# Syncope and Presyncope

***Clinical Guidelines for Medical Necessity Review***

**Version:** V2.0
**Effective Date:** September 2, 2022

# Important Notices

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## Other Notices:



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## Guideline Information:

**Disease Area:** Cardiology
**Care Path Group:** Diagnostic
**Care Path Name:** Syncope and Presyncope
**Type:** [**X**] Adult (18+ yo) | [_] Pediatric (0-17yo)

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# Care Path Overview

## Care Path Clinical Discussion

Syncope is a symptom that presents with an abrupt, transient, complete loss of consciousness, associated with an inability to maintain postural tone, with rapid and spontaneous recovery. Syncope does not include other causes of loss of consciousness, such as seizure, antecedent head trauma, or toxic ingestion. Syncope has various causes, which range from benign to life-threatening. Patients with presyncope have a similar prognosis to those with syncope and should undergo a similar evaluation.[1]

Physicians should perform a detailed history and physical examination on patients with syncope or presyncope. In the initial evaluation, a resting ECG is useful. The history, physical exam, and ECG can identify the syncope etiology in up 50% of patients.[2] Clinicians should evaluate the cause of syncope and assess the short- and long-term risks of syncope.[3] The physician must decide whether further workup can continue in an outpatient setting or whether a hospital-based evaluation is required. Hospital evaluation and treatment are recommended for patients presenting with syncope who have serious medical conditions. In patients with a presumptive cause of autonomic reflex-mediated syncope and no other serious medical conditions identified, hospital-based evaluation is unlikely to provide benefit.

The most frequent cause of syncope is vasovagal syncope. Subsets of vagally-mediated syncope include orthostatic hypotension and carotid sinus hypersensitivity. Cardiac and neurological causes are also common causes of syncope, as well as endocrinologic disorders.

*The information contained herein gives a general overview of the pathway of this specific diagnosis, beginning with the initial presentation, recommended assessments, and treatment options as supported by the medical literature and existing guidelines. It should be noted that the care of patients can be complex. The information below is meant to support clinical decision-making in adult patients. It is not necessarily applicable to every case, as the entire clinical picture (including comorbidities, history, etc.) should be considered.*

### *Key Information*

- The clinical setting in which the initial evaluation takes place can vary. The patient may seek evaluation in an outpatient setting with a primary care physician or a specialist or the emergency department (ED) at a hospital. The time interval between the index syncopal event and the initial evaluation can vary significantly according to the medical necessity for evaluation and the patient's ability to seek evaluation.[3]
- Syncope is common, with a lifetime incidence of at least 35%. The incidence is similar in men and women. The incidence is bimodal, with peaks at 20 and 80 years.[4]
- Broad-based use of additional testing is costly and often ineffective.[3] Certain tests, including routine laboratory testing, routine cardiac imaging (unless a cardiac issue is suspected), and carotid artery imaging (in the absence of focal neurological findings), are not valuable for evaluating syncope unless there is a specific reason why additional evaluation is needed.[3] If there are abnormal findings on cardiovascular testing, they may not be the cause of syncope; clinical judgment should drive their significance and decide if treatment is needed.[5]
- Choice of cardiac monitoring should vary based on the type of syncope experienced and the frequency of symptoms. External monitoring's effectiveness depends on the length of monitoring, the type of monitoring (continuous or intermittent), the frequency of syncope symptoms, and the abruptness of onset. An internal cardiac monitor can provide recording for up to four years and could be indicated if a syncopal incident has been infrequent.[5]
- It is critical to identify the cause of syncope. The underlying etiology determines the patient's prognosis.

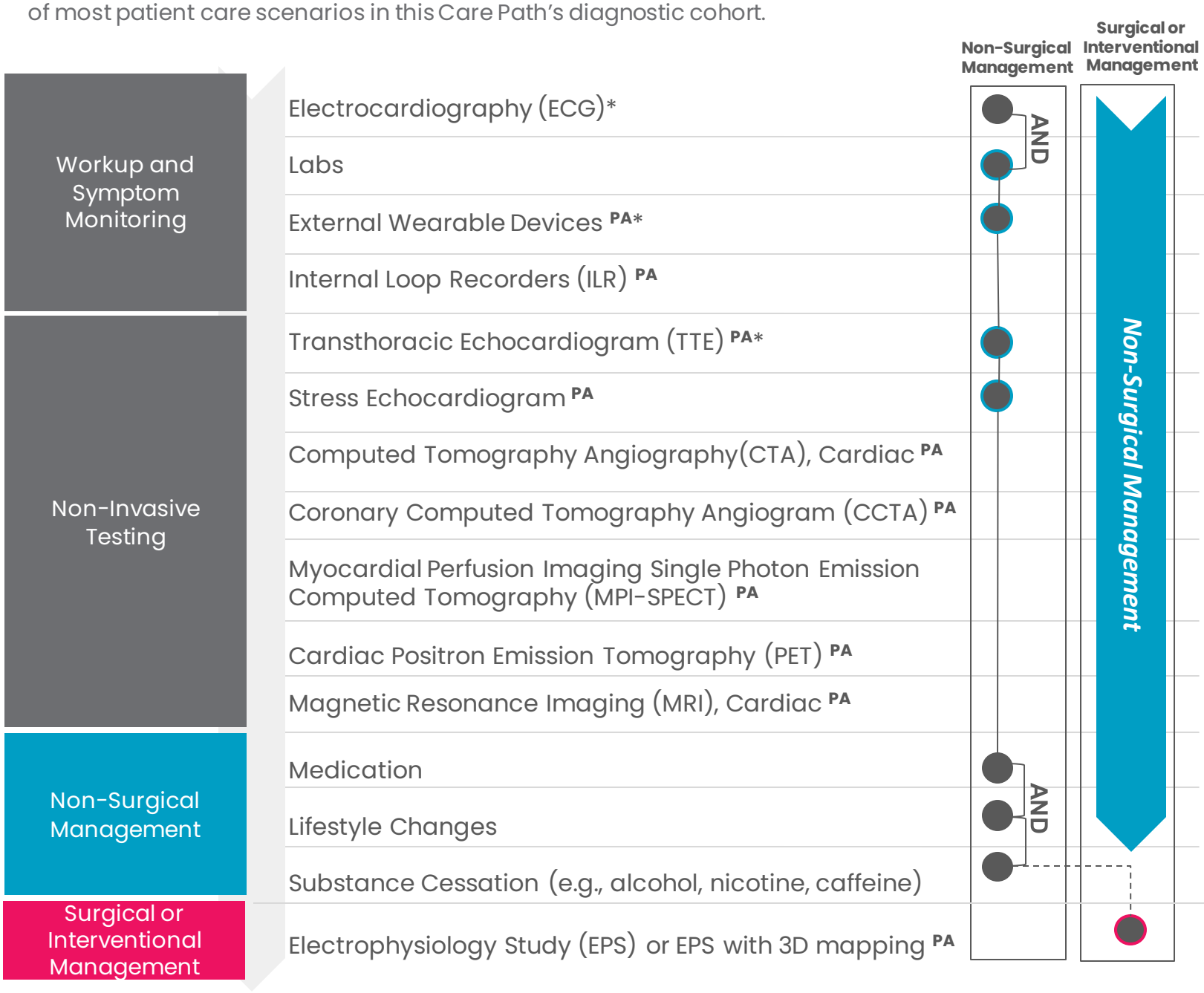
## Definitions

- **BP:** blood pressure
- **ECG**: electrocardiogram
- **OH**: orthostatic hypotension
- **POTS**: postural tachycardia syndrome
- **VVS**: vasovagal syncope.
- **ILR:** internal loop recorder
- **GDMT:** guideline-directed medical therapy
- **CAD:** coronary artery disease
- **PAL:** prior authorization list
- **ACC:** American College of Cardiology
- **AHA:** American Heart Association
- **Pretest Probability (of CAD):** Pretest probability of coronary artery disease (CAD) is the likelihood that the patient has CAD, calculated before the test result is known. These guidelines reference the 2019 European Society of Cardiology (ESC) Guidelines for the diagnosis and management of chronic coronary syndromes model to calculate the pretest probability based on age, sex, and type of chest pain.[6-7]
- **External Wearable Devices:** Cardiac monitoring devices like Holter monitor, Telemetry patches for 2 weeks, etc.

# Syncope and Presyncope

**What is a "Cohere Care Path"?**

These Care Paths organize the services typically considered most clinically optimal and likely to be automatically approved. These service recommendations also include the suggested sequencing and quantity or frequency determined clinically appropriate and medically necessary for the management of most patient care scenarios in this Care Path's diagnostic cohort.




**Key**

PA = Service may require prior authorization
★ = Denotes preferred service
AND = Services completed concurrently
OR = Services generally mutually exclusive

= Non-surgical management prior authorization group of services
= Surgical management prior authorization group of services
= Subsequent service
= Management path moves to a different management path

# Care Path Diagnostic Criteria

## Disease Classification

Syncope.

***ICD-10 Codes Associated with Classification***

| ICD-10 Code | Code Description/Definition |
|---|---|
| R42 | Dizziness and giddiness |
| R55 | Syncope and collapse |
| I45.9 | Syncope with heart block |
| I95 | Hypotension |
| I95.0 | Idiopathic hypotension |
| I95.1 | Orthostatic hypotension |
| I95.2 | Hypotension due to drugs |
| I95.3 | Hypotension of hemodialysis |
| I95.8 | Other hypotension |
| I95.81 | Postprocedural hypotension |
| I95.89 | Other hypotension |
| I95.9 | Hypotension, unspecified |

## Presentation and Etiology

### *Causes and Risk Factors*

The most frequent syncope cause is vasovagal syncope, which is a reflex governed by the autonomic nervous system. Cardiac and neurological causes are also common causes of syncope. Neurological causes of syncope include cerebrovascular disease, autonomic dysfunction, and subclavian steal syndrome. Focal neurological deficits in stroke, vertebrobasilar transient ischemic stroke, and migraine may present as syncope.[2]

Cardiac causes of syncope include structural heart diseases or conditions that result in decreased cardiac output, such as aortic stenosis, ischemic heart disease, heart failure, hypertrophic cardiomyopathy, aortic dissection,

cardiac tamponade, prosthetic valve thrombosis, cardiac tumors, pulmonary hypertension, and pulmonary embolism, etc. Bradyarrhythmias (e.g., AV block, sinus arrest) and tachyarrhythmias (e.g., ventricular tachycardia/fibrillation) are frequent causes of cardiac syncope due to impaired cardiac output.[8]

Treatment depends on the cause of cardiac syncope, with treatments including pacemaker implantation, or use of antiarrhythmic medications, catheter ablation, or implantable cardioverter-defibrillator.[2] The underlying etiology determines the patient's prognosis and is related to the severity of the cardiac disease.[9] The annual mortality for true syncope can reach 33% for cardiac causes and between 0 and 12% for non-cardiac causes. Thus, it is crucial to identify its cause to reduce morbidity and mortality.[2]

Syncope incidence follows a bimodal distribution with peaks at 20 and 80 years.[4] Risk factors of syncope in older adults include[3,8]:

- Male sex.
- Age older than 60 years.
- Aortic stenosis.
- Impaired renal function.
- Atrioventricular or left bundle-branch block.
- Bradyarrhythmias.
- Chronic obstructive pulmonary disease.
- Heart failure.
- Atrial fibrillation.
- Polypharmacy, especially medications that cause a drop in blood pressure.

### *Clinical Presentation*

The clinical setting in which the initial evaluation takes place varies. The patient may seek evaluation in an outpatient setting with a primary care physician or a specialist or the emergency department (ED) at a hospital. The time interval between the index syncopal event and the initial evaluation can vary significantly according to the medical necessity for evaluation and the patient's ability to seek evaluation[3].

- Factors associated with a *cardiac* causes of syncope include[3,5]:
    - Age older than 60 years.
    - Male sex.
    - Ischemic heart disease.
    - Structural heart disease.
    - Previous history of arrhythmias.
    - Reduced ventricular function.
    - Sudden loss of consciousness.
    - Syncope while supine or during exertion.

    - Abnormal findings on cardiac examination.
    - Family history of inheritable conditions or sudden cardiac death before 50 years of age.
    - Congenital heart disease.

- Factors associated with a non-cardiac cause include[3,5]:
    - Younger age.
    - Absence of cardiac disease.
    - Syncope episodes with positional change (i.e., sit to stand).
    - Prodrome.
    - Triggers (e.g., dehydration, coughing, heat exposure).
    - Recurring syncope or prolonged history of syncope.

Diagnostic testing for syncopal or near syncopal events should identify or exclude underlying cardiac conditions based on the patient's clinical history.

***Typical History***

The diagnostic history focuses on the situations in which syncope occurs, prodromal symptoms, patient's self-report, bystander observations of the event and vital signs, and post-event symptoms. Video recordings are helpful when available. Time relationship to meals and physical activities and duration of the prodrome help differentiate the neurally mediated syncope from the cardiac syncope. Comorbidities and medication use are critical factors in older patients. The physician should take a careful history, including the presence of pre-existing cardiovascular disease. A family history should be obtained, emphasizing histories of syncope, sudden unexplained death, or drowning[3,8].

***Typical Physical Exam Findings***

- The patient who presents with syncope may have a normal physical exam. The physician should pay particular attention to the vital signs, cardiac exam, and neurological exam[3].
- The physical examination should include determining orthostatic blood pressure and heart rate changes in a laying position, on immediate standing, and after 3-5 minutes of upright posture.[3]
- The physician should note heart rate and rhythm and the presence of murmurs, gallops, or rubs that would indicate the presence of structural heart disease[3,8].

Any focal defects or other neurological abnormalities may suggest a need for further neurological evaluation or referral.[3]

### *Typical Diagnostic Findings*

An ECG is recommended for all patients with syncope. The ECG rarely identifies a specific arrhythmic cause of syncope, but certain findings are considered diagnostic. The 2018 European Society of Cardiology guidelines lists the following as highly probable causes of arrhythmia-related syncope[8]:

- Persistent sinus bradycardia less than 40 beats per minute (BPM) or sinus pauses greater than 3 seconds in an awake patient. These findings suggest a bradycardic etiology, as it requires greater than 8 to 10 seconds of hypotension to trigger syncope[8].
- Mobitz II second-degree AV block.
- Third-degree (complete) AV block.
- Alternating left and right bundle branch block.
- VT or paroxysmal supraventricular tachycardia with rapid ventricular rate[8].
- Nonsustained polymorphic VT with long or short QT interval.
- Pacemaker or implantable cardioverter-defibrillator malfunction with cardiac pauses.

Several abnormal ECG findings also indicate heart disease, providing a basis for further testing. These include[8]:

- Bifascicular block.
- Other intraventricular conduction abnormalities (QRS duration ≥0.12 seconds).
- Mobitz I second-degree AV block.
- Asymptomatic sinus bradycardia (40 to 50 BPM) or slow atrial fibrillation (40 to 50 BPM) in the absence of negatively chronotropic medications.
- Nonsustained VT.
- Pre-excited QRS complexes, suggesting Wolff-Parkinson-White syndrome.
- Long or short QT intervals.
- Early repolarization.
- Right bundle branch block pattern with ST elevation in leads V1 to V3 (Brugada syndrome).
- Negative T waves in more than one right precordial lead or epsilon waves that suggest arrhythmogenic right ventricular cardiomyopathy.
- Left ventricular hypertrophy, suggesting hypertrophic cardiomyopathy or hypertensive heart disease.

# Care Path Services & Medical Necessity Criteria

## Workup and Symptom Monitoring

***Service: External Wearable Devices***

### General Guidelines

- **Units, Frequency, & Duration:** None.
- **Criteria for Subsequent Requests:** If the initial device from a previous request did not capture the event in the initial monitoring.
- **Recommended Clinical Approach:** Choice of cardiac monitoring should be based on how often the syncope occurs and the type of syncope experienced.[3] External monitoring approaches, including a Holter monitor, transtelephonic monitor, external loop recorder, patch recorder, and mobile cardiac outpatient telemetry, can be used in certain ambulatory patients with syncope suspected to be caused by an arrhythmia. Their effectiveness is dependent on the duration of monitoring, type of monitoring (continuous or intermittent), frequency of syncope, prodrome duration, and how quickly the patient is incapacitated.[5,10]
- **Exclusions:** None.

### Medical Necessity Criteria

#### Indications

➔ **External wearable devices** are appropriate if **ALL** of the following are **TRUE**[8]:

- ◆ The patient has symptoms less than or equal to every 4 weeks.
- ◆ The syncope has a suspected arrhythmic origin.
- ◆ If the patient has had 3 or more external wearable devices in the last six months, consider an internal loop recorder.

#### Non-Indications

➔ **External wearable devices** are not appropriate if **ANY** of the following is **TRUE**:

- ◆ The patient has an implantable cardiac device capable of acquiring clinical data of a similar or equivalent quality to an external cardiac monitor.

- The patient needs immediate hospitalization or intensive evaluation.

## Site of Service Criteria

Outpatient

## Procedure Codes (HCPCS/CPT)

| HCPCS Code | Code Description/Definition |
|---|---|
| 93228 | Other qualified health care professional review and interpretation with report of external mobile cardiovascular telemetry with electrocardiographic recording, concurrent computerized real time data analysis, and greater than 24 hours of accessible electrocardiogram (ECG) data storage (retrievable with query) with ECG triggered and patient selected events transmitted to a remote attended surveillance center for up to 30 days |
| 93229 | Technical support for connection and patient instructions for use, attended surveillance for up to 30 days, analysis and other qualified health care professional prescribed transmission of daily and emergent data reports of external mobile cardiovascular telemetry with electrocardiographic recording, concurrent computerized real time data analysis, and greater than 24 hours of accessible electrocardiogram (ECG) data storage (retrievable with query) with ECG triggered and patient selected events transmitted to a remote attended surveillance center |

***Service: Internal Loop Recorders (ILRs)***

## General Guidelines

- **Units, Frequency, & Duration:** When medical necessity criteria are met in the absence of exclusionary criteria, refer to a cardiac electrophysiologist or trained cardiologist to implant an internal loop recorder (ILR). Anticipate a single outpatient procedure. The implant duration can be up to 4 years, depending on the device's battery life. Periodic recordings are actively or passively transmitted for interpretation by a physician.[3,10-11]
- **Criteria for Subsequent Requests:** Subsequent requests are only applicable when there is a documented device malfunction, an infection that requires removal of the initial device, or incorrect placement resulting in poor R-wave sensing.[3]
- **Recommended Clinical Approach:** Non-invasive ambulatory ECG monitoring is recommended in patients with symptoms suggestive of a rhythm abnormality such as sinus node dysfunction/arrest, AV block, or an unstable tachyarrhythmia before this intervention. Poor diagnostic yield of non-invasive monitoring in the setting of continued symptoms may lead a physician to recommend an ILR; this is particularly true for patients with unexplained syncope, often due to a bradyarrhythmic event. This procedure is performed by a trained cardiologist or cardiac electrophysiologist, and referral to a center that supports this service is required.[1,5]
- **Exclusions:** None.

## Medical Necessity Criteria

### Indications

➔ **Internal loop recorders** are considered appropriate if **ALL** of the following are **TRUE** [1,5,10-11]:

- ◆ No diagnostic conclusions have been achieved with noninvasive monitoring methods (e.g., external loop recorder, mobile cardiac telemetry).
- ◆ The infrequency of syncope/presyncope symptoms compels an extended monitoring interval to achieve a diagnosis.
- ◆ The patient has no other internal cardiac devices to detect, record, and transmit data to a physician/cardiologist.
- ◆ There is no active systemic infection or nonreversible bleeding disorder present.

### Non-Indications

- ➔ **Internal loop recorders** are not considered appropriate if **ANY** of the following is **TRUE**:
  - ◆ The patient has a culprit arrhythmic diagnosis identified on noninvasive monitoring.[11]
  - ◆ The patient has an active infection or an irreversible bleeding disorder.

## Site of Service Criteria

Outpatient.

## Procedure Codes (HCPCS/CPT)

| HCPCS Code | Code Description/Definition |
|---|---|
| 33285 | Insertion and programming of subcutaneous cardiac rhythm monitor |
| 33286 | Removal of subcutaneous cardiac rhythm monitor |

# Non-Invasive Testing

***Service: Transthoracic Echocardiogram (TTE)***

## General Guidelines

- **Units, Frequency, & Duration:** None.
- **Criteria for Subsequent Requests**[3,12]:
    - Single repeat TTEs are appropriate for:
        - Evaluating significant changes in signs/symptoms since the patient's last TTE.
        - Providing objective evidence of value for patients undergoing medical treatment to improve LV function.
    - Repeat TTEs are **NOT** appropriate for clinically stable or asymptomatic patients with mild valvular findings, stenosis, or deformity.
- **Recommended Clinical Approach:** Transthoracic echocardiography can be useful in selected syncope patients if structural heart disease is suspected.[13] Echocardiography may have limited benefit in patients at the extremes of adult body weight. A thick chest wall (in markedly obese patients) or overcrowded ribs (in severely underweight patients) may limit ultrasound waves' penetration.[14-21]
- **Exclusions:** None.

## Medical Necessity Criteria

### Indications

➔ **TTE** is considered appropriate if **ANY** of the following is **TRUE**:

◆ The patient has syncope if structural heart disease is suspected, including but not limited to[3,8,12]:

- Heart murmur/valvular heart disease.
- History of myocardial disease or myocardial infarction.
- Prior heart surgery.
- Cardiomyopathy.
- Shortness of breath or chest pain.
- Abnormal cardiac test results.
- Palpitations.
- TIA or stroke.
- Pericardial disease.
- Hypertensive heart disease.

### Non-Indications

➔ **TTE** is not considered appropriate if **ANY** of the following is **TRUE**:

- Echocardiography has no contraindications. Echocardiography may have limited benefit in patients at the extremes of adult body weight. A thick chest wall (in markedly obese patients) or overcrowded ribs (in severely underweight patients) may limit ultrasound waves' penetration.[14,22-23]

## Site of Service Criteria

Outpatient or Inpatient.

## Procedure Codes (HCPCS/CPT)

| HCPCS Code | Code Description/Definition |
|---|---|
| 93306 | Real time transthoracic echocardiography with 2-dimensional (2D) image documentation, M-mode recording with spectral Doppler echocardiography, and color flow Doppler echocardiography |
| 93307 | Complete real time transthoracic echocardiography with 2-dimensional (2D) image documentation |
| 93308 | Follow-up real time transthoracic echocardiography with 2-dimensional (2D) image documentation |
| C8921 | Tte w or w/o fol w/cont, com |
| C8922 | Tte w or w/o fol w/cont, f/u |
| C8923 | 2d tte w or w/o fol w/con,co |
| C8924 | 2d tte w or w/o fol w/con,fu |
| C8929 | Tte w or wo fol wcon,doppler |

***Service: Stress Echocardiogram***

## General Guidelines

- **Units, Frequency, & Duration:** None.
- **Criteria for Subsequent Requests:** None.
- **Recommended Clinical Approach:** Stress echocardiography is appropriate for patients with coronary artery disease symptoms (CAD) and intermediate or high pretest probability of CAD.[6,15,24] Physicians can use either exercise or pharmacologic agents (i.e., dobutamine) as the stress mechanism. This test results in no radiation exposure and is typically lower cost than myocardial perfusion imaging single-photon emission computed tomography (MPI-SPECT). Other advantages of stress echo compared to MPI-SPECT include shorter patient time commitment and additional information on cardiac structures (valves, ascending aorta, pericardial space). The test is less technically demanding than MPI-SPECT or positron emission tomography (PET) studies. The diagnostic accuracy of exercise and stress echocardiography is reduced in patients with limited acoustic windows.[25] Patients who cannot exercise or exercise submaximally should undergo a pharmacologic stress echo.
- **Exclusions:** None.

## Medical Necessity Criteria

### Indications

➔ **Stress echo** is appropriate if **ANY** of the following is **TRUE**:
- ◆ The patient has syncope and intermediate to high pretest probability of CAD.[6,15,24]
- ◆ The patient has syncope and one or more of the following:
  - ECG abnormalities that would obscure the diagnosis of ischemia (e.g., Wolff-Parkinson-White pattern, LBBB, paced ventricular rhythm, the patient takes digoxin).[14,26]
  - Inability to exercise (i.e., breathing or physical limitations).
  - Inability to achieve the target heart rate with a standard stress test.
  - A previous non-diagnostic non-invasive stress testing needing further clarification.

### Non-Indications

➔ **Stress echo** is not considered appropriate if the following is **TRUE**[17-21]**:**
- ◆ The patient has an unstable cardiac or pulmonary condition

- ➔ **Stress echo** may not be considered appropriate if **ANY** of the following is **TRUE**[7,17-21]:
  - ◆ Left main coronary artery stenosis.
  - ◆ Severe hypertension.
  - ◆ Significant tachycardia or bradyarrhythmia.
  - ◆ Moderate or severe valvular heart disease.
  - ◆ Normal coronary angiogram or CCTA within the last two years and with no stenosis or plaque
  - ◆ Normal stress test (given adequate stress) within the last year

## Site of Service Criteria

Outpatient or Inpatient.

## Procedure Codes (HCPCS/CPT)

| HCPCS Code | Code Description/Definition |
|---|---|
| 93350 | Real time transthoracic echocardiography with 2-dimensional (2D) image documentation during rest and cardiovascular stress test using treadmill and/or pharmacologically induced stress, with interpretation and report |
| 93351 | Real time transthoracic echocardiography with 2-dimensional (2D) image documentation during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report, including performance of continuous electrocardiographic monitoring, with physician supervision |
| 93352 | administration of contrast with a stress echocardiogram |
| C8928 | Tte w or w/o fol w/con,stres |
| C8930 | Tte w or w/o contr, cont ECG |

***Service: Computed Tomography Angiography (CTA), Cardiac***

## General Guidelines

- **Units, Frequency, & Duration:** Single request.
- **Criteria for Subsequent Requests:** New indication or follow-up after an intervention.
- **Recommended Clinical Approach:** Cardiac CTA has a limited role in the diagnosis and management of syncope. Cardiac CTA is useful in assessing structural cardiac abnormalities and acquired or congenital anatomic factors that may impact management strategy, including implantation of a pacemaker or defibrillator. Angiography as an adjunct imaging protocol is also valuable for understanding vascular anatomy. However, cardiac CT is not a sensitive imaging modality for assessing myocardial disease or sinus node dysfunction, leading to syncopal events. For cardiac conditions such as myocarditis, hypertrophic cardiomyopathy, infiltrative diseases, surgical scarring, or assessment of prior infarct, magnetic resonance imaging (MRI) is a more valuable technique.[27-33]
- **Exclusions:** This protocol includes cardiac CT for cardiac anatomic evaluation. Other study protocols (e.g., calcium scoring, coronary CTA) may require different diagnostic indications and fall out of this scope.

## Medical Necessity Criteria

### Indications

➔ **Cardiac CTA** is considered appropriate if **ANY** of the following is **TRUE**:
- ◆ The patient has syncope/near syncope and suspected structural heart disease, and echocardiography cannot adequately define anatomic structures.
- ◆ Pre-procedural evaluation of cardiac anatomy is needed for a planned permanent pacemaker or ICD implantation.

### Non-Indications

➔ **Cardiac CTA** is not considered appropriate if **ANY** of the following is **TRUE**:
- ◆ An MRI was recently requested for the same indications.

➔ **Cardiac CTA** may not be appropriate if **ANY** of the following is **TRUE**:
- ◆ Non-rate controlled atrial fibrillation.
- ◆ Contrast dye hypersensitivity.
- ◆ Impaired renal function because angiographic contrast is utilized for the study.

- The patient is pregnant.
- The patient takes metformin.

## Site of Service Criteria

Outpatient

## Procedure Codes (HCPCS/CPT)

| HCPCS Code | Code Description/Definition |
|---|---|
| 75572 | Computed tomography (CT) of heart with contrast material for evaluation of cardiac structure and morphology, including 3-dimensional (3D) image postprocessing, assessment of cardiac function, and evaluation of venous structures |
| 75573 | Computed tomography (CT) of heart with contrast material for evaluation of cardiac structure and morphology in congenital heart disease |
| 76380 | Limited follow-up computed tomography (CT) |

***Service: Coronary Computed Tomography Angiography (CCTA)***

## General Guidelines

- **Units, Frequency, & Duration:** None.
- **Criteria for Subsequent Requests:** None.
- **Recommended Clinical Approach:** According to many members of the American College of Cardiology, coronary computed tomography angiography (CCTA) is the test of choice in most symptomatic patients without known CAD.[34] CCTA may be indicated in the evaluation of syncope related to known or suspected ventricular arrhythmias in conjunction with underlying ischemic heart disease.
- **Exclusions:** None.

## Medical Necessity Criteria

### Indications

➔ **CCTA** is considered appropriate if **ANY** of the following is **TRUE**[27,34]:

- ◆ Syncope and an intermediate to high pre-test probability of CAD
- ◆ Syncope with a previously normal or inconclusive stress test but CAD is suspected.
- ◆ Documented clinically significant ventricular arrhythmias on ambulatory monitoring or stress testing.
- ◆ Syncope with new-onset heart failure and no known history of CAD
- ◆ Syncope with exertion

### Non-Indications

➔ **CCTA** may not be considered appropriate if **ANY** of the following is **TRUE**:

- ◆ Contrast dye hypersensitivity.
- ◆ Impaired renal function because angiographic contrast is utilized for the study.
- ◆ The patient is pregnant.
- ◆ The patient has atrial fibrillation or another arrhythmia with uncontrolled heart rate.
- ◆ The patient takes metformin.
- ◆ Normal coronary angiogram or CCTA within the last two years and with no stenosis or plaque
- ◆ Normal stress test (given adequate stress) within the last year

## Site of Service Criteria

Outpatient

## Procedure Codes (HCPCS/CP

| HCPCS Code | Code Description/Definition |
|---|---|
| 75574 | Computed tomographic angiography (CTA) of coronary arteries and bypass grafts, with contrast material and 3-dimensional (3D) image postprocessing |

***Service: Myocardial Perfusion Imaging Single-Photon Emission Computed Tomography (MPI-SPECT)***

## General Guidelines

- **Units, Frequency, & Duration:** None.
- **Criteria for Subsequent Requests:** None.
- **Recommended Clinical Approach:** This may be appropriate for patients with coronary artery disease (CAD) symptoms and an intermediate or high pretest probability of CAD.[6,15,24] An exercise stress test is recommended if the patient can exercise to a satisfactory workload. If the patient cannot exercise to the target range, a drug such as adenosine will simulate exercise and may be an acceptable substitute. Resting ECG abnormalities decrease the accuracy of using the ECG to show an ischemic response, and in this situation, MPI-SPECT imaging before and after exercise will help. Limitations of MPI-SPECT include cost and radiation. Interpretation of MPI-SPECT can also be affected by attenuation artifacts related to soft tissue overlying the heart or extracardiac radioisotope (e.g., liver or gastrointestinal uptake, which may be adjacent to the heart).[25]
- **Exclusions:** None.

## Medical Necessity Criteria

### Indications

➔ **MPI-SPECT** is considered appropriate in the evaluation of syncope if **ALL** of the following is **TRUE**:

- ◆ The patient has syncope and intermediate to high pretest probability of CAD.[6,15,24]
- ◆ The patient has syncope and one or more of the following:
  - ECG abnormalities that would obscure the diagnosis of ischemia (e.g., Wolff-Parkinson-White pattern, LBBB, paced ventricular rhythm, the patient takes digoxin).[14,26]
  - Inability to exercise (i.e., breathing or physical limitations).
  - Inability to achieve the target heart rate with a standard stress test.
  - A previous non-diagnostic non-invasive stress testing needing further clarification by MPI-SPECT.

### Non-Indications

➔ **MPI-SPECT** may not be considered appropriate if **ANY** of the following is **TRUE**:

- Normal coronary angiogram or CCTA within the last two years and with no stenosis or plaque
- Normal stress test (given adequate stress) within the last year
- The patient has any unstable cardiac or pulmonary conditions.
- The patient is pregnant.
- Vasodilators (i.e., adenosine, regadenoson, and dipyridamole) are contraindicated in patients with hypotension, sinus node dysfunction, high-degree atrioventricular (AV) block (in the absence of back up pacemaker capability), and reactive airway disease.

## Site of Service Criteria

Outpatient or Inpatient.

## Procedure Codes (HCPCS/CPT)

| HCPCS Code | Code Description/Definition |
|---|---|
| 78451 | Single-photon emission computed tomography (SPECT) myocardial perfusion imaging study at rest or with stress (exercise or pharmacologic). |
| 78452 | Multiple single-photon emission computed tomography (SPECT) myocardial perfusion imaging studies at rest and/or with stress (exercise or pharmacologic) |
| 78453 | Single planar myocardial perfusion imaging study at rest |
| 78454 | Multiple planar myocardial perfusion imaging studies with stress |
| 78469 | Planar and single-photon emission computed tomography (SPECT) myocardial imaging |
| 78481 | Single planar cardiac blood pool imaging study by first pass technique with exercise and pharmacological stress, wall motion study plus ejection fraction, with quantification |
| 0331T | Myocardial sympathetic innervation imaging, planar qualitative and quantitative assessment; |
| 0332T | Myocardial sympathetic innervation imaging, planar qualitative and quantitative assessment; with tomographic SPECT |

***Service: Cardiac Positron Emission Tomography (PET)***

## General Guidelines

- **Units, Frequency, & Duration:** Single request.
- **Criteria for Subsequent Requests:** None.
- **Recommended Clinical Approach:** Positron emission tomography (PET) is a non-invasive diagnostic imaging procedure used to evaluate metabolism in normal tissues and diseased tissues in ischemic heart disease. The benefits of PET scans include greater accuracy for patients who cannot adequately exercise and less radiation exposure than SPECT. It is particularly beneficial in obese patients and others prone to SPECT attenuation artifact, in younger patients (men younger than 40, women younger than 50) to reduce radiation exposure compared to SPECT and following equivocal or nondiagnostic testing.[25,35]
- **Exclusions:** None.

## Medical Necessity Criteria

### Indications

➔ **Cardiac PET** is appropriate in the evaluation of syncope if **ALL** of the following are **TRUE**:
- ◆ Patient with syncope and one or more of the following:
  - Intermediate or high pre-test probability of CAD.
- ◆ The patient has one or more of the following:
  - Is likely to experience attenuation artifact with SPECT imaging due to factors such as morbid obesity, large breasts, breast implants, previous mastectomy, chest wall deformity, pleural/pericardial effusion.[25]
  - A previous inconclusive MPI-SPECT or stress echo.

### Non-Indications

➔ **Cardiac PET** is not appropriate if **ANY** of the following is **TRUE**:
- ◆ The patient has allergic reactions or intolerance to radiotracers.
- ◆ The patient is pregnant.
- ◆ The patient has a contraindication to vasodilators (e.g., adenosine, regadenoson, and dipyridamole) or dobutamine.
- ◆ The patient has any unstable cardiac or pulmonary conditions.

## Site of Service Criteria

Outpatient or Inpatient.

## Procedure Codes (HCPCS/CPT)

| HCPCS Code | Code Description/Definition |
|---|---|
| 78429 | Single positron emission tomography (PET) myocardial imaging study for metabolic evaluation with concurrently acquired computed tomography (CT) transmission scan |
| 78430 | Single positron emission tomography (PET) myocardial perfusion imaging study with evaluation of ejection fraction, at rest or stress (exercise or pharmacologic), with concurrently acquired computed tomography (CT) transmission scan |
| 78431 | Multiple positron emission tomography (PET) myocardial perfusion imaging studies with evaluation of ejection fraction, at rest and stress (exercise or pharmacologic), with concurrently acquired computed tomography (CT) transmission scan |
| 78432 | Positron emission tomography (PET) combined myocardial perfusion imaging study and metabolic evaluation study using dual radiotracer |
| 78433 | Positron emission tomography (PET) combined myocardial perfusion imaging and metabolic evaluation study using dual radiotracer, with concurrently acquired computed tomography (CT) transmission scan |
| 78491 | Single positron emission tomography (PET) myocardial perfusion imaging study with evaluation of ejection fraction, at rest or stress (exercise or pharmacologic) |
| 78492 | Multiple positron emission tomography (PET) myocardial perfusion imaging studies with evaluation of ejection fraction, at rest and with stress (exercise or pharmacologic). |
| G0235 | Pet not otherwise specified |
| G0252 | Pet imaging initial dx |

***Service: Magnetic Resonance Imaging (MRI), Cardiac***

## General Guidelines

- **Units, Frequency, & Duration:** None.
- **Criteria for Subsequent Requests:** Considerations of additional phase, dynamic sequences, positioning of the patient, and use of markers at the discretion of the protocoling radiologist.
- **Recommended Clinical Approach:** Cardiac magnetic resonance imaging (MRI) has a limited role in the evaluation of patients with syncope. Cardiac MRI may help evaluate cardiomyopathies such as hypertrophic cardiomyopathy (HCM), arrhythmogenic right ventricular (RV) dysplasia, sarcoidosis, amyloidosis, which may be associated with ventricular tachyarrhythmias, heart block, and other conduction abnormalities and risk of sudden cardiac death. MRI may play a role in the decision to implant a permanent pacemaker (PPM) or AICD.[36]
- **Exclusions:** Exclusions include contraindications of MRI (e.g., retained metal, incompatible width to bore size, claustrophobia), incompatibility with following directions (i.e., breath-hold), and renal insufficiency (eGFR less than 30 mL/min per 1.73 $m^2$) if gadolinium is requested.

## Medical Necessity Criteria

### Indications

➔ **MRI** is considered appropriate if **ALL** of the following are **TRUE**[37-38]:
- ◆ The patient had prior cardiac imaging testing and **ANY** of the following are **TRUE**:
  - Failed to characterize a cardiac basis for syncope OR
  - Revealed abnormal findings better characterized by cardiac MRI.
- ◆ The patient has **ANY** of the following:
  - Objective evidence of cardiomyopathy.
  - Suspicion of a lethal heart rhythm disorder (e.g., ventricular tachyarrhythmias or heart block).
  - Congenital Heart Disease.
  - An extrathoracic disease that may involve the heart (e.g., sarcoidosis, amyloidosis, cancer).
  - Pulmonary Hypertension.
  - Congestive Heart Failure.
  - Suspected cardiac mass (e.g., thrombus, malignancy).
  - A disease of the thoracic aorta.
  - Myocarditis or pericarditis.

- A history of cardiac arrest and a planned permanent pacemaker or AICD implantation.

### Non-Indications

➔ **MRI** is not considered appropriate if **ANY** of the following is **TRUE**[38]:

- MRI is the initial imaging modality.
- The patient has non-compatible implanted devices.
- The patient has metallic intraocular foreign bodies.
- There is a potential for adverse reactions to contrast media.
- The patient has severe claustrophobia.
- If the patient has renal insufficiency (eGFR less than 30 mL/min per 1.73 $m^2$) and if gadolinium contrast is requested, an MRI/MRA may not be considered appropriate.

## Site of Service Criteria

Outpatient or Inpatient.

## Procedure Codes (HCPCS/CPT)

| HCPCS Code | Code Description/Definition |
|---|---|
| 71550 | Magnetic resonance imaging (MRI) of chest without contrast material |
| 71551 | Magnetic resonance imaging (MRI) of chest with contrast |
| 71552 | Magnetic resonance imaging (MRI) of chest with contrast material, including noncontrast images and image postprocessing, for evaluation of hilar and mediastinal lymphadenopathy |
| 75557 | Cardiac magnetic resonance imaging (MRI) without contrast material, for evaluation of morphology & function |
| 75559 | Cardiac magnetic resonance imaging (MRI) with stress imaging, without contrast material, for evaluation of morphology and function |
| 75561 | Cardiac magnetic resonance imaging (MRI) without contrast material, followed by contrast material and further sequences, for evaluation of morphology and function |
| 75563 | Cardiac magnetic resonance imaging (MRI) with stress imaging, without contrast material, followed by contrast material and further sequences, for evaluation of morphology and function |
| C9762 | Cardiac magnetic resonance imaging for morphology and |

| | |
|---|---|
| | function, quantification of segmental dysfunction; with strain imaging |
| C9763 | Cardiac magnetic resonance imaging for morphology and function, quantification of segmental dysfunction; with stress imaging |
| S8042 | Mri low field |

# Surgical or Interventional Management

***Service: Electrophysiology Study (EPS)***

## General Guidelines

- **Units, Frequency, & Duration:** One instance, as indicated by clinical guidelines.
- **Criteria for Subsequent Requests:** None.
- **Recommended Clinical Approach:** The yield of electrophysiology studies (EPS) for evaluation of syncope is dependent on the presence of another cardiac disease.[9] In the absence of known cardiac disease, the yield of an EPS is only about 10%.[3] An EPS is indicated when clinical arrhythmias are found on ambulatory monitoring which could be amenable to ICD implantation, ablation, or permanent pacemaker insertion. In addition, EPS may be considered when there is suspicion of conduction disease and non-invasive testing does not reveal any AV block.[39] Specific maneuvers during an EPS can evaluate sinus node recovery. These are typically performed as part of a comprehensive EPS for other arrhythmias such as atrial fibrillation or flutter, both of which can be associated with sinus node dysfunction in tachy-brady syndrome. Finally, isolated recommendations for EPS in the setting of syncope and Brugada pattern on ECG exist, but the data supporting the accuracy of these studies are controversial.[40]
- **Exclusions:** None.

## Medical Necessity Criteria

### Indications

➔ **EPS** is considered appropriate if **ANY** of the following is **TRUE**[40]:

- ◆ In a patient with symptoms suggestive of significant bradycardia or heart block where non-invasive evaluations have been inconclusive (e.g., ECG, stress testing, heart monitoring).
- ◆ In a patient with tachyarrhythmia where mapping and ablation or AICD implantation are being considered.
- ◆ In patients with ischemic or nonischemic cardiomyopathy or adult congenital heart disease who do not meet indications for a primary prevention ICD.
- ◆ For risk stratification of Brugada Syndrome.

### Non-Indications

➔ **EPS** is not considered appropriate if **ANY** of the following is **TRUE**[40]:

- Symptomatic sinus bradycardia/arrest was correlated with patient symptoms on outpatient testing.
- Tachyarrhythmias associated with syncope/near syncope, which indicate a need for coronary intervention.
- Syncope associated with arrhythmias that are indications for pacemaker or ICD implantation.

## Site of Service Criteria

Outpatient.

## Procedure Codes (HCPCS/CPT)

| HCPCS Code | Code Description/Definition |
|---|---|
| 93600 | Bundle of His recording |
| 93602 | Intra-atrial recording |
| 93603 | Right ventricular recording |
| 93610 | Intra-atrial pacing |
| 93612 | Intraventricular pacing |
| 93618 | Induction of arrhythmia by electrical pacing |
| 93619 | Comprehensive electrophysiologic evaluation with insertion and repositioning of multiple electrode catheters, with right atrial pacing and recording, right ventricular pacing and recording, and His bundle recording |
| 93620 | Comprehensive electrophysiologic evaluation with insertion and repositioning of multiple electrode catheters, with attempted induction of arrhythmia, with right atrial pacing and recording, right ventricular pacing and recording, and His bundle recording |
| 93624 | Electrophysiologic follow-up study with pacing and recording to test effectiveness of therapy with attempted induction of arrhythmia |
| 93631 | Intra-operative epicardial and endocardial pacing and mapping to localize the site of tachycardia or zone of slow conduction for surgical correction |
| 93654 | Comprehensive electrophysiologic evaluation with insertion and repositioning of multiple electrode catheters, |

| | |
|---|---|
| | with attempted induction of arrhythmia, with right atrial pacing and recording, with focus of ventricular ectopy |

# Surgical Risk Factors

**Patient Medical Risk Stratification**

| Patient Risk Score | Patient Characteristic | Min Range | Max Range | Guidance |
|---|---|---|---|---|
| **1- Very Low Risk** | No known medical problems | | | |
| **2- Low Risk** | Hypertension | | 180/110 mm Hg | |
| **2- Low Risk** | Asthma | peak flow >80% of predicted or personal best value | | |
| **2- Low Risk** | Prior history of alcohol abuse | | | Screen for liver disease and malnutrition |
| **2- Low Risk** | Prior history of tobacco use | | | |
| **3- Intermediate Risk** | Asthma | peak flow <80% of predicted or personal best value | | |
| **3- Intermediate Risk** | Active alcohol abuse | | | |
| **3- Intermediate Risk** | Age | 65 | 75 | |
| **3- Intermediate Risk** | History of treated, stable coronary artery disease (CAD) | | | |
| **3- Intermediate Risk** | Stable atrial fibrillation | | | |
| **3- Intermediate Risk** | Diabetes mellitus | HbA1C >7% | | |
| **3- Intermediate Risk** | Morbid obesity | BMI 30 | BMI 40 | |
| **3- Intermediate Risk** | Anemia | hemoglobin <11 (females), <12 (males) | | Workup to identify etiology |
| **3- Intermediate Risk** | HIV | CD4 <200 cells/mm3 | | Get clearance from HIV specialist |
| **3- Intermediate Risk** | Rheumatologic disease | | | Preoperative consultation with rheumatologist re: perioperative medication management |

| | | | | |
|---|---|---|---|---|
| **3- Intermediate Risk** | Peripheral vascular disease or history of peripheral vascular bypass | ankle-brachial pressure index (ABPI) <0.9 | | Preoperative consultation with vascular surgeon |
| **3- Intermediate Risk** | History of venous thromboembolism (VTE) | | | |
| **3- Intermediate Risk** | Well-controlled obstructive sleep apnea | | | |
| **3- Intermediate Risk** | Malnutrition | transferrin <200 mg/dL albumin <3.5 g/dL prealbumin <22.5 mg/dL total lymphocyte count <1200-1500 cell/mm3 BMI <18 | | Preoperative consultation with nutritionist |
| **3- Intermediate Risk** | Active tobacco Use | | | Enroll patient in smoking cessation program |
| **3- Intermediate Risk** | Known allergy or hypersensitivity to medication needed for procedure | | | |
| **4- High Risk** | Advanced Renal Disease (Creatinine > 2) | | | |
| **4- High Risk** | Diabetes mellitus with complications | HbA1c >8% | | |
| **4- High Risk** | Age | 76 | 85 | |
| **4- High Risk** | Oxygen dependent pulmonary disease | | | |
| **4- High Risk** | Sickle cell anemia | | | |
| **4- High Risk** | Obesity | BMI 40 | | |
| **4- High Risk** | Cirrhosis, history of hepatic decompensation or variceal bleeding | | | |
| **4- High Risk** | Impaired cognition; dementia | | | |
| **4- High Risk** | Compensated CHF | | | |
| **4- High Risk** | Cerebrovascular disease | | | |
| **4- High Risk** | Uncontrolled or suspected obstructive sleep apnea (OSA) | | | |
| **4- High Risk** | Renal insufficiency | serum creatinine >1.5 mg/dL or | | |

| | | | | |
|---|---|---|---|---|
| | | creatinine clearance <100 mL/min | | |
| **4- High Risk** | Opioid dependence | | | |
| **5- Very High Risk** | Percutaneous Coronary Intervention (PCI) within 1 month | | | |
| **5- Very High Risk** | Cardiovascular: unstable angina, recent myocardial infarction (60 days), uncontrolled atrial fibrillation or other high-grade abnormal rhythm, severe valvular disease, decompensated heart failure | | | |
| **5- Very High Risk** | Primary pulmonary hypertension | | | Preoperative consultation with pulmonologist warranted |
| **5- Very High Risk** | Cirrhosis or severe liver disease, history of hepatic decompensation or variceal bleeding | | | |
| **5- Very High Risk** | Severe frailty, dependence for ADLs, or history of 3 or more falls in last 6 mos | | | |
| **5- Very High Risk** | Obesity | | BMI >50 | |
| **5- Very High Risk** | Age | | >85 | |
| **5- Very High Risk** | History of VTE with CI to anticoagulation, failure of anticoagulation, cessation of anticoagulation therapy secondary to bleeding | | | Preoperative consultation with hematologist or internist |
| **5- Very High Risk** | Renal failure requiring dialysis | | | |
| **5- Very High Risk** | Immunosuppression | | | |
| **5- Very High Risk** | Chronic Pain | | | |

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|---|---|
| **Review History** | |
| January 4, 2022 (V.1) | **Physician author:** Mary Krebs, MD (Primary Care Physician)<br>**Peer reviewed by:** Kenneth Korr, MD (Cardiologist), Carter Newton, MD FACC (Cardiologist), Russell Rotondo, MD FACC (Cardiologist)<br>**Approving Physician:** Russell Rotondo, MD FACC (Cardiologist) |
| September 2, 2022 (V.2) | **Peer reviewed by:** Tim Sanborn, MD (Cardiologist)<br>**Approving Physician:** Russell Rotondo, MD FACC (Cardiologist) |