

# Evolut Clinical Guideline [0267328](#) for Stress Echocardiogram

|                                                                                                                                                             |                                                          |                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------|
| <b>Guideline <del>or Policy</del> Number:</b><br>Evolut_CG_ <a href="#">0267328</a>                                                                         | <b><u>Applicable Codes</u></b>                           |                                                               |
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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 for stress imaging, specifically Stress Echocardiography (SE) with appropriate preference for suitable alternatives, such as an exercise treadmill exam without imaging, when more suitable, unless otherwise stated (refer to **Background section**).

### Special Note

See [Legislative Language](#) for specific mandates in **Washington**~~Washington State~~.  
When a noncardiac explanation is provided for symptoms, no testing is required (AUC Score 8) <sup>(1)</sup>

### 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. <sup>(1,2-6,3,4,5)</sup>

## INDICATIONS FOR STRESS ECHOCARDIOGRAPHY <sup>-(1,7-10)</sup>

### Suspected Coronary Artery Disease (CAD)

- **Symptomatic patients without known CAD. No imaging stress test within the**

**last 12 months.** The terms "~~typical~~," "~~atypical~~," "~~typical~~", '~~atypical~~', and "~~non-anginal symptoms~~" can still be observed in medical records (consult the **Diamond Forrester table** in the **Definitions** section). However, the [American College of Cardiology \(ACC\)](#) has simplified its terminology to "~~Less likely anginal symptoms~~" and "~~Likely anginal symptoms~~" (refer to **Definitions**) and utilized below.

- Less-likely anginal symptoms ~~(AUC 4-6)~~
  - When baseline EKG makes standard exercise test inaccurate (see **Definitions** section) ~~—~~ [\(AUC Score 8\)](#) <sup>(1)</sup>
  - ~~When a noncardiac explanation is provided for symptoms, no testing is required (AUC 8)~~
- Likely Anginal Symptoms (typical angina)
  - < 50 years old with ≤ one risk factor if an [electrocardiogram \(ECG\)](#) treadmill test cannot be done. \*\*AUC scores for this bullet point are identical for [myocardial perfusion imaging \(MPI\)](#), stress echo, and [exercise tolerance test \(ETT\)](#) [\(AUC =Score 7\)](#). <sup>(1)</sup> Although the ACC guideline does not specify youth and gender, decisions should be guided by best medical judgment, considering factors such as safety and radiation exposure.
  - ≥ 50 years old [\(AUC Score 8\)](#) <sup>(1)</sup>
- Repeat testing in patient with new or worsening symptoms and negative result at least one year ago **AND** meets one of the criteria above
- **Asymptomatic patients without known CAD**
  - Previously unevaluated ECG evidence of possible myocardial ischemia including ischemic ST segment or T wave abnormalities (see **Background** section)
  - Previously unevaluated pathologic Q waves (see **Background** section)
  - Previously unevaluated complete left bundle branch block

## Abnormal Calcium Scores ~~(8,9,10,~~(11,12)

- STABLE SYMPTOMS with a prior Coronary Calcium Agatston Score of >100. No prior stress imaging done within the last 12 months ~~(10)~~(1,11) [\(AUC Score 7\)](#) <sup>(1)</sup>
- ASYMPTOMATIC high global CAD risk patient with a prior Coronary Calcium Agatston Score of >100. No prior stress imaging done within the last 12 months ~~(10)~~(11,13)
- ASYMPTOMATIC patient with Coronary Calcium Agatston Score > 400 ~~—~~ [\(or a qualitative assessment where 'severe' coronary artery calcification is stated in a report incidentally detected on CT imaging performed for other clinical indications\)](#) No prior stress imaging done within the last 12 months <sup>(14)</sup>

## Inconclusive CAD Evaluation and Obstructive CAD Remains a Concern

- Exercise stress ECG with low-risk Duke treadmill score ≥5, but patient's current symptoms indicate an indicate increasing likelihood of disease
- Exercise stress ECG with an intermediate Duke treadmill score [\(AUC 8\)](#) <sup>(1)</sup>

- A previously unevaluated ventricular wall motion abnormality demonstrated by another imaging modality and stress echo is being performed to determine if the patient has myocardial ischemia ~~(8,13)(1,15)~~ **(AUC Score 8)** ~~(9)~~ **5** <sup>(1)</sup>
- ~~Intermediate coronary computed tomography angiography (CCTA) defined as :~~
- 40–~~60~~–70% lesion **(AUC Score 7)** <sup>(1)</sup>
- Coronary stenosis of unclear significance on previous coronary angiography not previously evaluated <sup>(8)</sup>

## Follow-Up of Patient's Post Coronary Revascularization (PCI or CABG) ~~(14)~~ **(1)**

- **Asymptomatic follow-up stress imaging** at a minimum of 2 years post coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI) (whichever is later) is appropriate for patients with: **(AUC = 6)**
  - **High risk:** diabetes with accelerated progression of CAD, [chronic kidney disease](#) (CKD<sub>+</sub>), [peripheral artery disease](#) (PAD<sub>+</sub>), prior brachytherapy, [In-Stent Restenosis](#) (ISR<sub>+</sub>), or [saphenous vein graft](#) (SVG) intervention: **(AUC Score 7)** <sup>(1)</sup>
  - A history of silent ischemia ~~or~~ **(AUC Score 7)** <sup>(1)</sup>
  - A history of a prior left main stent **(AUC Score 5)** <sup>(1)</sup>

**OR**

- For patients with high occupational risk, associated with public safety, airline and boat pilots, bus and train drivers, bridge and tunnel workers/toll collectors, police officers and firefighters
- **New, recurrent, or worsening symptoms, treated medically or by revascularization** is an indication for stress imaging, if it will alter management for typical anginal symptoms or symptoms documented to be similar to those prior to revascularization if no imaging stress test within the last 12 months. **(AUC Score 8)** ~~(10)~~ **(1,11)**

## Follow-Up of Known CAD **(1)**

- **Routine follow-up of asymptomatic or stable symptoms** when last invasive or non-invasive assessment of coronary disease showed hemodynamically significant CAD (ischemia on stress test or [fractional flow reserve](#) (FFR)  $\leq 0.80$  or significant stenosis in a major vessel ( $\geq 50\%$  left main coronary artery or  $\geq 70\%$  [left anterior descending artery](#) (LAD<sub>+</sub>), [left circumflex artery](#) (LCX<sub>+</sub>), [right coronary artery](#) (RCA)), over two years ago without intervening coronary revascularization, is an appropriate indication for stress imaging

## Special Diagnostic Conditions Requiring Coronary Evaluation

- Prior acute coronary syndrome (with documentation in MD notes), within last 12 months, without a prior stress test or coronary angiography performed since that time
- Newly diagnosed systolic ~~heart failure~~ or diastolic heart failure, **with reasonable**

**suspicion of cardiac ischemia (prior events, risk factors),** unless invasive coronary angiography is immediately planned <sup>(10,14)</sup> ~~(AUC Score 8)~~ <sup>(8)(16)</sup>

- Ventricular arrhythmias <sup>(17)</sup>

~~AUC Score = 7~~ <sup>(8)</sup>

- Sustained ventricular tachycardia (VT) > 100 bpm (AUC Score 7) <sup>(1)</sup>, ventricular fibrillation (VF) (AUC Score 7) <sup>(1)</sup>, or exercise-induced VT (AUC Score 8) <sup>(1)</sup>, when invasive coronary arteriography has not been performed <sup>(15)</sup>
- Non-sustained VT, multiple episodes, each ≥ 3 beats at ≥ 100 bpm, frequent premature ventricular contractions (PVCs) (defined as greater than or equal to 30/hour on remote monitoring), when an exercise ECG cannot be performed <sup>(15)</sup> (AUC Score 7) <sup>(1)</sup>
- For intermediate and high-risk global patients who require initiation of Class IC antiarrhythmic drugs. It can be performed annually thereafter until discontinuation of drug use <sup>(16)(17)</sup> **(AUC Score 7)** <sup>(8)(1)</sup>
- Hemodynamic assessment of ischemia in one of the following documented conditions:
  - Anomalous coronary arteries in an asymptomatic individual without prior stress echocardiography <sup>(17)</sup> (AUC Score 8) <sup>(18)</sup>
  - Myocardial bridging of a coronary artery <sup>(18)(19)</sup>
- Coronary aneurysms in Kawasaki's disease <sup>(19)(20)</sup>
- Following radiation therapy to the anterior or left chest, at 5 years post initiation and every 5 years thereafter <sup>(20)(21)</sup> (AUC Score 6) <sup>(1)</sup>

## Chronic Vascular Disease

### Valvular

#### Evaluation with Inclusion of Doppler <sup>(21,22,23,24)</sup>

- For the evaluation of aortic stenosis and flow (contractile) reserve in symptomatic patients with severe aortic stenosis by calculated valve area, low flow / low gradient, and ejection fraction < 50% ~~(AUC Score 8)~~ <sup>(14)(2,22)</sup>
- For evaluation of asymptomatic moderate or severe aortic stenosis (AS) for measurement of changes in valve hemodynamics <sup>(2,22)</sup> **(AUC Score 8)** <sup>(14)(22)</sup>
- Non-severe aortic regurgitation (AR) with symptoms: Assessment of functional capacity and to assess for other causes of symptoms <sup>(8,14)(2,22)</sup> **(AUC Score 7)** <sup>(14)(22)</sup>
- For evaluation of mitral stenosis (MS) if there is <sup>(2,22)</sup>:
  - Exertional shortness of breath which suggests the amount of MS is worse than is seen on the resting echocardiogram **(AUC Score 8)** <sup>(14)(22)</sup>
- For evaluation for mitral regurgitation (MR) if there is one of the following <sup>(2,22,23)</sup>:
  - Exertional shortness of breath which suggests the amount of MR is worse than is seen on the resting echocardiogram <sup>(14)</sup> **(AUC Score 8)** <sup>(14)</sup> ~~OR~~ <sup>(22)</sup>
  - The echocardiogram is not able to distinguish whether the MR is moderate or severe in a patient that is asymptomatic **(AUC Score 7)** <sup>(14)(22)</sup>

- For symptomatic patients with [hypertrophic cardiomyopathy \(HCM\)](#), who do not have resting or provokable outflow tract gradient  $\geq 50$  [mm HgmmHg](#) on [transthoracic echocardiogram \(TTE\)](#), for detection and quantification of dynamic [left ventricular outflow tract \(LVOT\)](#) obstruction <sup>(25)(24)</sup>
- For asymptomatic patients with HCM who do not have a resting or provokable outflow tract gradient  $\geq 50$  [mm HgmmHg](#) on TTE [\(Class 2A\)](#) <sup>(24)</sup>

## Diastolic Function

- For unexplained dyspnea and suspected heart failure with preserved [left ventricular ejection fraction \(LVEF\)](#) <sup>(8)</sup> [heart failure with preserved ejection fraction \(HFpEF\)](#) with normal or equivocal diastolic function on resting images [\(AUC Score 8\)](#) <sup>(1)</sup>

## Prior To Elective Non-Cardiac Surgery <sup>(7,26,27,28)</sup>

- An intermediate or high-risk surgery with of one or more risk factors (see below), **AND** documentation of an inability to walk (or  $< 4$  METs) **AND** there has not been an imaging stress test within 1 year <sup>(26,(25-27),29)</sup> [\(AUC Score 8\)6](#) <sup>(28)</sup>
  - **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 Risks:**
    - **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

## Pre Organ-Transplant

- Planning for any organ or stem cell transplantation is an indication for preoperative stress imaging, if there has not been a conclusive stress evaluation, CTA, or heart catheterization within the past year, at the discretion of the transplant service. <sup>(7,30)</sup> [\(AUC Score 8\)6](#) <sup>(28)</sup>

## Post Cardiac Transplantation

- Annually, post cardiac transplantation, in a patient not undergoing invasive coronary arteriography

## LEGISLATIVE [REQUIREMENTS](#) [LANGUAGE](#)

### [State of Washington](#) <sup>(31)</sup>

#### [Health Technology Clinical 20211105A – Noninvasive Cardiac Imaging for Coronary Artery Disease](#) <sup>(29)</sup>

## ~~20211105A~~

### Number and coverage topic:

**20211105A** – Noninvasive Cardiac Imaging for Coronary Artery Disease

### HTCC coverage determination:

Noninvasive cardiac imaging is a **covered benefit with conditions**.

### HTCC reimbursement determination:

**Limitations of coverage:** The following noninvasive cardiac imaging technologies are **covered with conditions**:

- Stress echocardiography for:
  - Symptomatic adult patients ( $\geq 18$  years of age) at intermediate or high risk of Coronary Artery Disease (CAD), or
  - Adult patients with known CAD who have new or worsening symptoms.
- Single Positron Emission Tomography (SPECT) for:
  - Patients under the same conditions as stress echocardiography when stress echocardiography is not technically feasible or clinically appropriate.
- Positron Emission Tomography (PET) for:
  - Patients under the same conditions as SPECT, when SPECT is not technically feasible or clinically appropriate.
- Coronary Computed Tomographic Angiography (CCTA) for:
  - Symptomatic adult patients ( $\geq 18$  years of age) at intermediate or high risk of CAD, or
  - Adult patients with known CAD who have new or worsening symptoms.
- CCTA with Fractional Flow Reserve (FFR) for:
  - Patients under the same conditions as CCTA, when further investigation of functional significance of stenoses is clinically indicated.

### Non-covered indicators:

N/A

### Notes:

- Out of scope/data not reviewed for this decision:
  - Asymptomatic individuals, follow up of prior abnormal cardiac imaging studies, myocardial viability, preoperative evaluation
  - Patients presenting for evaluation of cardiac pathologies other than CAD
- This determination supersedes the following previous determinations:
  - Coronary Computed Tomographic Angiography for detection of Coronary Artery Disease (20081114A)
  - Cardiac Nuclear Imaging (20130920A)

## CODING AND STANDARDS

### Coding

#### ~~CPT~~ Codes

~~93350, 93351~~, +93320, +93321, +93325, 93350, 93351, +93352, +93356

### Applicable Lines of Business

|                                                                                                                       |                                            |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <input checked="" type="checkbox"/>                                                                                   | CHIP (Children's Health Insurance Program) |
| <input checked="" type="checkbox"/>                                                                                   | Commercial                                 |
| <input checked="" type="checkbox"/>                                                                                   | Exchange/Marketplace                       |
| <input checked="" type="checkbox"/>                                                                                   | Medicaid                                   |
| <input checked="" type="checkbox"/>  | Medicare Advantage                         |

## BACKGROUND

Stress echocardiography is an exercise stress test which utilizes echocardiography to provide information on exercise tolerance, ischemic burden, and structural heart disease including valvular disease and provides analysis of left ventricular function.

Stress echocardiography (SE) refers to ultrasound imaging of the heart during exercise electrocardiography (ECG) testing, during which visualized wall motion abnormalities can provide evidence of potential significant coronary artery disease (CAD).

While drug-induced stress with dobutamine can be an alternative to exercise stress testing in patients who are unable to exercise, this guideline does not require use of this modality. Hence, reference in this document to SE predominantly refers to exercise stress echocardiography.

Although SE provides comparable accuracy without radiation risk, relative to myocardial perfusion imaging (MPI), scenarios which do not permit effective use of SE might be better suited for stress imaging with MPI, cardiovascular magnetic resonance imaging (CMR) or positron emission tomography (PET), or coronary computed tomography angiography (CCTA).

Cardiac Doppler ultrasound is a form of ultrasound that can detect and measure blood flow. Doppler ultrasound depends on the Doppler Effect, a change in the frequency of a wave resulting from the motion of a reflector, the red blood cell. There are three types of Doppler ultrasound performed during a cardiac Doppler examination:

- Pulsed Doppler
- Continuous wave Doppler
- Color flow Doppler

## 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. <sup>(3)(4)</sup>

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

## Definitions

- Stable patients without known CAD fall into 2 categories <sup>(6)(1,7,8)</sup>:
  - **Asymptomatic patients**, for whom Global Risk of CAD events can be determined from coronary risk factors using calculators available online (see **Websites for Global Cardiovascular Risk Calculators** section)
  - **Symptomatic patients**, for whom we estimate the Pretest Probability that their chest-related symptoms are due to clinically significant CAD (see below):
- The medical record should provide enough detail to establish the type of chest pain:
  - **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 (e.g., resolving spontaneously within seconds or lasting for an extended period unrelated to exertion).
- **Risk Factors for Coronary disease include (but not limited to)**: diabetes mellitus, smoking, family history of premature CAD (men age less than 55, females less than 65), hypertension, dyslipidemia.
- 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** as in #2. Previously, the 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 <sup>(6)(1,7,8)</sup>.

### **Diamond Forrester Table** <sup>(32,33)(30,31)</sup>

| Age (Years) | Gender | Typical/Definite Angina Pectoris | Atypical/Probable Angina Pectoris | Nonanginal 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

- MPI may be performed without diversion to SE in any of the following [\(8,34\)\(1,32\)](#):
  - Inability to exercise
    - Physical limitations precluding ability to exercise for at least 3 full minutes of Bruce protocol
    - Limited functional capacity (< 4 metabolic equivalents) **such as one** of the following:
      - Cannot take care of their activities of daily living (ADLs) or ambulate
      - Cannot walk 2 blocks on level ground
      - Cannot climb 1 flight of stairs
      - Cannot vacuum, dust, do dishes, sweep, or carry a small grocery bag
  - Other Comorbidities
    - Severe chronic obstructive pulmonary disease with pulmonary function test (PFT) documentation, severe shortness of breath on minimal exertion, or requirement of home oxygen during the day
    - Poorly controlled hypertension, with systolic BP > 180 or Diastolic BP > 120 (and clinical urgency not to delay MPI)
  - ECG and Echo-Related Baseline Findings
    - Prior cardiac surgery (coronary artery bypass graft or valvular)
    - Documented poor acoustic imaging window
    - Left ventricular ejection fraction ≤ 40%
    - Pacemaker or ICD
    - Persistent atrial fibrillation
    - Resting wall motion abnormalities that would make SE interpretation difficult
    - Complete [left bundle branch block \(LBBB\)](#)
  - Risk-related scenarios
    - High pretest probability in suspected CAD
    - Intermediate or high global risk in patients requiring type IC antiarrhythmic drugs (prior to initiation of therapy and annually)

- Arrhythmia risk with exercise
- Previously unevaluated pathologic Q waves (in two contiguous leads) defined as the following:
  - 40 ms (1 mm) wide
  - 2 mm deep
  - 25% of depth of QRS complex
- ECG Stress Test Alone versus Stress Testing with Imaging
 

Prominent scenarios suitable for an ECG stress test **WITHOUT** imaging (i.e., exercise treadmill ECG test) are inferred from the guidelines presented above, often requiring that the patient can exercise for at least 3 minutes of Bruce protocol with achievement of near maximal heart rate **AND** has an interpretable ECG for ischemia during exercise <sup>(9)(1)</sup>.

  - The (symptomatic) low or intermediate pretest probability patient who can exercise and has an interpretable ECG
  - The patient who is under evaluation for exercise-induced arrhythmia
  - For the evaluation of syncope or presyncope during exertion
  - The patient who requires an entrance stress test ECG for a cardiac rehab program or for an exercise prescription
  - When exercise cannot be performed, pharmacologic stress can be considered.
- Duke Exercise ECG Treadmill Score <sup>(35)(33)</sup>

Calculates risk from ECG treadmill alone:

  - The equation for calculating the Duke treadmill score (DTS) is: DTS = exercise time in minutes - (5 x ST deviation in mm or 0.1 mV increments) - (4 x exercise angina score), with angina score being 0 = none, 1 = non-limiting, and 2 = exercise-limiting.
  - The score typically ranges from - 25 to + 15. These values correspond to low-risk (with a score of  $\geq + 5$ ), intermediate risk (with scores ranging from - 10 to + 4), and high-risk (with a score of  $\leq -11$ ) categories.
- An uninterpretable baseline ECG includes <sup>(6)(7)</sup>:
  - ST segment depression is considered significant when there is 1 mm or more, not for non-specific ST- T wave changes
  - Ischemic looking T waves are considered significant when there are at least 2.5 mm inversions (excluding V1 and V2)
  - LVH with associated STT abnormalities, pre-excitation pattern such as WPW, a ventricular paced rhythm, or left bundle branch block
  - Digitalis use
  - Resting HR under 50 bpm on a medication, such as beta-blockers or calcium channel blockers, that is required for patient's treatment and cannot be stopped, with an anticipated suboptimal workload
- 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. A high risk is considered greater than a 20% risk of a cardiovascular event over the ensuing 10 years. High global risk by itself generally lacks scientific support as an indication for stress imaging. There are rare exemptions, such as patients requiring IC antiarrhythmic drugs, who might require coronary risk stratification prior to initiation of the drug.

- **CAD Risk—Low**  
10-year absolute coronary or cardiovascular risk less than 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 greater than 20%.

### **Websites for Global Cardiovascular Risk Calculators\*** [\(36,37,\(34–38\),39,40\)](#)

| <b>Risk Calculator</b>                                                                        | <b>Link to Online Calculator</b>                                                                                                                                                |
|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Framingham Cardiovascular Risk                                                                | <a href="https://reference.medscape.com/calculator/framingham-cardiovascular-disease-risk">https://reference.medscape.com/calculator/framingham-cardiovascular-disease-risk</a> |
| Reynolds Risk Score<br><br>Can use if no diabetes<br><br>Unique for use of family history     | <a href="http://www.reynoldsriskscore.org/">http://www.reynoldsriskscore.org/</a>                                                                                               |
| Pooled Cohort Equation                                                                        | <a href="http://clincalc.com/Cardiology/ASCVD/PooledCohort.aspx?example">http://clincalc.com/Cardiology/ASCVD/PooledCohort.aspx?example</a>                                     |
| ACC/AHA Risk Calculator                                                                       | <a href="http://tools.acc.org/ASCVD-Risk-Estimator/">http://tools.acc.org/ASCVD-Risk-Estimator/</a>                                                                             |
| MESA Risk Calculator<br><br>With addition of Coronary Artery Calcium Score, for CAD-only risk | <a href="https://www.mesa-nhlbi.org/MESACHDRisk/MesaRiskScore/RiskScore.aspx">https://www.mesa-nhlbi.org/MESACHDRisk/MesaRiskScore/RiskScore.aspx</a>                           |

\*Patients who have known CAD are already at high global risk and are not applicable to the calculators.

- **Definitions of Coronary Artery Disease** [\(6,\(7,8,12,39,40\)11,41,42\)](#)

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).

- Coronary artery calcification is a marker of risk, as measured by Agatston score on coronary artery calcium imaging. Its incorporation into Global Risk can be achieved by using the MESA risk calculator.
- Ischemia-producing disease (also called hemodynamically or functionally significant disease, for which revascularization might be appropriate), generally implies at least one of the following:
  - Suggested by percentage diameter stenosis  $\geq 70\%$  by angiography; intermediate lesions are 50 – 69% [\(8\)\(1\)](#)
  - For a left main artery, suggested by a percentage stenosis  $\geq 50\%$  or minimum lumen cross-sectional area on IVUS  $\leq 6$  square mm [\(6,42,43\)\(7,40,41\)](#)
  - FFR (fractional flow reserve)  $\leq 0.80$  for a major vessel [\(42,43\)\(40,41\)](#)
- FFR (fractional flow reserve) 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
- Anginal Equivalent [\(6,44,45\)\(7,42,43\)](#)
  - Development of an anginal equivalent (e.g., shortness of breath, fatigue, or weakness) either with or without prior coronary revascularization should be based upon the documentation of reasons to suspect that symptoms other than chest discomfort are not due to other organ systems (e.g., dyspnea due to lung disease, fatigue due to anemia). This may include 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.

## Acronyms+Abbreviations

[AAD: Antiarrhythmic drug](#)

[ACC: American College of Cardiology](#)

ADLs: Activities of daily living

[BSA: Body surface area in square meters](#)

CABG: Coronary artery bypass grafting surgery

[CAC: Coronary artery calcium](#)

CAD: Coronary artery disease

CCTA: Coronary computed tomography angiography

[CKD: Chronic kidney disease](#)

CMR: Cardiovascular magnetic resonance imaging

CT(A): Computed tomography (angiography)

DTS: Duke Treadmill Score

ECG: Electrocardiogram

[ETT: Exercise tolerance test](#)

FFR: Fractional flow reserve

HCM: Hypertrophic cardiomyopathy

[ISR: : In-Stent Restenosis](#)

IVUS: Intravascular ultrasound

[LAD: Left anterior descending artery](#)

LBBB: Left bundle-branch block

[LCX: left circumflex artery](#)

LVEF: Left ventricular ejection fraction

LVH: Left ventricular hypertrophy

LVOT: Left ventricular outflow tract

MESA: Multi-Ethnic Study of Atherosclerosis

MET: Estimated metabolic equivalent of exercise

MI: Myocardial infarction

MPI: Myocardial perfusion imaging

MR: Mitral regurgitation

MS: Mitral stenosis

[PAD: peripheral artery disease](#)

PCI: Percutaneous coronary intervention

PET: Positron emission tomography

PFT: Pulmonary function test

PVCs: Premature ventricular contractions

[RCA: Right coronary artery](#)

SE: Stress echocardiography

[SPECT: Single-photon emission computed tomography](#)

[SVG: Saphenous vein graph](#)

TTE: Transthoracic echocardiography

VT: Ventricular tachycardia

VF: Ventricular fibrillation

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 <sup>(1)</sup>**

**Study Design:** This document is an appropriate use criterion (AUC) 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 specialty societies.

**Target Population:** Patients with known or suspected chronic coronary disease, including those with symptoms of ischemia, those without symptoms but at risk for atherosclerotic cardiovascular disease, and those with other cardiovascular conditions.

**Key Factors:** The AUC provides ratings for various diagnostic and prognostic tests, including stress testing, imaging, and invasive procedures. It aims to guide clinicians in selecting appropriate tests based on clinical scenarios, considering factors such as patient symptoms, prior testing, and risk factors. The document also includes a "no test" option for certain scenarios, emphasizing the importance of clinical judgment and patient preferences.

### **2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease <sup>(7)</sup>**

**Study Design:** This document is a practice 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 associations.

**Target Population:** Adult patients with stable known or suspected ischemic heart disease, including those with new-onset chest pain or stable pain syndromes.

**Key Factors:** The guideline covers various aspects such as clinical evaluation, risk assessment, treatment recommendations, and patient follow-up. It emphasizes the importance of patient involvement in decision-making and provides detailed recommendations for diagnosis, risk assessment, and treatment, including lifestyle modifications and medical therapy.

### **2023 AHA/ACC/ACCP/ASPC/NLA/PCNA Guideline for the Management of Patients With Chronic Coronary Disease <sup>(9)</sup>**

**Study Design:** This guideline provides an update on the management of patients with chronic coronary disease, consolidating new evidence since the previous guidelines. It was developed by the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines.

**Target Population:** Patients with chronic coronary disease, including those with stable ischemic heart disease and those who have had a myocardial infarction or revascularization.

**Key Factors:** The guideline emphasizes a patient-centered approach, considering social determinants of health and incorporating shared decision-making and team-based care. It includes recommendations for lifestyle changes, medical therapy, revascularization, and management of special populations.

## **ANALYSIS OF EVIDENCE**

### **Analysis <sup>(1,7,9)</sup>**

Stress echocardiography is consistently recognized as a valuable tool for diagnosing and managing patients with CAD and SIHD. The shared conclusions across the three articles highlight its diagnostic accuracy, non-invasive nature, and role in risk stratification. However, the articles differ in their focus on methodology, clinical scenarios, and technological advancements. The 2012 guidelines provide a foundational review of evidence, while the 2023 updates incorporate new studies and advancements in imaging technologies. The

appropriate use criteria in the Winchester 2023 article offer practical guidance for clinicians in selecting the right test based on patient characteristics and clinical presentation.

### **Shared Conclusions:**

- All three articles emphasize the diagnostic value of stress echocardiography in detecting myocardial ischemia and assessing cardiac function. Stress echocardiography is highlighted as a reliable method for evaluating patients with suspected coronary artery disease (CAD) and stable ischemic heart disease (SIHD).
- Stress echocardiography is consistently recommended for risk stratification in patients with known or suspected CAD. It helps in identifying patients at higher risk for adverse cardiovascular events, guiding therapeutic decision-making.

The non-invasive nature of stress echocardiography is praised across all articles. It is considered a safer alternative to invasive procedures like coronary angiography, especially for initial diagnostic purposes

## **POLICY HISTORY**

### ***Summary***

| Date                                     | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| July 2024 <sup>45</sup>                  | <ul style="list-style-type: none"> <li>● <del>Added AUC Scoring to Cardiac Guidelines from published Societies. When an AUC score was not published by a Society, we assigned an AUC score of 6 based upon AUC scoring standards—this has been explained in Clinical Reasoning</del></li> <li>● <del>Anginal symptoms have been changed to ‘less likely’ and ‘likely’ to coincide with the changed National Standards</del></li> <li>● <del>Diamond Forrester Table has been taken out of the National Standards; however, it will remain in the guidelines as a historical information reference source</del></li> <li>● <del>Added WA legislative requirement</del><u>This guideline merges and replaces two Evolent guidelines with identical clinical criteria: ECG 7328-01 for Stress Echocardiography and ECG 026 for Stress Echocardiography into Evolent Clinical Guideline 7328 for Stress Echocardiogram</u></li> <li>● <u>Added in general information statement regarding guideline criteria development by reputable sources, standard of care, and best practices</u></li> <li>● <u>Updated AUC scores</u></li> <li>● <u>Applicable Line of Business adjusted – Medicare checked</u></li> <li>● <u>Added a Summary of Evidence and Analysis of Evidence</u></li> </ul> |
| <del>May 2023</del> <u>November 2024</u> | <ul style="list-style-type: none"> <li>● <del>Removed time limitation “within past two years” for further evaluation inconclusive prior CAD evaluation</del></li> <li>● <del>Added coronary stenosis of unclear significance on coronary angiography</del></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Date | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | <ul style="list-style-type: none"> <li>• <del>Added evaluation of asymptomatic moderate or severe aortic stenosis (AS) and aortic regurgitation (AR) for measurement of changes in valve hemodynamics</del></li> <li>• <del>Added evaluation symptomatic patients with suspected diastolic dysfunction</del></li> <li>• <del>Added statement on clinical indications not addressed in</del> This guideline <u>replaces UM CARDIO 1123 Stress Echocardiography</u></li> </ul> |

## LEGAL AND COMPLIANCE

### Guideline Approval

#### Committee

Reviewed / Approved by Evolent Specialty Clinical Services 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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