

# CLINICAL APPROPRIATENESS GUIDELINES

# CARDIOLOGY

## Appropriate Use Criteria: Diagnostic Coronary Angiography

**EFFECTIVE SEPTEMBER 12, 2021**

**Proprietary**

Approval and implementation dates for specific health plans may vary. Please consult the applicable health plan for more details. AIM Specialty Health disclaims any responsibility for the completeness or accuracy of the information contained herein.



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## Description and Application of the Guidelines

The AIM Clinical Appropriateness Guidelines (hereinafter “the AIM Clinical Appropriateness Guidelines” or the “Guidelines”) are designed to assist providers in making the most appropriate treatment decision for a specific clinical condition for an individual. As used by AIM, the Guidelines establish objective and evidence-based criteria for medical necessity determinations where possible. In the process, multiple functions are accomplished:

- To establish criteria for when services are medically necessary
- To assist the practitioner as an educational tool
- To encourage standardization of medical practice patterns
- To curtail the performance of inappropriate and/or duplicate services
- To advocate for patient safety concerns
- To enhance the quality of health care
- To promote the most efficient and cost-effective use of services

The AIM guideline development process complies with applicable accreditation standards, including the requirement that the Guidelines be developed with involvement from appropriate providers with current clinical expertise relevant to the Guidelines under review and be based on the most up-to-date clinical principles and best practices. Relevant citations are included in the References section attached to each Guideline. AIM reviews all of its Guidelines at least annually.

AIM makes its Guidelines publicly available on its website twenty-four hours a day, seven days a week. Copies of the AIM Clinical Appropriateness Guidelines are also available upon oral or written request. Although the Guidelines are publicly-available, AIM considers the Guidelines to be important, proprietary information of AIM, which cannot be sold, assigned, leased, licensed, reproduced or distributed without the written consent of AIM.

AIM applies objective and evidence-based criteria, and takes individual circumstances and the local delivery system into account when determining the medical appropriateness of health care services. The AIM Guidelines are just guidelines for the provision of specialty health services. These criteria are designed to guide both providers and reviewers to the most appropriate services based on a patient’s unique circumstances. In all cases, clinical judgment consistent with the standards of good medical practice should be used when applying the Guidelines. Guideline determinations are made based on the information provided at the time of the request. It is expected that medical necessity decisions may change as new 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 and for justifying and demonstrating the existence of medical necessity for the requested service. The Guidelines are not a substitute for the experience and judgment of a physician or other health care professionals. Any clinician seeking to apply or consult the Guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient’s care or treatment.

The Guidelines do not address coverage, benefit or other plan specific issues. Applicable federal and state coverage mandates take precedence over these clinical guidelines. If requested by a health plan, AIM will review requests based on health plan medical policy/guidelines in lieu of the AIM Guidelines.

The Guidelines may also be used by the health plan or by AIM for purposes of provider education, or to review the medical necessity of services by any provider who has been notified of the need for medical necessity review, due to billing practices or claims that are not consistent with other providers in terms of frequency or some other manner.

## General Clinical Guideline

### Clinical Appropriateness Framework

Critical to any finding of clinical appropriateness under the guidelines for a specific diagnostic or therapeutic intervention are the following elements:

- Prior to any intervention, it is essential that the clinician confirm the diagnosis or establish its pretest likelihood based on a complete evaluation of the patient. This includes a history and physical examination and, where applicable, a review of relevant laboratory studies, diagnostic testing, and response to prior therapeutic intervention.
- The anticipated benefit of the recommended intervention should outweigh any potential harms that may result (net benefit).
- Current literature and/or standards of medical practice should support that the recommended intervention offers the greatest net benefit among competing alternatives.
- Based on the clinical evaluation, current literature, and standards of medical practice, there exists a reasonable likelihood that the intervention will change management and/or lead to an improved outcome for the patient.

If these elements are not established with respect to a given request, the determination of appropriateness will most likely require a peer-to-peer conversation to understand the individual and unique facts that would supersede the requirements set forth above. During the peer-to-peer conversation, factors such as patient acuity and setting of service may also be taken into account.

### Simultaneous Ordering of Multiple Diagnostic or Therapeutic Interventions

Requests for multiple diagnostic or therapeutic interventions at the same time will often require a peer-to-peer conversation to understand the individual circumstances that support the medical necessity of performing all interventions simultaneously. This is based on the fact that appropriateness of additional intervention is often dependent on the outcome of the initial intervention.

Additionally, either of the following may apply:

- Current literature and/or standards of medical practice support that one of the requested diagnostic or therapeutic interventions is more appropriate in the clinical situation presented; or
- One of the diagnostic or therapeutic interventions requested is more likely to improve patient outcomes based on current literature and/or standards of medical practice.

### Repeat Diagnostic Intervention

In general, repeated testing of the same anatomic location for the same indication should be limited to evaluation following an intervention, or when there is a change in clinical status such that additional testing is required to determine next steps in management. At times, it may be necessary to repeat a test using different techniques or protocols to clarify a finding or result of the original study.

Repeated testing for the same indication using the same or similar technology may be subject to additional review or require peer-to-peer conversation in the following scenarios:

- Repeated diagnostic testing at the same facility due to technical issues
- Repeated diagnostic testing requested at a different facility due to provider preference or quality concerns
- Repeated diagnostic testing of the same anatomic area based on persistent symptoms with no clinical change, treatment, or intervention since the previous study
- Repeated diagnostic testing of the same anatomic area by different providers for the same member over a short period of time

## Repeat Therapeutic Intervention

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In general, repeated therapeutic intervention in the same anatomic area is considered appropriate when the prior intervention proved effective or beneficial and the expected duration of relief has lapsed. A repeat intervention requested prior to the expected duration of relief is not appropriate unless it can be confirmed that the prior intervention was never administered.

# Diagnostic Coronary Angiography

## Codes

*CPT® (Current Procedural Terminology) is a registered trademark of the American Medical Association (AMA). CPT® five digit codes, nomenclature and other data are copyright by the American Medical Association. All Rights Reserved. AMA does not directly or indirectly practice medicine or dispense medical services. AMA assumes no liability for the data contained herein or not contained herein.*

The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes. Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

### CPT/HCPCS

- 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
- 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

## General Information

### Standard Anatomic Coverage

- Coronary arteries

### Guideline Scope

- This guideline addresses the appropriate use of nonemergency coronary angiography. It does not pertain to coronary angiography when performed as part of an inpatient stay nor does it apply when urgent coronary angiography is performed in patients with unstable coronary syndrome (myocardial infarction and/or unstable angina pectoris).

### Imaging Considerations

- In addition to coronary angiography, diagnostic cardiac catheterization may include any or all of the following: left heart catheterization, right heart catheterization, left ventriculography, right ventriculography, aortography and intracardiac shunt studies. Only procedures which provide clinically relevant information should be performed at the time of coronary angiography.

- Selection of the optimal diagnostic imaging for cardiac evaluation should be made within the context of other available modalities (which include treadmill stress test, myocardial perfusion imaging, stress echocardiography, cardiac CT, cardiac MRI, and cardiac PET), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.
- Although the risk-benefit ratio for any procedure should dictate clinical appropriateness on a case-by-case basis, advanced age, advanced renal disease, advanced malignancy, or coagulopathy should be considered relative contraindications to coronary angiography.
- Providers who refer patients for coronary angiography and those who perform such procedures are responsible for considering safety issues. One of the most significant considerations is the requirement for intravascular iodinated contrast material, which may have an adverse effect on patients with a history of documented allergic contrast reactions or atopy, as well as on individuals with renal impairment, who are at greater risk for contrast-induced nephropathy.
- Since coronary angiography requires the use of fluoroscopy, it is critically important that every effort be made to minimize both patient and laboratory staff exposure to ionizing radiation.

## Requirements

- Elective coronary angiography is generally to be considered only when a patient has undergone noninvasive evaluation.
- Coronary angiography requires conscious sedation; it should only be performed at locations where cardiac monitoring and appropriate equipment for cardiopulmonary resuscitation are readily available.
- Coronary angiography is never clinically appropriate when used as a screening test in asymptomatic individuals.

**Table 1. Classification of EKG treadmill and stress test results**

TEST RESULT	EKG treadmill test <i>performed without imaging</i>	SPECT MPI or Stress PET <i>performed with imaging</i>	Stress Echocardiography <i>performed with imaging</i>
<b>Low risk</b>	Duke treadmill score $\geq 5$	< 5% ischemic myocardium	No stress-induced WMA
<b>Intermediate risk</b>	Duke treadmill score -10 to +4	5% to 10% ischemic myocardium	Stress-induced WMA in a single segment
<b>High risk</b>	<b>ANY</b> of the following: Duke treadmill score $\leq -11$ ST segment elevation Hypotension with exercise Ventricular tachycardia Prolonged ST segment depression	<b>ANY</b> of the following: > 10% ischemic myocardium Stress-induced WMA in 2 or more segments Significant stress-induced LV dysfunction Transient ischemic LV dilation	<b>ANY</b> of the following: Stress-induced WMA in 2 or more segments Significant stress-induced LV dysfunction Transient ischemic LV dilation

Excerpted from Table 1.3 in the ACCF/SCAI/AATS/AHA/ASE/ASNC/HFSA/HRS/SCCM/SCCT/SCMR/STS 2012 Appropriate Use Criteria for Diagnostic Catheterization (Patel, 2012)

MPI = myocardial perfusion imaging; WMA = wall motion abnormality

**Table 2. Pretest probability of coronary artery disease by age, gender, and symptoms**

Age (yrs)	Gender	Typical/Definite Angina Pectoris	Atypical/Probable Angina Pectoris	Nonanginal Chest Pain	Asymptomatic
30-39	Men	Intermediate	Intermediate	Low	Very Low
	Women	Intermediate	Very Low	Very Low	Very Low
40-49	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Low	Very Low	Very Low
50-59	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Intermediate	Low	Very Low
60-69	Men	High	Intermediate	Intermediate	Low
	Women	High	Intermediate	Intermediate	Low

Excerpted from Table A in the ACCF/SCAI/AATS/AHA/ASE/ASNC/HFSA/HRS/SCCM/SCCT/SCMR/STS 2012 Appropriate Use Criteria for Diagnostic Catheterization (Patel, 2012)

## Clinical Indications

### Patients with established coronary artery disease

Diagnostic coronary angiography is considered medically necessary in **EITHER** of the following scenarios:

- Asymptomatic patients with high-risk findings on noninvasive stress testing (see Table 1)
- Symptomatic patients with **ANY** of the following:
  - Intermediate- or high-risk findings on noninvasive stress testing (see Table 1)
  - Persistent symptoms despite use of (or contraindication to) guideline directed antianginal medical therapy
  - Angina, heart failure, or arrhythmia within 90 days of myocardial infarction when coronary angiography was not performed at the time of the infarction

### Patients with suspected coronary artery disease

Diagnostic coronary angiography is considered medically necessary in **EITHER** of the following scenarios:

- Asymptomatic patients with **ANY** of the following:
  - High-risk findings on noninvasive stress testing (see Table 1)
  - Resting LV systolic dysfunction (ejection fraction 40% or less) with evidence of viability in the dysfunctional segment
  - Lesions of unclear severity (left main) on CCTA
- Symptomatic patients with **ANY** of the following:
  - High pretest probability (see Table 2) of coronary artery disease (based on age, gender, and symptom description) in a patient with high risk of coronary artery disease (using ASCVD Pooled Cohort Equations)
  - Intermediate- or high-risk findings on noninvasive stress testing (see Table 1)
  - Low-risk findings on noninvasive stress testing (see Table 1) in a patient with ongoing ischemic equivalent symptoms
  - Equivocal or uninterpretable noninvasive stress testing
  - Resting LV systolic dysfunction (ejection fraction 40% or less) with evidence of viability in the dysfunctional segment



- Newly recognized LV systolic dysfunction (ejection fraction  $\leq$  49%) of unknown etiology
- Newly recognized regional wall motion abnormality of unknown etiology (regardless of ejection fraction)
- CCTA finding of  $>$  50% stenosis
- Lesions of unclear severity (left main or non left main) on CCTA

## Patients with either suspected or established coronary artery disease

Diagnostic coronary angiography is considered medically necessary in **ANY** of the following scenarios:

- Patients resuscitated from sudden cardiac death or with documented ventricular fibrillation or sustained ventricular tachycardia
- Following cardiac transplant in a patient who has not undergone coronary angiography in the preceding 6 months
- Patients scheduled to undergo valve replacement/repair who fall into **ANY** of the following categories:
  - Male  $>$  40 years
  - Women who are postmenopausal
  - Persons with known coronary artery disease
  - Persons with intermediate or high risk of coronary artery disease (using ASCVD Pooled Cohort Equations)
- Congenital heart disease in **EITHER** of the following scenarios:
  - To exclude coexistent atheromatous coronary artery disease in patients undergoing surgical repair of congenital heart disease who have intermediate or high risk of coronary artery disease (using ASCVD Pooled Cohort Equations)
  - To evaluate congenital coronary artery anomalies when **ANY** of the following apply:
    - Diagnosis has been established using CCTA or cardiac MR, and coronary angiography will provide additional information which will change management
    - Patient has undergone CCTA or cardiac MR, and the diagnosis could not be excluded
    - Neither CCTA nor MRI is available to establish or exclude the diagnosis in a patient with suspected disease
    - CCTA and MRI have been considered, but neither study is considered to be appropriate for a patient with suspected disease

## References

1. American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines; American Society of Echocardiography; American Society of Nuclear Cardiology; Heart Rhythm Society; Society of Cardiovascular Anesthesiologists; Society for Cardiovascular Angiography and Interventions; Society for Vascular Medicine; Society for Vascular Surgery, Fleisher LA, Beckman JA, Brown KA, et al. 2009 ACCF/AHA focused Update on Perioperative Beta Blockade Incorporated into the ACC/AHA 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery. *J Am Coll Cardiol.* 2009; 54(22):e13–e118.
2. Bashore TM, Balter S, Barac A, et al. 2012 American College of Cardiology Foundation/Society for Cardiovascular Angiography and Interventions expert consensus document on cardiac catheterization laboratory standards update: A report of the American College of Cardiology Foundation Task Force on Expert Consensus documents developed in collaboration with the Society of Thoracic Surgeons and Society for Vascular Medicine. *J Am Coll Cardiol.* 2012; 59(24):2221-2305.
3. Costanzo MR, Dipchand A, Starling R, et al. The International Society of Heart and Lung Transplantation Guidelines for the care of heart transplant recipients. *J Heart Lung Transplant.* 2010; 29(8):914-956.
4. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive Summary of The Third Report of The National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). *JAMA.* 2001; 285(19):2486–97.
5. Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, American Association for Thoracic Surgery, Preventive

Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. *J Am Coll Cardiol*. 2012; 60(24):e44–e164.

6. Gibbons RJ, Abrams J, Chatterjee K, et al. ACC/AHA 2002 guideline update for the management of patients with chronic stable angina--summary article: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines (Committee on the Management of Patients with Chronic Stable Angina). *J Am Coll Cardiol*. 2003; 41(1):159–68.
7. Goff DC, Jr., Lloyd-Jones DM, Bennett G, et al. 2013 ACC/AHA guideline on the assessment of cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Journal of the American College of Cardiology*. 2014;63(25 Pt B):2935-59.
8. Grani C, Buechel RR, Kaufmann PA, et al. Multimodality Imaging in Individuals With Anomalous Coronary Arteries. *JACC Cardiovasc Imaging*. 2017;10(4):471-81.
9. Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC Guidelines for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol*. 2014; 63(22):e57-185.
10. Patel MR, Bailey SR, Bonow RO, et al. ACCF/SCAI/AATS/AHA/ASE/ASNC/HFSA/HRS/SCCM/SCCT/SCMR/STS 2012 appropriate use criteria for diagnostic catheterization: a report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, Society for Cardiovascular Angiography and Interventions, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Failure Society of America, Heart Rhythm Society, Society of Critical Care Medicine, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and Society of Thoracic Surgeons. *J Am Coll Cardiol*. 2012; 59(22):1995–2027.
11. Scanlon PJ, Faxon DP, Audet AM, et al. ACC/AHA Guidelines for coronary angiography: A report of the American College of Cardiology/American Heart Association Task Force on practice guidelines (Committee on Coronary Angiography). Developed in collaboration with the Society for Cardiac Angiography and Interventions. *J Am Coll Cardiol*. 1999; 33(6):1756-1824.
12. Shaw LJ, Peterson ED, Shaw LK, et al. Use of a prognostic treadmill score in identifying diagnostic coronary disease subgroups. *Circulation*. 1998; 98(16):1622–30.
13. Stout KK, Daniels CJ, Aboulhosn JA, et al. 2018 AHA/ACC Guideline for the Management of Adults With Congenital Heart Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2019;139(14):e698-e800.
14. Warnes CA, Williams RG, Bashore TM, et al. ACC/AHA 2008 Guidelines for the management of adults with congenital heart disease: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (writing committee to develop guidelines for the management of adults with congenital heart disease). *Circulation*. 2008; 118(23):2395-2451.
15. Wolk MJ, Bailey SR, Doherty JU, et al. ACCF/AHA/ASE/ASNC/HFSA/HRS/SCAI/SCCT/SCMR/STS 2013 multimodality appropriate use criteria for the detection and risk assessment of stable ischemic heart disease: a report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Failure Society of America, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and Society of Thoracic Surgeons. *J Am Coll Cardiol*. 2014; 63(4):380-406.
16. Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA Guidelines for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on practice guidelines. *Circulation*. 2013; 128(16):e240-e327.

# History

Status	Review Date	Effective Date	Action
Revised	12/03/2020	09/12/2021	Independent Multispecialty Physician Panel (IMPP) review. Replaced use of SCORE risk calculator with the AHA/ACC risk calculator (ACSVD Pooled Cohort Equations). Added reference.
Revised	02/03/2020	03/14/2021	IMPP review. Added criteria to specify appropriate scenarios for evaluation of suspected congenital coronary artery anomalies.
Revised	07/11/2018	03/09/2019	IMPP review. Added the General Clinical Guideline.
Revised	03/01/2018	06/11/2018	IMPP review. Added language in preamble section to clarify application of this guideline to elective coronary angiography.
Revised	03/06/2017	01/02/2018	IMPP review. Original effective date.
Created	08/27/2015	-	Date of origin.