ie, the cause of limited perfusion). Resting or provoked intravascular pressure measurements and segmental limb pressure studies may be needed to determine whether lesions are hemodynamically significant.(1) [B in Context Link 1, 2]

[C] A specialty society guideline recommends endovascular treatment of aortoiliac or femoropopliteal occlusive disease as an effective alternative to surgical bypass for patients with lifestyle-limiting claudication.(1) The utility of endovascular revascularization for patients with infrapopliteal artery disease is not established.(1) [C in Context Link 1]

[D] Chronic limb-threatening ischemia (also known as critical limb ischemia) is defined as a condition characterized by chronic (2 weeks or longer) ischemic rest pain, nonhealing wound/ulcer, or gangrene in one or both legs attributable to objectively proven arterial occlusive disease.(12) The term "chronic limb-threatening ischemia" is preferred over "critical limb ischemia" as it includes a broader spectrum of patients with chronic atherosclerotic disease who are at risk for limb-threatening ischemia and excludes nonatherosclerotic conditions (eg, embolism, trauma, neoplasm, vasculitis).(3)(19) [D in Context Link 1, 2, 3]

[E] Acute limb ischemia (ALI) is defined as acute (less than 2 weeks) severe hypoperfusion of the limb that may be characterized by pain, pallor, pulselessness, poikilothermia (inability to regulate temperature), paresthesia, and paralysis. Affected limbs are then characterized as viable (limb not immediately threatened, restoration of perfusion within 6 to 24 hours required, immediate anticoagulation initiated), threatened (restoration of perfusion within 6 hours required, immediate anticoagulation initiated), or irreversible (amputation). The etiology of ALI is usually embolism (eg, cardiac source) or in situ thrombosis. Catheter-based intra-arterial thrombolysis is the first-line means of perfusion restoration, with or without adjunctive percutaneous mechanical thrombectomy. Patients with contraindications to

thrombolysis (eg, recent cerebrovascular accident, GI bleeding) are treated with open surgical thromboembolectomy. Patients with concomitant critical limb ischemia (eg, symptoms of more than 2 weeks' duration due to additional chronically obstructive lesions) may undergo combined (hybrid) treatment including both thrombolysis and angioplasty of the chronic lesion(s).(1)(2)(3) [E in Context Link 1]

[F] For ambulatory operative status criteria patients, see Ambulatory Surgery Discharge and Complications: Common Complications and Conditions  ISC as needed. [F in Context Link 1]

[G] Some patients may have their hydration needs met via alternative means (eg, percutaneous endoscopic gastrostomy tube). [G in Context Link 1]

[H] Antithrombotic therapy refers to either anticoagulation or antiplatelet therapy. [H in Context Link 1]

[I] Prophylaxis is not routinely recommended for percutaneous revascularization procedures but may be considered for high-risk patients or for higher-risk procedures.(41) [I in Context Link 1]

[J] Discharge instructions should be given in the patient's and caregiver's native language using trained language interpreters whenever possible.(51) [J in Context Link 1]

Definitions

Hemodynamic stability

- Hemodynamic stability, as indicated by **1 or more** of the following:
 - Hemodynamic abnormalities at baseline or acceptable for next level of care
 - Patient hemodynamically stable, as indicated by **ALL** of the following(1)(2):
 - Tachycardia absent
 - Hypotension absent
 - No evidence of inadequate perfusion (eg, no myocardial ischemia)
 - No other hemodynamic abnormalities (eg, no Orthostatic hypotension)

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Hypotension absent

- Hypotension absent,[A] as indicated by **1 or more** of the following:
 - Hypotension absent in adult patient, as indicated by **1 or more** of the following:
 - Systolic blood pressure greater than or equal to 90 mm Hg[A](1)
 - Mean arterial pressure[B] greater than or equal to 70 mm Hg  MAP Calculator[A](1)(2)
 - Blood pressure at patient's baseline (eg, healthy adult with low systolic blood pressure), at intentional therapeutic goal (eg, patient with heart failure), or acceptable for next level of care (eg, blood pressure stable and no significant signs or symptoms due to low blood pressure)
 - Hypotension absent in pediatric patient, as indicated by **1 or more** of the following:

- Systolic blood pressure greater than or equal to 110 mm Hg in child 13 to 17 years of age^{[A](3)}
- Systolic blood pressure greater than or equal to 100 mm Hg in child 6 to 12 years of age^{[A](3)}
- Systolic blood pressure greater than or equal to 95 mm Hg in child 3 to 5 years of age^{[A](3)}
- Systolic blood pressure greater than or equal to 90 mm Hg in child 1 or 2 years of age^{[A](3)}
- Systolic blood pressure greater than or equal to 80 mm Hg in infant 6 to 11 months of age^{[A](3)}
- Systolic blood pressure greater than or equal to 70 mm Hg in infant 3 to 5 months of age^{[A](3)}
- Systolic blood pressure greater than or equal to 65 mm Hg in infant 1 or 2 months of age^{[A](3)}
- Blood pressure at patient's baseline (eg, healthy child with low systolic blood pressure), at intentional therapeutic goal, or acceptable for next level of care (eg, blood pressure stable and no significant signs or symptoms due to low blood pressure)

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Footnotes

- A. Criteria based upon clinician-acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.
- B. The mean arterial pressure (MAP) takes into account both SBP and DBP readings.

Orthostatic hypotension

- Orthostatic hypotension,^{[A][B]} as indicated by **1 or more** of the following⁽¹⁾⁽²⁾⁽³⁾:
 - Fall in SBP of 20 mm Hg or more 1 to 3 minutes after patient sits or stands from recumbent position
 - Fall in DBP of 10 mm Hg or more 1 to 3 minutes after patient sits or stands from recumbent position

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Footnotes

- A. Concomitant measurements of the heart rate are important to measure to help diagnose subtypes of orthostatic hypotension (eg, the lack of a compensatory increase in heart rate is typical of autonomic failure and an exaggerated tachycardia may be reflective of volume depletion). However, the heart rate is not a component of the definition of orthostatic hypotension, which relies upon blood pressure alone.⁽¹⁾⁽²⁾⁽³⁾

B. Criteria based upon clinician acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

Social Determinants of Health Assessment

- Risk of poor health outcomes may be increased by the presence of **1 or more** of the following social determinants of health(1)(2)(3):
 - Housing insecurity, as indicated by **1 or more** of the following:
 - Individual or caregiver's current living situation is **1 or more** of the following(4):
 - Does not have own housing (eg, staying in a hotel, shelter, or with others)
 - Has own housing (eg, house, apartment), but at risk of losing it in the future (ie, behind on rent or mortgage)
 - Has own housing (eg, house, apartment), but has lived in 3 or more places in past year
 - Current housing has **1 or more** of the following:
 - Electrical appliances (eg, stove, refrigerator) not working or unavailable
 - Insufficient heating or cooling
 - Insufficient ventilation
 - Lead paint or pipes
 - Mold
 - Pests (eg, bugs) or rodents
 - Smoke detectors not working or unavailable
 - Food insecurity, as indicated by **1 or more** of the following(5):
 - In the past year, individual or caregiver ran out of food and did not have money to buy more food.
 - In the past year, individual or caregiver worried that they would run out of food before they received money to buy more food.
 - Insufficient transportation, as indicated by **1 or more** of the following(6):
 - In the past year, individual or caregiver missed medical appointments or could not get medications due to lack of transportation.
 - In the past year, individual or caregiver missed nonmedical activities, work, or could not get things needed for daily living due to lack of transportation.
 - Insufficient utilities, as indicated by **1 or more** of the following(7):
 - Utilities (eg, electricity, water, gas, or oil) are currently shut off or unavailable.
 - In the past year, electric, water, gas, or oil company threatened to shut off services.
 - Personal safety risk, as indicated by **2 or more** of the following(5):
 - Individual is sometimes or frequently physically hurt by another person (including family member).
 - Individual is sometimes or frequently insulted or talked down to by another person (including family member).
 - Individual is sometimes or frequently threatened with physical harm by another person (including family member).
 - Individual is sometimes or frequently screamed or cursed at by another person (including family member).
 - Insufficient dependent care, as indicated by **1 or more** of the following:
 - In the past year, individual or caregiver was unable to work due to lack of dependent care.
 - In the past year, individual or caregiver was unable to work more (additional) hours due to lack of dependent care.
 - In the past year, individual or caregiver missed medical appointments or could not get medications due to lack of dependent care.
 - In the past year, individual or caregiver missed nonmedical activities (eg, school, church, social activity) due to lack of dependent care.
- Depression risk, as indicated by **ALL** of the following(8):
 - In the past 2 weeks, individual had little interest or pleasure in normal activities on at least several days.

- In the past 2 weeks, individual felt down, depressed, or hopeless on at least several days.

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Tachycardia absent

- Tachycardia[A][B] absent, as indicated by **1 or more** of the following:
 - Heart rate less than or equal to 100 beats per minute in adult[A][B](1)
 - Heart rate less than or equal to 85 beats per minute in child 13 to 17 years of age[A][B](2)
 - Heart rate less than or equal to 95 beats per minute in child 6 to 12 years of age[A][B](2)
 - Heart rate less than or equal to 110 beats per minute in child 1 to 5 years of age[A][B](2)
 - Heart rate less than or equal to 120 beats per minute in infant 3 to 11 months of age[A][B](2)
 - Heart rate less than or equal to 150 beats per minute in infant 1 or 2 months of age[A][B](2)

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Footnotes

- A. Criteria based upon clinician acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.
- B. Interpretation of heart rate requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline heart rate, medications, and clinical impact. For example, an elderly patient on a beta-blocker medication with a baseline resting heart rate of 60 beats per minute may be clinically

tachycardic at a heart rate of 94 beats per minute. Likewise, a patient who is upset, in pain, or nervous in the emergency department with a heart rate of 106 beats per minute may meet the technical definition of tachycardia, but this tachycardia (absent associated findings such as chest pain or hypotension) may not be clinically important. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term tachycardia. Whether a heart rate above or below the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment.

Codes

ICD-10 Diagnosis: E08.51, E08.52, E08.59, E08.65, E09.51, E09.52, E09.59, E10.51, E10.52, E10.59, E11.51, E11.52, E11.59, E13.51, E13.52, E13.59, I70.201, I70.202, I70.203, I70.208, I70.209, I70.211, I70.212, I70.213, I70.218, I70.219, I70.221, I70.222, I70.223, I70.228, I70.229, I70.231, I70.232, I70.233, I70.234, I70.235, I70.238, I70.239, I70.241, I70.242, I70.243, I70.244, I70.245, I70.248, I70.249, I70.25, I70.261, I70.262, I70.263, I70.268, I70.269, I70.291, I70.292, I70.293, I70.298, I70.299, I70.301, I70.302, I70.303, I70.308, I70.309, I70.311, I70.312, I70.313, I70.318, I70.319, I70.321, I70.322, I70.323, I70.328, I70.329, I70.331, I70.332, I70.333, I70.334, I70.335, I70.338, I70.339, I70.341, I70.342, I70.343, I70.344, I70.345, I70.348, I70.349, I70.35, I70.361, I70.362, I70.363, I70.368, I70.369, I70.391, I70.392, I70.393, I70.398, I70.399, I70.401, I70.402, I70.403, I70.408, I70.409, I70.411, I70.412, I70.413, I70.418, I70.419, I70.421, I70.422, I70.423, I70.428, I70.429, I70.431, I70.432, I70.433, I70.434, I70.435, I70.438, I70.439, I70.441, I70.442, I70.443, I70.444, I70.445, I70.448, I70.449, I70.45, I70.461, I70.462, I70.463, I70.468, I70.469, I70.491, I70.492, I70.493, I70.498, I70.499, I70.501, I70.502, I70.503, I70.508, I70.509, I70.511, I70.512, I70.513, I70.518, I70.519, I70.521, I70.522, I70.523, I70.528, I70.529, I70.531, I70.532, I70.533, I70.534, I70.535, I70.538, I70.539, I70.541, I70.542, I70.543, I70.544, I70.545, I70.548, I70.549, I70.55, I70.561, I70.562, I70.563, I70.568, I70.569, I70.591, I70.592, I70.593, I70.598, I70.599, I70.601, I70.602, I70.603, I70.608, I70.609, I70.611, I70.612, I70.613, I70.618, I70.619, I70.621, I70.622, I70.623, I70.628, I70.629, I70.631, I70.632, I70.633, I70.634, I70.635, I70.638, I70.639, I70.641, I70.642, I70.643, I70.644, I70.645, I70.648, I70.649, I70.65, I70.661, I70.662, I70.663, I70.668, I70.669, I70.691, I70.692, I70.693, I70.698, I70.699, I70.701, I70.702, I70.703, I70.708, I70.709, I70.711, I70.712, I70.713, I70.718, I70.719, I70.721, I70.722, I70.723, I70.728, I70.729, I70.731, I70.732, I70.733, I70.734, I70.735, I70.738, I70.739, I70.741, I70.742, I70.743, I70.744, I70.745, I70.748, I70.749, I70.75, I70.761, I70.762, I70.763, I70.768, I70.769, I70.791, I70.792, I70.793, I70.798, I70.799, I70.92, I72.4, I75.021, I75.022, I75.023, I75.029, T82.856A [Hide]

ICD-10 Procedure: 047C341, 047C34Z, 047C35Z, 047C36Z, 047C37Z, 047C3D1, 047C3DZ, 047C3EZ, 047C3FZ, 047C3GZ, 047C3Z1, 047C3ZZ, 047D341, 047D34Z, 047D35Z, 047D36Z, 047D37Z, 047D3D1, 047D3DZ, 047D3EZ, 047D3FZ, 047D3GZ, 047D3Z1, 047D3ZZ, 047E341, 047E34Z, 047E35Z, 047E36Z, 047E37Z, 047E3D1, 047E3DZ, 047E3EZ, 047E3FZ, 047E3GZ, 047E3Z1, 047E3ZZ, 047F341, 047F34Z, 047F35Z, 047F36Z, 047F37Z, 047F3D1, 047F3DZ, 047F3EZ, 047F3FZ, 047F3GZ, 047F3Z1, 047F3ZZ, 047H341, 047H34Z, 047H35Z, 047H36Z, 047H37Z, 047H3D1, 047H3DZ, 047H3EZ, 047H3FZ, 047H3GZ, 047H3Z1, 047H3ZZ, 047J341, 047J34Z, 047J35Z, 047J36Z, 047J37Z, 047J3D1, 047J3DZ, 047J3EZ, 047J3FZ, 047J3GZ, 047J3Z1, 047J3ZZ, 047K341, 047K34Z, 047K35Z, 047K36Z, 047K37Z, 047K3D1, 047K3DZ, 047K3EZ, 047K3FZ, 047K3GZ, 047K3Z1, 047K3ZZ, 047L341, 047L34Z, 047L35Z, 047L36Z, 047L37Z, 047L3D1, 047L3DZ, 047L3EZ, 047L3FZ, 047L3GZ, 047L3Z1, 047L3ZZ, 047M341, 047M34Z, 047M35Z, 047M36Z, 047M37Z, 047M3D1, 047M3DZ, 047M3EZ, 047M3FZ, 047M3GZ, 047M3Z1, 047M3ZZ, 047N341, 047N34Z, 047N35Z, 047N36Z, 047N37Z, 047N3D1, 047N3DZ, 047N3EZ, 047N3FZ, 047N3GZ, 047N3Z1, 047N3ZZ, 047P341, 047P34Z, 047P35Z, 047P36Z, 047P37Z, 047P3D1, 047P3DZ, 047P3EZ, 047P3FZ, 047P3GZ, 047P3Z1, 047P3ZZ, 047Q341, 047Q34Z, 047Q35Z, 047Q36Z, 047Q37Z, 047Q3D1, 047Q3DZ, 047Q3EZ, 047Q3FZ, 047Q3GZ, 047Q3Z1, 047Q3ZZ, 047R341, 047R34Z, 047R35Z, 047R36Z, 047R37Z, 047R3D1, 047R3DZ, 047R3EZ, 047R3FZ, 047R3GZ, 047R3Z1, 047R3ZZ, 047S341, 047S34Z, 047S35Z, 047S36Z, 047S37Z, 047S3D1, 047S3DZ, 047S3EZ, 047S3FZ, 047S3GZ, 047S3Z1, 047S3ZZ, 047T341, 047T34Z, 047T35Z, 047T36Z, 047T37Z, 047T3D1, 047T3DZ, 047T3EZ, 047T3FZ, 047T3GZ, 047T3Z1, 047T3ZZ, 047U341, 047U34Z, 047U35Z, 047U36Z, 047U37Z, 047U3D1, 047U3DZ, 047U3EZ, 047U3FZ, 047U3GZ, 047U3Z1, 047U3ZZ, 047V341, 047V34Z, 047V35Z, 047V36Z, 047V37Z, 047V3D1, 047V3DZ, 047V3EZ, 047V3FZ, 047V3GZ, 047V3Z1, 047V3ZZ, 047W341, 047W34Z, 047W35Z, 047W36Z, 047W37Z, 047W3D1, 047W3DZ, 047W3EZ, 047W3FZ, 047W3GZ, 047W3Z1, 047W3ZZ, 047Y341, 047Y34Z, 047Y35Z, 047Y36Z, 047Y37Z, 047Y3D1, 047Y3DZ, 047Y3EZ, 047Y3FZ, 047Y3GZ, 047Y3Z1, 047Y3ZZ, 04CC3ZZ, 04CD3ZZ, 04CE3ZZ, 04CF3ZZ, 04CH3ZZ, 04CJ3ZZ, 04CK3ZZ, 04CL3ZZ, 04CM3ZZ, 04CN3ZZ, 04CP3ZZ, 04CQ3ZZ, 04CR3ZZ, 04CS3ZZ, 04CT3ZZ, 04CU3ZZ, 04CV3ZZ, 04CW3ZZ, 04CY3ZZ, X27P3TA, X27Q3TA, X27R3TA, X27S3TA, X27T3TA, X27U3TA [Hide]

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