

Cigna Medical Coverage Policies – Radiology Pediatric Cardiac Imaging Guidelines

Effective February 01, 2024



Instructions for use

The following coverage policy applies to health benefit plans administered by Cigna. Coverage policies are intended to provide guidance in interpreting certain standard Cigna benefit plans and are used by medical directors and other health care professionals in making medical necessity and other coverage determinations. Please note the terms of a customer's particular benefit plan document may differ significantly from the standard benefit plans upon which these coverage policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a coverage policy.

In the event of a conflict, a customer's benefit plan document always supersedes the information in the coverage policy. In the absence of federal or state coverage mandates, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of:

1. The terms of the applicable benefit plan document in effect on the date of service
2. Any applicable laws and regulations
3. Any relevant collateral source materials including coverage policies
4. The specific facts of the particular situation

Coverage policies relate exclusively to the administration of health benefit plans. Coverage policies are not recommendations for treatment and should never be used as treatment guidelines.

This evidence-based medical coverage policy has been developed by eviCore, Inc. Some information in this coverage policy may not apply to all benefit plans administered by Cigna.

These guidelines include procedures eviCore does not review for Cigna. Please refer to the [Cigna CPT code list](#) for the current list of high-tech imaging procedures that eviCore reviews for Cigna.

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General Information

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| General Guidelines (PEDCD-1.0)..... | 5 |

General Guidelines (PEDCD-1.0)

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Heart disease in the pediatric population involves predominantly congenital lesions. Pediatric individuals can have acquired heart disease unique to children. For those diseases which occur in both pediatric and adult populations, differences exist in management due to individual age, comorbidities, and differences in disease natural history between children and adults.

Pediatric Cardiac Imaging Appropriate Clinical Evaluation

- Prior to considering advanced imaging (CT, MR, Nuclear Medicine) or echocardiogram, a pertinent clinical evaluation should be performed, including the following (both):
 - A detailed history, physical examination or meaningful technological contact (telehealth visit, telephone call, electronic mail or messaging)
 - A review of appropriate diagnostic studies (laboratory, EKG, echo, and other diagnostic imaging)
- A recent clinical evaluation is not needed prior to advanced imaging (CT, MR, Nuclear Medicine) or echocardiogram if **any** of the following apply:
 - Individual is undergoing guideline-supported scheduled imaging evaluation
 - Echocardiogram is being performed at the first cardiology visit for an appropriate indication as stated in these guidelines
 - Routine imaging is anticipated at the next visit (e.g., one year follow-up echo for a 10 year old with a VSD)
- Advanced imaging of the heart and echocardiogram are medically necessary in any of the following:
 - Individuals who have documented active clinical signs or symptoms of disease involving the heart
 - As follow-up for findings on echocardiograms.
 - See **Initial Transthoracic Echocardiography (TTE) Indications (PEDCD-8.2)** for indications for initial echos in asymptomatic individuals
- Repeat imaging studies of the heart are **not** indicated unless one of the following applies:
 - Repeat imaging is indicated in a specific guideline section
 - There is evidence for progression of disease
 - There is new onset of disease with documentation of how repeat imaging will affect individual management or treatment decisions
 - See **Repeat Transthoracic Echocardiography Indications (PEDCD-8.3)** for indications for repeat echos in asymptomatic individuals

- Asymptomatic individuals with exposure to cardiotoxic drugs can have serial echocardiograms as per **Cardiotoxicity and Echocardiography (PEDONC-19.2)** in the Pediatric Oncology Imaging Guideline
- Advanced imaging and echocardiogram is **not** indicated, in the absence of other appropriate indications listed in these guidelines, for **any** of the following:
 - Individuals starting ADHD medications
 - To screen asymptomatic individuals for disorders involving the heart

Pediatric Cardiac Imaging Modality General Considerations

- MRI
 - MRI and MRA studies are frequently indicated for evaluation of congenital heart defects not well visualized on echocardiography, thoracic arteries and veins not visualized on echocardiography, cardiomyopathies, and right ventricular disease, as well as in follow-up for these indications.
 - Due to the length of time for image acquisition and the need for the individual to be motionless during the acquisition, anesthesia is required for almost all infants and young children (age <7 years), as well as older children with delays in development or maturity. In this population, MRI imaging sessions should be planned with a goal of avoiding a short-interval repeat anesthesia exposure due to insufficient information using the following considerations:
 - MRI is typically performed without and with contrast.
 - If multiple body areas are supported for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same anesthesia session.
- CT
 - CT is primarily used to evaluate the coronary and great vessels in congenital heart disease if cardiac MR is contraindicated.
 - Coding considerations are listed in **CT Heart and Coronary Computed Tomography Angiography (CCTA) – Other Indications (PEDCD-10)**
- Ultrasound
 - Echocardiography is the primary modality used to evaluate the anatomy and function of the pediatric heart, and is generally indicated before considering other imaging modalities.
 - Coding considerations are listed in **Echocardiography - Other Indications (PEDCD-8)**
- Nuclear Medicine
 - SPECT, PET stress may be indicated for individuals with anomalous CA, angina chest pain, and follow-up for Kawasaki and MIS-C. See specific sections for those indications.

- Multi Gated Acquisition (MUGA) studies (CPT® 78472, CPT® 78473, CPT® 78481, CPT® 78483, CPT® 78494, or CPT® 78496) are rarely performed in pediatrics, but can be approved for the following:
 - Certain pediatric oncology individuals when echocardiography is insufficient: See: **Appropriate Clinical Evaluations (PEDONC-1.2)** for imaging guidelines.
 - Quantitation of left ventricular function when recent echocardiogram shows ejection fraction of <50% and MUGA results will impact acute patient care decisions.
- SPECT/CT fusion imaging involves SPECT (MPI) imaging and CT for optimizing location, accuracy, and attenuation correction combines functional and anatomic information.
 - There is currently no evidence-based data to formulate appropriateness criteria for SPECT/CT fusion imaging.
 - Combined use of nuclear imaging, including SPECT, along with diagnostic CT (fused SPECT/CT) is considered investigational.
- Central C-V Hemodynamics (CPT® 78414) is not an imaging study and is an outdated examination
- Cardiac Shunt Detection (CPT® 78428) is rarely performed in pediatrics but can be approved for individuals in whom Cardiac MR is not diagnostic
 - Calculation of left and right ventricular ejection fractions
 - Assessment of wall motion
 - Quantitation of right to left shunts
- Myocardial Tc-99m Pyrophosphate Imaging
 - Infarct Avid Myocardial Imaging studies (CPT® 78466, CPT® 78468, and CPT® 78469), historically this method of imaging the myocardium, Myocardial Tc-99m Pyrophosphate Imaging, was used to identify recent infarction, hence, the term "infarct-avid scan." Although still available, the sensitivity and specificity for identifying infarcted myocardial tissue is variable and the current use for this indication is limited
 - CPT® 78466, CPT® 78468, and CPT® 78469, CPT® 78800 or CPT® 78803 may be used, for identification of myocardial ATTR (transthyretin) amyloidosis. See **Myocardial Tc-99m Pyrophosphate Imaging (CD-3.7)** and **Cardiac Amyloidosis (CD-3.8)**

| MUGA (Multi Gated Acquisition) – Blood Pool Imaging | CPT® |
|--|-------------|
| Myocardial Imaging, infarct avid, planar, qualitative or quantitative | 78466 |
| Myocardial Imaging, infarct avid, planar, qualitative or quantitative with ejection fraction by first pass technique | 78468 |
| Myocardial Imaging, infarct avid, planar, qualitative or quantitative tomographic SPECT with or without quantification | 78469 |
| Radiopharmaceutical Localization Imaging Limited area | 78800 |

| MUGA (Multi Gated Acquisition) – Blood Pool Imaging | CPT® |
|---|-------------|
| Radiopharmaceutical Localization Imaging SPECT | 78803 |
| Note: When reporting CPT® 78803, planar imaging of a limited area or multiple areas should be included with the SPECT | |

Supporting Information

Individuals who are <18 years old should be imaged according to the Pediatric Cardiac Imaging Guidelines and the general Cardiac Imaging Guidelines. Individuals who are age ≥18 years should be imaged according to the Cardiac Imaging Guidelines, except where directed otherwise by a specific guideline section. Adult individuals who also have congenital heart disease should be imaged by **Adult Congenital Heart Disease (CD-11)** in the general Cardiac Imaging Guidelines.

The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

Procedure Codes Associated with Cardiac or PVD Imaging

| MRI/MRA | CPT® |
|--|-------------|
| Cardiac magnetic resonance imaging for morphology and function without contrast material | 75557 |
| Cardiac magnetic resonance imaging for morphology and function without contrast material; with stress imaging | 75559 |
| Cardiac magnetic resonance imaging for morphology and function without contrast material(s), followed by contrast material(s) and further sequences | 75561 |
| Cardiac magnetic resonance imaging for morphology and function without contrast material(s), followed by contrast material(s) and further sequences; with stress imaging | 75563 |
| Cardiac magnetic resonance imaging for velocity flow mapping (List separately in addition to code for primary procedure) | 75565 |

| CT | CPT® |
|---|-------------|
| Computed tomography, heart, without contrast material, with quantitative evaluation of coronary calcium | 75571 |
| Computed tomography, heart, with contrast material, for evaluation of cardiac structure and morphology (including 3D image postprocessing, assessment of cardiac function, and evaluation of venous structures, if performed) | 75572 |

| CT | CPT [®] |
|---|------------------|
| Computed tomography, heart, with contrast material, for evaluation of cardiac structure and morphology in the setting of congenital heart disease (including 3D image postprocessing, assessment of LV cardiac function, RV structure and function and evaluation of venous structures, if performed) | 75573 |
| Noninvasive estimated coronary fractional flow reserve (FFR) derived from coronary computed tomography angiography data using computation fluid dynamics physiologic simulation software analysis of functional data to assess the severity of coronary artery disease; data preparation and transmission, analysis of fluid dynamics and simulated maximal coronary hyperemia, generation of estimated FFR model, with anatomical data review in comparison with estimated FFR model to reconcile discordant data, interpretation and report | 0501T |
| Noninvasive estimated coronary fractional flow reserve (FFR) derived from coronary computed tomography angiography data using computation fluid dynamics physiologic simulation software analysis of functional data to assess the severity of coronary artery disease; data preparation and transmission | 0502T |
| Noninvasive estimated coronary fractional flow reserve (FFR) derived from coronary computed tomography angiography data using computation fluid dynamics physiologic simulation software analysis of functional data to assess the severity of coronary artery disease; analysis of fluid dynamics and simulated maximal coronary hyperemia, and generation of estimated FFR model | 0503T |
| Noninvasive estimated coronary fractional flow reserve (FFR) derived from coronary computed tomography angiography data using computation fluid dynamics physiologic simulation software analysis of functional data to assess the severity of coronary artery disease; anatomical data review in comparison with estimated FFR model to reconcile discordant data, interpretation and report | 0504T |

| CTA | CPT [®] |
|--|------------------|
| Computed tomographic angiography, heart, coronary arteries and bypass grafts (when present), with contrast material, including 3D image postprocessing (including evaluation of cardiac structure and morphology, assessment of cardiac function, and evaluation of venous structures, if performed) | 75574 |
| Computed tomographic angiography, abdominal aorta and bilateral iliofemoral lower extremity runoff, with contrast material(s), including noncontrast images, if performed, and image postprocessing | 75635 |

| Nuclear Medicine | CPT® |
|---|-------|
| Determination of central c-v hemodynamics (non-imaging) (eg, ejection fraction with probe technique) with or without pharmacologic intervention or exercise, single or multiple determinations | 78414 |
| Cardiac shunt detection | 78428 |
| Myocardial imaging, positron emission tomography (PET), metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), single study; with concurrently acquired computed tomography transmission scan | 78429 |
| Myocardial imaging, positron emission tomography (PET), perfusion study (including ventricular wall motion[s] and/or ejection fraction[s], when performed); single study, at rest or stress (exercise or pharmacologic), with concurrently acquired computed tomography transmission scan | 78430 |
| Myocardial imaging, positron emission tomography (PET), perfusion study (including ventricular wall motion[s] and/or ejection fraction[s], when performed); multiple studies at rest and stress (exercise or pharmacologic), with concurrently acquired computed tomography transmission scan | 78431 |
| Myocardial imaging, positron emission tomography (PET), combined perfusion with metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), dual radiotracer (eg, myocardial viability); | 78432 |
| Myocardial imaging, positron emission tomography (PET), combined perfusion with metabolic evaluation study (including ventricular wall motion[s] and/or ejection fraction[s], when performed), dual radiotracer (eg, myocardial viability); with concurrently acquired computed tomography transmission scan | 78433 |
| Absolute quantitation of myocardial blood flow (AQMBF), positron emission tomography (PET), rest and pharmacologic stress (List separately in addition to code for primary procedure) | 78434 |
| Myocardial perfusion imaging, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); single study, at rest or stress (exercise or pharmacologic) | 78451 |
| Myocardial perfusion imaging, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); multiple studies, at rest and/or stress (exercise or pharmacologic) and/or redistribution and/or rest reinjection | 78452 |
| Myocardial perfusion imaging, planar (including qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); single study, at rest or stress (exercise or pharmacologic) | 78453 |

| Nuclear Medicine | CPT [®] |
|--|------------------|
| Myocardial perfusion imaging, planar (including qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); multiple studies, at rest and/or stress (exercise or pharmacologic) and/or redistribution and/or rest reinjection | 78454 |
| Myocardial imaging, positron emission tomography (PET), metabolic evaluation study (including ventricular wall motion and/or ejection fraction, when performed), single study | 78459 |
| Myocardial imaging, infarct avid, planar; qualitative or quantitative | 78466 |
| Myocardial imaging, infarct avid, planar; with ejection fraction by first pass technique | 78468 |
| Myocardial imaging, infarct avid, planar; tomographic SPECT with or without quantification | 78469 |
| Cardiac blood pool imaging, gated equilibrium; planar, single study at rest or stress (exercise and/or pharmacologic), wall motion study plus ejection fraction, with or without additional quantitative processing | 78472 |
| Cardiac blood pool imaging, gated equilibrium; multiple studies, wall motion study plus ejection fraction, at rest and stress (exercise and/or pharmacologic), with or without additional quantification | 78473 |
| Cardiac blood pool imaging (planar), first pass technique; single study, at rest or with stress (exercise and/or pharmacologic), wall motion study plus ejection fraction, with or without quantification | 78481 |
| Cardiac blood pool imaging (planar), first pass technique; multiple studies, at rest and with stress (exercise and/or pharmacologic), wall motion study plus ejection fraction, with or without quantification | 78483 |
| Myocardial imaging, positron emission tomography (PET), perfusion (including ventricular wall motion and/or ejection fraction, when performed); single study at rest or stress (exercise or pharmacologic) | 78491 |
| Myocardial imaging, positron emission tomography (PET), perfusion (including ventricular wall motion and/or ejection fraction, when performed); multiple studies at rest and/or stress (exercise or pharmacologic) | 78492 |
| Cardiac blood pool imaging, gated equilibrium, SPECT, at rest, wall motion study plus ejection fraction, with or without quantitative processing | 78494 |
| Cardiac blood pool imaging, gated equilibrium, single study, at rest, with right ventricular ejection fraction by first pass technique (List separately in addition to code for primary procedure) | 78496 |
| Quantitative differential pulmonary perfusion, including imaging when performed | 78597 |
| Quantitative differential pulmonary perfusion and ventilation (eg, aerosol or gas), including imaging when performed | 78598 |

| Nuclear Medicine | CPT® |
|--|-------------|
| Radiopharmaceutical localization of tumor, inflammatory process or distribution of radiopharmaceutical agent(s) (includes vascular flow and blood pool imaging, when performed); planar, single area (eg, head, neck, chest, pelvis), single day imaging | 78800 |
| Radiopharmaceutical localization of tumor, inflammatory process or distribution of radiopharmaceutical agent(s) (includes vascular flow and blood pool imaging, when performed); planar, 2 or more areas (eg, abdomen and pelvis, head and chest), 1 or more days imaging or single area imaging over 2 or more days | 78801 |
| Radiopharmaceutical localization of tumor, inflammatory process or distribution of radiopharmaceutical agent(s) (includes vascular flow and blood pool imaging, when performed); planar, whole body, single day imaging | 78802 |
| Radiopharmaceutical localization of tumor, inflammatory process or distribution of radiopharmaceutical agent(s) (includes vascular flow and blood pool imaging, when performed); tomographic (SPECT), single area (eg, head, neck, chest, pelvis), single day imaging | 78803 |
| Radiopharmaceutical localization of tumor, inflammatory process or distribution of radiopharmaceutical agent(s) (includes vascular flow and blood pool imaging, when performed); planar, whole body, requiring 2 or more days imaging | 78804 |
| Radiopharmaceutical localization of tumor, inflammatory process or distribution of radiopharmaceutical agent(s) (includes vascular flow and blood pool imaging, when performed); tomographic (SPECT) with concurrently acquired computed tomography (CT) transmission scan for anatomical review, localization and determination/detection of pathology, single area (eg, head, neck, chest, pelvis), single day imaging | 78830 |
| Myocardial sympathetic innervation imaging, planar qualitative and quantitative assessment | 0331T |
| Myocardial sympathetic innervation imaging, planar qualitative and quantitative assessment; with tomographic SPECT | 0332T |

| Ultrasound | CPT® |
|---|-------------|
| Transthoracic echocardiography for congenital cardiac anomalies; complete | 93303 |
| Transthoracic echocardiography for congenital cardiac anomalies; follow-up or limited study | 93304 |
| Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, complete, with spectral Doppler echocardiography, and with color flow Doppler echocardiography | 93306 |

| Ultrasound | CPT® |
|--|--------|
| Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, complete, without spectral or color Doppler echocardiography | 93307 |
| Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, follow-up or limited study | 93308 |
| Echocardiography, transesophageal, real-time with image documentation (2D) (with or without M-mode recording); including probe placement, image acquisition, interpretation and report | 93312 |
| Echocardiography, transesophageal, real-time with image documentation (2D) (with or without M-mode recording); placement of transesophageal probe only | 93313 |
| Echocardiography, transesophageal, real-time with image documentation (2D) (with or without M-mode recording); image acquisition, interpretation and report only | 93314 |
| Transesophageal echocardiography for congenital cardiac anomalies; including probe placement, image acquisition, interpretation and report | 93315 |
| Transesophageal echocardiography (TEE) for congenital cardiac anomalies; placement of transesophageal probe only | 93316 |
| Transesophageal echocardiography for congenital cardiac anomalies; placement of transesophageal probe only | 93317 |
| 3D echocardiographic imaging and postprocessing during transesophageal echocardiography, or during transthoracic echocardiography for congenital cardiac anomalies, for the assessment of cardiac structure(s) (eg, cardiac chambers and valves, left atrial appendage, interatrial septum, interventricular septum) and function, when performed (List separately in addition to code for echocardiographic imaging) Code with (93303-93304, 93312, 93314, 93315, 93317, 93350-93351) | +93319 |
| Doppler echocardiography, pulsed wave and/or continuous wave with spectral display (List separately in addition to codes for echocardiographic imaging); complete | +93320 |
| Doppler echocardiography, pulsed wave and/or continuous wave with spectral display (List separately in addition to codes for echocardiographic imaging); follow-up or limited study (List separately in addition to codes for echocardiographic imaging) | +93321 |
| Doppler echocardiography color flow velocity mapping (List separately in addition to codes for echocardiography) | +93325 |
| Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report; | 93350 |

| Ultrasound | CPT [®] |
|---|------------------|
| Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, 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 supervision by a physician or other qualified health care professional | 93351 |
| Use of echocardiographic contrast agent during stress echocardiography (List separately in addition to code for primary procedure) | +93352 |
| Myocardial strain imaging using speckle tracking-derived assessment of myocardial mechanics (List separately in addition to codes for echocardiography imaging) | +93356 |
| Transthoracic echocardiography with contrast, or without contrast followed by with contrast, for congenital cardiac anomalies; complete | C8921 |
| Transthoracic echocardiography with contrast, or without contrast followed by with contrast, for congenital cardiac anomalies; follow-up or limited study | C8922 |
| Transthoracic echocardiography with contrast, or without contrast followed by with contrast, real-time with image documentation (2D), includes M-mode recording, when performed, complete, without spectral or color doppler echocardiography | C8923 |
| Transthoracic echocardiography with contrast, or without contrast followed by with contrast, real-time with image documentation (2D), includes M-mode recording when performed, follow-up or limited study | C8924 |
| Transesophageal echocardiography (TEE) with contrast, or without contrast followed by with contrast, real time with image documentation (2D) (with or without M-mode recording); including probe placement, image acquisition, interpretation and report | C8925 |
| Transesophageal echocardiography (TEE) with contrast, or without contrast followed by with contrast, for congenital cardiac anomalies; including probe placement, image acquisition, interpretation and report | C8926 |
| Transthoracic echocardiography with contrast, or without contrast followed by with contrast, real-time with image documentation (2D), includes M-mode recording, when performed, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation and report | C8928 |
| Transthoracic echocardiography with contrast, or without contrast followed by with contrast, real-time with image documentation (2D), includes M-mode recording, when performed, complete, with spectral doppler echocardiography, and with color flow doppler echocardiography | C8929 |

| Ultrasound | CPT® |
|---|--------|
| Transthoracic echocardiography, with contrast, or without contrast followed by with contrast, real-time with image documentation (2D), includes M-mode recording, when performed, 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 | C8930 |
| Myocardial contrast perfusion echocardiography, at rest or with stress, for assessment of myocardial ischemia or viability (List separately in addition to code for primary procedure) | +0439T |

| Cardiac Cath Procedure | CPT® |
|--|-----------------------------|
| Congenital Heart Disease Code "Set" | 93593-93597 |
| Right heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone; normal native connections | 93593 |
| Right heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone; abnormal native connections | 93594 |
| Left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone, normal or abnormal native connections | 93595 |
| Right and left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone(s); normal native connections | 93596 |
| Right and left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone(s); abnormal native connections | 93597 |
| Anomalous coronary arteries, patent foramen ovale, mitral valve prolapse, and bicuspid aortic valve | 93451-93464, 93566-93568 |
| RHC without LHC or coronaries | 93451 |
| LHC without RHC or coronaries | 93452 |
| RHC and retrograde LHC without coronaries | 93453 |
| Native coronary artery catheterization; | 93454 |
| with bypass grafts | 93455 |

| Cardiac Cath Procedure | CPT® |
|--|---|
| with RHC | 93456 |
| with RHC and bypass grafts | 93457 |
| with LHC | 93458 |
| with LHC and bypass grafts | 93459 |
| with RHC and LHC | 93460 |
| with RHC and LHC and bypass grafts | 93461 |
| LHC by trans-septal or apical puncture | +93462 |
| Angiography of non-coronary arteries and veins performed as a distinct service | Select appropriate codes from the Radiology and Vascular Injection Procedures sections. |

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Congenital Heart Disease

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Congenital Heart Disease General Information (PEDCD-2.1)

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- Congenital heart disease accounts for the majority of cardiac problems occurring in the pediatric population. Individuals may be diagnosed any time spanning prenatal evaluation to adolescence. For individuals over 18 years of age, see **Adult Congenital Heart Disease (CD-11)** in the Cardiac Imaging Guidelines.
- There are a number of variables that influence the modality and timing of imaging individuals with congenital heart disease, which results in a high degree of individuality in determining the schedule for imaging these individuals, including:
 - Gestational age
 - Individual's age
 - Physiologic effects of the defect
 - Status of interventions (catheterization and surgical)
 - Rate of individual's growth
 - Stability of the defect on serial imaging
 - Comorbid conditions
 - Activity level
- Age definitions for pediatric individuals (for purpose of these guidelines)
 - Infant 0-12 months
 - Subcategory of infant: Neonate or newborn 0-28 days
 - Child 1-18 years
 - Subcategory of child: Adolescent 11-18 years
 - "Children" refers to all pediatric individuals ages 0-18 years
- Newborns (neonates) have special considerations as they have potentially rapidly changing physiology
 - Newborns with any concerns for ductal dependent lesion can have echocardiograms at any frequency
 - Newborns have changes in pulmonary vascular resistance that can affect clinical status rapidly, and may require more frequent imaging.
 - Neonatal physiology can extend to the first couple of months of life.
 - Newborns can have one repeat echo, if prior echocardiogram is abnormal or equivocal (either in the hospital or as newborn outpatient)
- Individuals can have an echocardiogram at that time for **Change in clinical status and/or new concerning signs or symptoms**. This can include:
 - Shortness of breath
 - Fatigue

- Chest discomfort
- Percentile weight loss
- Weight gain
- Poor feeding
- Tachypnea
- Tachycardia
- CHF signs on exam
- Change in EKG, Pulse ox, laboratory values
- An additional study can be approved prior to the next routine interval, to assess for more rapid change, if the change in clinical status involves the echocardiogram itself, such as:
 - Increasing stenosis gradient
 - Increasing regurgitation amount
 - Increasing pulmonary vascular resistance
 - Decreased ventricular function
 - Change in ductal status
- In individuals that can have both Cardiac MR or Cardiac CT and/or MRA Chest or CTA Chest, this is abbreviated as CMR/CT-MRA/CCTA
- Individuals with medication adjustments may require additional imaging at that time.
 - Pediatric dosing tends to be mg/kg or mcg/kg. Adjusting the dose to the same mg/kg would not be considering a dosing change for imaging.
 - Because doses adjustments are done by weight, and infants are growing rapidly, they can have changing physiology, pulmonary vascular resistance, ductal size and weight changes, dose response and may require more than one echo during a medication adjustment.
- Heart surgery
 - TTE is indicated one month prior to heart surgery. Depending on lesion, MR/CT Cardiac and/or Chest may also be included.
 - Can have an echocardiogram within one month post-operative
 - Cardiac MRI/CCT if prior echo is equivocal
- MRA/CTA Chest can be performed if prior echo is equivocal and there are issues regarding aortic arch or pulmonary arteries or veins
- In individuals who have a documented equivocal echocardiogram due to a technical factor (i.e., poor acoustic windows due to body habitus) which will likely be present on subsequent echocardiograms, a Cardiac MR/CT, or MRA/CTA Chest, may be done with the frequency of echoes, if done instead of an echo.
- MRA/CTA Chest if thoracic issue not seen on echo
- For routine non-invasive imaging for a specific lesion see **Imaging and Surveillance per Congenital lesion (PEDCD-2.4)**
- For catheterizations see section **Cardiac Catheterization (PEDCD-11)**

- **Individuals with Pulmonary hypertension with CHD** should be reviewed for both their lesion and for PHT in section **Pediatric Pulmonary Hypertension (PEDCD-7)**

Congenital Heart Disease Coding (PEDCD-2.2)

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Congenital Heart Disease Echocardiography Coding (PEDCD-2.2.1)

- **Any** of the following echocardiography code combinations are appropriate for re-evaluation of individuals with known congenital heart disease:
 - CPT® 93303, CPT® 93320, and CPT® 93325
 - CPT® 93304, CPT® 93321, and CPT® 93325
 - CPT® 93303
 - CPT® 93304
- CPT® 93306 is not indicated in the evaluation of known congenital heart disease.

Congenital Heart Disease imaging per modality (PEDCD-2.2.2)

Echocardiogram

- Transthoracic echocardiogram (TTE)
 - TTE for congenital cardiac anomalies; complete (CPT® 93303)
 - TTE for congenital cardiac anomalies; limited study (CPT® 93304)
 - TTE (2D) m-mode recording, complete, with spectral and color flow doppler echocardiography (CPT® 93306)
 - TTE (2D) with or without m-mode recording; complete (CPT® 93307)
 - TTE (2D) with or without m-mode recording; limited study (CPT® 93308)
- Transesophageal echocardiogram (TEE)
 - TEE (2D) including probe placement, imaging, interpretation, and report (CPT® 93312)
 - TEE for congenital cardiac anomalies; including probe placement, imaging, interpretation, and report (CPT® 93315)

MRI

- Cardiac (CMR)
 - Cardiac MRI for morphology and function without contrast (CPT® 75557)
 - Cardiac MRI for morphology and function without and with contrast (CPT® 75561)
 - Cardiac magnetic resonance imaging for velocity flow mapping (List separately in addition to code for primary procedure) (CPT® 75565)

- MRI Chest
 - MRI Chest without contrast (CPT® 71550)
 - MRI Chest with contrast (CPT® 71551)
 - MRI Chest with & without contrast (CPT® 71552)
- MRI Angiography (MRA)
 - MRA Chest (excluding myocardium) with or without contrast (CPT® 71555)

CT

- Cardiac (CCT)
 - CT, Heart, with contrast material, for evaluation of cardiac structure and morphology (CPT® 75572)
 - CT, Heart, with contrast material, for evaluation of cardiac structure and morphology in the setting of congenital heart disease (CPT® 75573)
- CT Angiography-Cardiac (CCTA)
 - CTA Heart, coronary arteries and bypass grafts (when present), with contrast, including 3D image post processing (CPT® 75574)
- CT-Chest
 - CT Thorax without contrast (CPT® 71250)
 - CT Thorax with contrast (CPT® 71260)
 - CT Thorax without & with contrast (CPT® 71270)
- CT Angiography-Chest (CTA Chest)
 - CTA Chest without and with contrast (CPT® 71275)

Stress Imaging (echo, MRI, MPI)

- Stress echo
 - Echocardiography (TTE), (2D), with or without m-mode, during rest and cardiovascular stress, with interpretation and report (CPT® 93350)
 - Echocardiography (TTE), (2D), m-mode, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress, with interpretation (CPT® 93351)
- Stress MRI
 - Cardiac MRI for morphology and function without contrast, with stress imaging (CPT® 75559)
 - Cardiac MRI for morphology and function without and with contrast, with stress imaging (CPT® 75563)
- Myocardial perfusion imaging (MPI)
 - MPI, tomographic (SPECT) including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed; single study, at rest or stress (exercise or pharmacologic) (CPT® 78451)
 - MPI, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique,

additional quantification, when performed); multiple studies, at rest and/or stress (exercise or pharmacologic) and/or redistribution and/or rest reinjection (CPT® 78452)

Pulmonary perfusion imaging

- Pulmonary perfusion imaging (e.g., particulate) (CPT® 78580)
- Pulmonary ventilation (e.g., aerosol or gas) and perfusion imaging (CPT® 78582)
- Quantitative differential pulmonary perfusion, including imaging when performed (CPT® 78597)
- Quantitative differential pulmonary perfusion and ventilation (e.g., aerosol or gas), including imaging when performed (CPT® 78598)

Congenital Heart Disease Modality Considerations (PEDCD-2.3)

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- Echocardiography is the primary imaging modality used for diagnosing and monitoring congenital heart disease and is generally required before other imaging modalities are indicated unless otherwise indicated in a specific guideline section.
- Cardiac MRI either without contrast (CPT® 75557) or without and with contrast (CPT® 75561) is indicated, when a recent echocardiogram is inconclusive, needs confirmation of findings, or does not completely define the disease (for subsequent follow-up studies, a recent echocardiogram is not a requirement):
 - CPT® 75565 is also indicated for individuals with valvular disease or a need to evaluate intracardiac blood flow. These individuals will usually have CPT® 93320 and CPT® 93325 performed with their echocardiography studies.
 - MRA Chest (CPT® 71555) may be added if the aorta or pulmonary artery needs to be visualized beyond the root, or if aortopulmonary collaterals, pulmonary veins, or systemic veins need to be visualized.
 - MRA Chest alone (CPT® 71555) should be performed if the individual cannot cooperate with full cardiac MRI exam.
- MRA Chest (CPT® 71555) is indicated for assessment of the great arteries, pulmonary veins, and systemic chest veins with inconclusive recent echocardiography findings, including the following:
 - Coarctation of the aorta
 - Tetralogy of Fallot
 - Anomalous pulmonary veins
 - Transposition of the great arteries
 - Truncus arteriosus
 - Vascular rings and other lesions of the great arteries, with inconclusive recent echocardiography findings
- CT imaging is indicated when recent echocardiogram is inconclusive:
 - Report CPT® 75574 for evaluating coronary artery anomalies
 - Report CPT® 75573 for congenital heart disease
 - CPT® 71275 Determination of vascular extra-cardiac anatomy in individuals with complex congenital heart disease
 - Pulmonary artery (PA) and Pulmonary vein (PV) assessment
- CTA Chest (CPT® 71275) is indicated with inconclusive recent echocardiography findings to assess:
 - Coarctation of the aorta
 - Tetralogy of Fallot

- Anomalous pulmonary veins and other lesions of the great arteries
- Vascular rings
- Pulmonary perfusion imaging
 - Pulmonary perfusion imaging (e.g., particulate) (CPT[®] 78580)(CPT[®] 78582) (CPT[®] 78597)(CPT[®] 78598)
 - In individuals with congenital heart disease or suspected congenital heart diseases, who have clinical questions regarding relative pulmonary blood flow, can have perfusion imaging

Imaging and Surveillance per Congenital lesion (PEDCD-2.4)

CDP.CHD.0002.4.A

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- Echocardiography is often repeated frequently throughout a pediatric individual's life, and can generally be approved regardless of symptoms based on the lesion and age of the individual. These are listed in sections in sections below.
 - Modifiers following guidelines.
 - Some congenital conditions may require more frequent testing, especially with more complex heart disease, congestive heart failure, obstructive heart lesions, ductal dependent lesions, changes in clinical status, repeat interventions, and/or in neonates
 - Any individual being treated for heart failure, with consideration for changing medical regimen can have an echocardiogram
- Echocardiography is performed during the physician office visit, and these studies should not be denied because of lack of contact within 60 days.
- Adults 18 years and older who also have congenital heart disease should be imaged according to **Adult Congenital Heart Disease (CD-11)** and the general Cardiac Imaging Guidelines.

Atrial Defects-Secundum ASD, PFO, and Partial anomalous pulmonary venous return (PAPVR), Sinus Venosus defect (PEDCD-2.4.1)

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See section on AVSD in **AVSD (Atrioventricular canal, Endocardial cushion defect) (PEDCD-2.4.3) for primum ASD**

PFO (Patent Foramen Ovale)

- Routine surveillance in an asymptomatic individual with PFO is not indicated
 - PFO is a normal variant
 - In infants, a PFO that is difficult to distinguish from an ASD can be imaged with the same guidelines as used in a small unrepaired ASD (with congenital echo).
 - Individuals with PFOs may have an additional indication for an echo and can be imaged according to the echocardiogram guidelines in **Repeat Transthoracic Echocardiography Indications (PEDCD-8.3)** and **Frequency of echocardiography testing (CD-2.3)** in the general Cardiac Imaging Guidelines.
- Follow-up imaging with an echocardiogram is indicated when there is documentation of the following:
 - New cardiac symptoms
 - A concern that the last echo was equivocal for other cardiac issues
 - Question of a clot/embolism that has gone across the PFO
 - Prior echo did not differentiate the PFO from a secundum ASD
- TTE (CPT® 93306- non congenital echocardiogram) is indicated when an individual with a prior history of PFO requires an echocardiogram for any new reason
- Preoperative for PFO closure
 - TTE or TEE
 - Closure is rare in children but may be indicated in individuals with transient ischemic attacks or strokes with suspected atrial level shunt
 - CMR/CT-CMRA/CTA if unclear findings from echocardiogram.
- Intra-procedural PFO
 - Intra-procedural TEE (CPT® 93355) is not in scope for this program
- Post procedure PFO closure
 - Post-surgical imaging as follows (PFO generally requires less frequent monitoring post device than ASDs):

- TTE one time within 30 days of closure
- TTE one time within 6 months of PFO closure
- TTE or TEE is indicated at any time post procedure when there is concern for **any** of the following:
 - Infection
 - Malposition
 - Embolization
 - Persistent shunt
- If persistent shunt TTE is indicated every 3 months until the finding is stable or there is a need for intervention

ASD and PAPVR asymptomatic isolated atrial septal defect (ASD)

This section reference secundum ASD, sinus Venosus, ASD and unobstructed partial anomalous pulmonary venous return

- Any surgical status
 - TTE is indicated for any of the following:
 - Initial evaluation of a change in clinical status and/or new concerning signs or symptoms
 - Prior to planned cardiac intervention
 - Repeat any time prior to next allowed study if concern for elevated pulmonary vascular resistance/Pulmonary hypertension
 - CMR/CT-CMRA/CTA
 - If anomalous vein or SV defect cannot be assessed on echo
 - To assess shunt or RV for considering of surgery, or if echocardiogram equivocal
- Unrepaired
 - Newborn with isolated ASD can have one repeat TTE within 2 months
 - Small asymptomatic isolated ASD with no pulmonary hypertension can have TTE as follows:
 - Infant <6 months every three months
 - Infant ≥6 months, repeat at one year.
 - Child Every 3 years
 - Routine surveillance for ≥moderate ASD or PAPVR >1 vein
 - Infant every 3 months
 - Echo (TTE) every 1 year
- Prior to planned repair of ASD
 - TTE and/or TEE
 - MRI if any residual issues unanswered by echo

- Prior to planned SV defect or PAPVR
 - TTE and/or TEE
 - CMR/CT-CMRA/CTA
- Post- ASD closure with device
 - TTE post device closure
 - 1 week
 - 1 month
 - Every 3 months
 - 1 year
 - Every 2 years
 - May repeat TTE every 3 months until the finding is stable or there is a need for intervention if there is significant residual shunt, valvular or ventricular dysfunction, arrhythmias, and/or pulmonary hypertension
- Post-surgical closure of ASD
 - TTE
 - Within the first month
 - Within the 1st year
 - Every 2 years after the first year study
 - May repeat TTE every 3 months until the finding is stable or there is a need for intervention if significant residual shunt, valvular or ventricular dysfunction, arrhythmias, and/or pulmonary hypertension.

VSD (PEDCD-2.4.2)

CDP.CHD.0242.A

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All

TTE is indicated for any of the following:

- with change in clinical status and/or new concerning signs or symptoms
- Prior to planned cardiac intervention

Unrepaired

TTE

- Small muscular VSD, No Symptoms, No pulmonary hypertension
 - Newborn 1 repeat within 2 months
 - Infancy every 6 months
 - Childhood every 3 years
- Small VSD in location other than muscular
 - Newborn 1 repeat TTE within 2 months
 - Infant TTE every 6 months
 - Child TTE every year.
- Moderate or large VSD on medical management
 - Newborn TTE every 2 weeks
 - infant every 1 month
 - Child <2 years old TTE every 3 months
 - Child >2 years old TTE every year.

Post Repair VSD

TTE

- One study within one month of surgery
- One study within one year of surgery,
- After first year of surgery, every 2 years
- Following surgical or device closure in an individual with significant residual shunt, valvular or ventricular dysfunction, arrhythmias, and/or pulmonary hypertension.
 - Child –TTE every 3 months
 - Adolescent- TTE every 6 months

AVSD (Atrioventricular canal, endocardial cushion defect) (PEDCD-2.4.3)

CDP.CHD.0243.A
v1.0.2024

Any surgical status

TTE is indicated for any of the following:

- Change in clinical status and/or new concerning signs or symptoms
- Prior to planned cardiac intervention

Unrepaired

- Partial/transitional Atrioventricular canal (AVC)
 - Newborn one addition study next 2 months.
 - TTE
 - Infancy every 3 months in infancy
 - Child <2 years every 6 months
 - Child ≥2 years, 1 year
- Complete AVC
 - TTE
 - Newborn, TTE repeat within first month
 - Infant <6 weeks, TTE every 2 weeks.
 - Infant ≥6 weeks, TTE monthly

Repaired (TTE)

- Within one month of surgery
- Within 1 year
- Then annually
- May repeat TTE every 3 months until the finding is stable or there is a need for intervention if residual shunt, valvular LV dysfunction, LVOT obstruction, arrhythmia, arrhythmia or PHT, symptoms of heart failure

PDA (Patent ductus arteriosus) (PEDCD-2.4.4)

CDP.CHD.0244.A

v1.0.2024

Any surgical status

TTE is indicated for any of the following:

- Initial evaluation of a change in clinical status and/or new concerning signs or symptoms
- Prior to planned cardiac intervention

Unrepaired

- Newborn, one repeat TTE in newborn period
 - None, if spontaneously closed
- >1-year-old
 - No Routine surveillance in an asymptomatic individual with a trivial, silent PDA
- Infant
 - Small PDA: TTE every 3 months
 - ≥ Moderate PDA: TTE every month
- Child
 - Small PDA: every 1 year
 - Moderate PDA: every 6 months
- Adolescent every 3 years

Post PDA device

- Post procedure surveillance (TTE)
 - One echo in first 30 days
 - Annually for first 2 years
 - Every 5 years after first 2 years
- Post procedure LPA stenosis or aortic obstruction
 - Child
 - TTE annually
 - MRA/CTA Chest, or (lung perfusion for LPA stenosis) if questions remain unanswered after TTE
 - Adolescents

- Every two years TTE and
- MRA/CTA Chest, or (lung perfusion for LPA stenosis) if questions remain unanswered after TTE

TAPVR Total anomalous pulmonary venous return (PEDCD-2.4.5)

CDP.CHD.0245.A

v1.0.2024

Any surgical status

- TTE, TEE, CMR/CT-CMRA/CTA, Lung perfusion scan are indicated for any of the following:
 - Change in clinical status and/or new concerning signs or symptoms
 - Prior to planned cardiac intervention

Unrepaired

- No restrictions

Repaired

- TTE one Post procedure evaluation first 30 days
- TTE every 3 months in infancy
- Child: every 1 year
- Adolescence: TTE every 2 years

Ebstein anomaly and TV dysplasia (PEDCD-2.4.6)

CDP.CHD.0246.A

v1.0.2024

Any surgical status

- TTE, TEE, CMR/CT-CMRA/CTA are indicated for any of the following:
 - Change in clinical status and/or new concerning signs or symptoms
 - Prior to planned repair or intervention

Unrepaired

- Newborn Repeat study within 30 days.
- Infant
 - Trivial TR is a normal finding
 - Mild TR- TTE every year
 - ≥ Moderate TR- TTE every 3 months
- Child
 - Mild TR every year TTE
 - ≥ Moderate every 6 months

Repaired (TTE)

- Post-op within 30 days
- TTE once a year
- TTE every 6 months if valvular or ventricular dysfunction, or arrhythmias
- Child: every year
- Adolescent: every 2 years
- Every 3 months if CHF or atrial arrhythmias

Pulmonary Stenosis (PS) (PEDCD-2.4.7)

CDP.CHD.0247.A

v1.0.2024

Any surgical status

- TTE is indicated for any of the following:
 - Change in clinical status and/or new concerning signs or symptoms
 - Prior to planned cardiac procedure
 - If increasing gradient, 1 additional study prior to next allowed study
 - PS in Williams syndrome: See **LVOT lesions (PEDCD-2.4.10)**

Unrepaired

- Neonate
 - TTE repeat study within 30 days
- Infant PS asymptotic (any severity)
 - TTE every 3 months
- Child
 - TTE every 1 year
- Adolescent
 - TTE every 2 years
 - MRA/CTA Chest if pulmonary artery dilation every 3 years

Post procedure (TTE)

- Within 30 days
- Infant
 - TTE every 3 months
- Child
 - TTE 1 year
 - Moderate or severe sequelae TTE every 6 months
- Adolescent
 - TTE every 2 years
- Any individual with heart failure, TTE every 3 months

Pulmonary Atresia with intact septum (PAIVS) (PEDCD-2.4.8)

CDP.CHD.0248.A

v1.0.2024

Any surgical status

TTE is indicated for any of the following:

- Prior to planned repair
- Change in clinical status and/or new concerning signs or symptoms

Post procedural: Palliation

- TTE
 - 1 within 30 days
 - Every 1 month until repaired

Post procedural: Complete Repair

- TTE within 30 days post-op
- Any age
 - TTE every three months for CHF
- Infant
 - TTE at 3 months in asymptomatic infant
- Child
 - TTE annually
 - Every 6 months if moderate sequelae
- Adolescent
 - CMR/CT and/or CMRA/CTA every 3 years

Mitral valve disease (PEDCD-2.4.9)

CDP.CHD.0249.A

v1.0.2024

Any surgical status

- TTE is indicated for any of the following:
 - Prior to planned surgery
 - Initial evaluation of change in clinical status and/or new concerning signs or symptoms

Unrepaired congenital mitral valve stenosis

- Infant in first three months of life
 - Weekly TTE
- After 3 months (TTE)
 - Every 3 months if mild MS
 - Every month if \geq moderate MS
- Child (TTE)
 - With moderate MS every 3 months until a decision is made to intervene
 - Child with mild symptoms annually

Unrepaired: Congenital Mitral Regurgitation (MR) including Mitral Valve Prolapse

- Infant
 - TTE every 6 months an asymptomatic infant with mild MR
 - TTE every month in asymptomatic infant with \geq moderate MR
- Child
 - TTE every 2 years with mild MR, normal LV size and systolic function
 - TTE every 6 months with \geq moderate MR
 - TTE every 3 years in an asymptomatic with MVP and mild MR

Post procedure, surgical or catheter based

- TTE within 30 days
- Infant
 - TTE every 3 months, mild MS or MR, and no LV dysfunction
 - TTE every month in \geq moderate MS or MR, dilated LV, and no LV dysfunction

- Child
 - TTE annually
 - In a child with normal prosthetic mitral valve function and no LV dysfunction
 - In a child with mild MS or MR, and no LV dysfunction
 - TTE every 3 months
 - In a child with \geq moderate MS or MR, dilated LV, and no LV dysfunction
 - In a child with prosthetic mitral valve or ventricular dysfunction, and/or arrhythmias

LVOT lesions (PEDCD-2.4.10)

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Subvalvular Aortic stenosis

Any surgical status

- TTE, TEE, Cardiac MR/CT are indicated for any of the following:
 - Initial evaluation of change in clinical status and/or new concerning signs or symptoms
 - Preoperative
- If aortic dimension z score >2
 - TTE or Chest CTA/MRA every 2 years if stable z score
 - TTE or Chest CTA/MRA every 6 months if increasing z score

Unrepaired

- Newborn- No restrictions
- Infant TTE
 - 1 monthly for any subvalvular AS, but \leq mild AR
- Child
 - TTE one per year if mild AS and no AR
 - TTE every 6 months \geq moderate subvalvular AS and/or mild AR
 - Routine surveillance (6–12 months) in an asymptomatic child with \geq moderate AS and/or \geq moderate AR

Repaired

- Infant
 - TTE within 30 days
 - TTE every 3 months \leq mild MS and or AR
 - TTE every 1 month \geq moderate AS or AR
- Child
 - TTE every 1 year \leq Mild AS or AR
 - TTE every 6 months \geq moderate AS or AR
 - TTE every 3 months if heart failure

Aortic Valve Stenosis and/or regurgitation/ BAV (Bicuspid Aortic Valve)**Any surgical status**

- TTE, TEE, Cardiac MR/CT are indicated for any of the following:
 - Initial evaluation of change in clinical status and/or new concerning signs or symptoms
 - Preoperative

Unrepaired

- Infant <3 months
 - TTE 1 per week
- Infant >3 months
 - TTE every 3 months
 - TTE every 1 month, if \geq moderate AS or AR
- Child
 - TTE every 1 year with mild AS/AR and no aortic dilation
 - TTE every 6 months with moderate AS/AR, or aortic dilation.
 - TTE every 3 years if BAV with trivial or mild valvular dysfunction and no aortic root dilation
 - Every 6 months in any as with increasing z-score aortic root ascending aorta

Post procedural

- Within 30 days TTE
- Infant
 - Every 1 month following neonatal intervention with \geq moderate AS or AR or LV dysfunction
 - Every 3 months \leq mild AS/AR and no LV dysfunction
- Child (TTE)
 - 6 months echo if \geq moderate AS or AR
 - 1-year echo if \leq mild AS or AR, and/or normal prosthetic valve
 - Every 3 months if CHF or Ventricular dysfunction

Supravalvular AS

Any surgical status

- TTE, TEE, Cardiac MR/CT, Chest MRA/CTA are indicated for any of the following:
 - Initial evaluation of change in clinical status and/or new concerning signs or symptoms
 - Preoperative
 - Williams syndrome
 - Individuals with Williams syndrome can be screened/evaluated for arch abnormalities and pulmonary artery abnormalities and coronary artery abnormalities with the same intervals as TTE referenced below.
 - Stress imaging can be done at initial evaluation and for cardiac symptoms, change in clinical status and/or new concerning signs or symptoms

Unrepaired

- Infant
 - TTE every 3 months
- Child
 - TTE every 1 year
 - TTE every 6 months if moderate AS

Post-operative (TTE)

- Within 30 days
- Every 2 years in mild to moderate AS
- Every 6 months if \geq moderate AS

Aortic Coarctation and IAA (interrupted aortic arch) (PEDCD- 2.4.11)

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All individuals

- TTE, MRA/CTA Chest are indicated for any of the following:
 - Initial evaluation of change in clinical status and/or new concerning signs or symptoms
 - Prior to planned surgery/intervention
- Cardiac MR/CT is indicated for any of the following:
 - Initial evaluation of change in clinical status and/or new concerning signs or symptoms
 - Prior to planned surgery/intervention if any issues remain not answered on echo

Unrepaired Aortic Coarctation

- Newborn, TTE weekly if assessing for ductal closure
- Infant with mild coarctation in absence of PDA
 - Echo every 3 months
- Child with mild coarctation
 - Echo every 1 year
 - MRA Chest, CTA Chest every 3 years

Post procedure: surgical or catheter based

- TTE
 - Within 30 days of procedure
 - Every 3 months if mild or no sequelae in first year
 - Every 6 months if mild or no sequelae in the second year
 - Every 1 year after the second year
 - Every 3 months at any time if CHF symptoms or \geq moderate sequelae
 - MRA/CTA Chest every 3 years (include Cardiac MR/CT if issues not clarified on echo)

Coronary Anomalies (PEDCD-2.4.12)

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- CCTA or cardiac MRI is indicated for evaluating coronary artery anomalies and other complex congenital heart disease of cardiac chambers or great vessels
 - CPT® 75574 for evaluating coronary artery anomalies
 - CPT® 75573 for congenital heart disease
 - CTA Chest (CPT® 71275) can be added to evaluate great vessels
- Congenital anomalies of the coronary arteries are an important cause of sudden death in pediatric individuals. Coronary arteries may arise from the wrong coronary artery cusp leading to ischemic changes during exercise. These lesions may be found incidentally during a murmur evaluation. Anomalous coronary arteries may be seen on echocardiogram during an evaluation for chest pain or syncope or palpitations. In addition, individuals with no echocardiographic findings but symptoms concerning for angina chest pain may require stress testing.
 - Individuals who have positive echocardiographic findings, regardless of symptoms, and individuals who have classical typical angina chest pain regardless of echocardiographic findings, may require treadmill stress testing, stress imaging, of advanced imaging such as Cardiac MRI, Stress echocardiogram, PET, Cardiac CT, and/or cardiac catheterization.
- Congenital coronary anomalies include abnormal origin of a coronary artery from the PA, anomalous aortic origin of a coronary artery from a different aortic sinus of Valsalva (left coronary artery from the right sinus of Valsalva or right coronary artery from the left sinus of Valsalva), coronary arteriovenous fistula, and coronary artery ostial atresia, all in the setting of normal conotruncal anatomy.
 - Any surgical status
 - Prior to planned surgery, or change in clinical status and/or new concerning signs or symptoms
 - TTE
 - CMR or CCT
 - Can initially include MRA/CTA Chest.
 - If the origin of the coronaries arteries is below the sinus of Valsavla then a chest study is not needed on subsequent imaging.
 - If the origin of the coronary artery is not at the level of the sinus of Valsalva, a MRA/CTA Chest can be included when MR/CT imaging is required
 - Stress imaging- to assess the need for surgery
 - Unrepaired
 - Routine surveillance every 2 years in an asymptomatic individual with anomalous right coronary artery from the left aortic sinus
 - TTE

- Stress imaging
- Although typically repaired, in the event that a repair is not completed, anomalous left coronary artery from the right coronary sinus can have imaging
 - TTE annually
 - Stress imaging annually
- Routine surveillance in an asymptomatic individual with small coronary fistula
 - TTE- every 2 years
- Routine surveillance in an asymptomatic individual with moderate or large coronary fistula
 - TTE annually
- Post-procedural: surgical or catheter
 - TTE
 - Within 30 days of procedure
 - Monthly the first year following repair
 - Every 3 months after first year of surgery
 - Annually after the second year of surgery
 - Every 3 months if ventricular dysfunction
 - Stress testing
 - EKG stress testing without imaging may be indicated in the first post year, and every 1-2 years depending on level of activity.
 - Stress testing with imaging
 - First postoperative year
 - If EKG stress test positive or equivocal
- Change in clinical status and/or new concerning signs or symptoms
- Individuals with congenital heart disease such as TOF, Truncus Arteriosus, and TGA have increased incidence of coronary artery anomalies
- Individuals with Williams syndrome can have coronary artery stenosis
- Individuals with confirmed coronary artery anomalies may require repeat imaging based on the clinical scenario
- CCTA to rule out anomalous coronary artery should be limited to one of the following:
 - Individuals who need to have an anomalous coronary artery mapped prior to an invasive procedure.
 - Individuals who have not had a previous imaging study that clearly demonstrates an anomalous coronary artery
 - Individuals with a history that includes one or more of the indications in **Indications for CCTA (CPT® 75574) (PEDCD-10.3)**

Tetralogy of Fallot (TOF) (PEDCD-2.4.13)

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Any surgical status

- TTE, CMR/CT-CMRA/CTA
 - Initial evaluation of change in clinical status and/or new concerning signs or symptoms
 - Evaluation prior to planned pulmonary valve replacement, cardiac intervention, or surgery

Unrepaired

- Newborn-TTE no limits
- Infant
 - 1 per month

Post procedure palliation

- 1 per month following palliative procedure prior to complete repair, valvuloplasty, PDA and/or RVOT stenting, or shunt placement before complete repair

Post-operative TOF (initial repair)

- TTE
 - Within 30 days of repair
 - Child-12 months
 - Adolescence every 24 months
 - Every 6 months in an individual with valvular dysfunction other than pulmonary valve, RVOT obstruction, branch pulmonary artery stenosis, arrhythmias, or presence of an RV-to-PA conduit
 - TTE every 3 months if CHF
- Cardiac MR/CT, MRA/CTA Chest every
 - Routine surveillance (36 months) in an individual with PR and preserved ventricular function

- 12 months if moderate (≥ 150 mL/m²) or progressive (increase of >25 mL/m²) RV dilatation or dysfunction (RVEF $\leq 48\%$ or $\geq 6\%$ decrease in EF) or nearing imaging criteria for PVR.

Post-surgical or catheter based pulmonary valve replacement

- TTE
 - Within 30 days follow-up
 - 1 and 6 months after replacement
 - One year post procedure
 - Annually after replacement
 - Every 6 months if RV-to-PA conduit dysfunction, valvular or ventricular dysfunction, branch pulmonary artery stenosis, or arrhythmias
 - Every 3 months if CHF symptoms
- CMR/CT-CMRA/CTA every 2 years

Double Outlet Right Ventricle (DORV) (PEDCD-2.4.14)

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Any surgical status

- TTE, CMR/CT-CMRA/CTA are indicated for any of the following:
 - Initial evaluation of change in clinical status and/or new concerning signs or symptoms
 - Evaluation prior to repair

Unrepaired

- TTE
 - Newborn no limit
 - Monthly infant with balanced systemic and pulmonary circulation
 - Every 3 months child with balanced circulation

Postoperative

- TTE
 - Within 30 days
 - First year post-op every 6 months
 - After one year, TTE every 1 year
 - TTE 3 months in an individual with valvular or ventricular dysfunction, right or left ventricular outflow tract obstruction, branch pulmonary artery stenosis, arrhythmias, or presence of an RV-to-PA conduit, heart failure.
- Cardiac MR/CT, MRA/CTA Chest
 - 3 years for asymptomatic individual

D-Loop Transposition of the Great Arteries (D-Loop TGA) (PEDCD-2.4.15)

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Any surgical status

- **TTE, CMR/CT-CMRA/CTA, stress imaging** are indicated for any of the following:
 - Initial evaluation of change in clinical status and/or new concerning signs or symptoms
 - Any time after procedure involving coronary arteries
- **CMR/CT-CMRA/CTA** every 5 years.

Unrepaired (TTE)

- No Limits

Post arterial switch

- TTE
 - Within 30 days of repair
 - Infant: every one month
 - Child: every 3 months
 - Child with \geq moderate sequelae: TTE every three 3 months (moderate valvular or ventricular dysfunction, right or left ventricular outflow tract obstruction, branch pulmonary artery stenosis, or arrhythmias)
- Routine CMR/CT
 - Every 3 years
 - Every year if neo AI
- MRA/CTA Chest
 - Every 3 years
 - Every year if neo AI or aortic dilation
- Stress imaging
 - 1 routine test after arterial switch at any time

Post Rastelli

- TTE
 - Within 30 days
 - Every three months following procedure for one year
 - Child Every 6 months following the first year after repair if no or mild sequelae
 - Adolescent annually
 - Every three months if moderate valvular dysfunction, LVOT obstruction, presence of an RV-to-PA conduit, branch, pulmonary artery stenosis, or arrhythmias, or heart failure
- CMR/CT-CMRA/CTA every 3 years

Post atrial switch

- TTE Every 1 year if mild to no symptoms
 - Every 3 months TTE, and CMR MRA CCT CTA if \geq moderate systemic AV, valve regurgitation, systemic RV dysfunction, LVOT obstruction, or arrhythmias, or CHF.
 - Routine **CMR/CT-CMRA/CTA** every 3 years

Congenitally Corrected Transposition of the Great Arteries (ccTGA, LTGA) (PEDCD-2.4.16)

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Any surgical status

- TTE, TEE, **CMR/CT-CMRA/CTA** are indicated for any of the following:
 - Change clinical status and/or new concerning signs or symptoms
 - Preoperative evaluation (typically within one month)
- CMR/CT-CMRA/CTA every 3 years

Unrepaired

- TTE
 - Newborn-Weekly
 - Infant
 - Every 3 months if no cardiac symptoms and only mild findings
 - Every 1 month if cardiac symptoms and moderate findings
 - Child
 - <2 years every 3 months
 - >2 years every 1 year
 - Every 6 months if ≥moderate AV regurg
 - Every 3 months if CHF symptoms
 - CMR/CT-CMRA/CTA
 - Every 3 years

Postoperative: Anatomic Repair

- TTE
 - Post-operative evaluation (within 30 days)
 - Every 3 months within a year following repair in an asymptomatic individual with no or mild sequelae
 - Every 1 year after the first year following repair in an asymptomatic individual with no or mild sequelae
 - Every 6 months if valvular or ventricular dysfunction, right or left ventricular outflow tract obstruction, or presence of a RV-to-PA conduit

- Every 3 months if CHF symptoms
- CMR/CT-CMRA/CTA
 - Every 3 years

Postoperative: Physiological Repair with VSD Closure and/or LV-to-PA Conduit

- TTE
 - Postoperative evaluation (within 30 days)
 - Every 3 months within a year following repair in an asymptomatic individual with no or mild sequelae
 - Annually in an asymptomatic individual with no or mild sequelae
 - Every 3 months if in an individual with \geq moderate systemic AV valve regurgitation, systemic RV dysfunction, and/or LV-to-PA conduit dysfunction, or with CHF symptoms
- CMR/CT-CMRA/CTA every 3 months in an individual with \geq moderate systemic AV valve regurgitation, systemic RV dysfunction, and/or LV-to-PA conduit dysfunction, or with CHF symptoms

Truncus Arteriosus (PEDCD-2.4.17)

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Any surgical status

- TTE, CMR/CT-CMRA/CTA are indicated for any of the following:
 - Initial evaluation of change in clinical status and/or new concerning signs or symptoms
 - Prior to planned intervention or surgery

Postoperative

- TTE
 - Within 30 days
 - Monthly in first year after surgery
 - After first year every 6 months
 - Every 3 months if
 - ≥moderate truncal stenosis or regurgitation
 - Residual VSD or RV to PA conduit or Branch PA obstruction
 - Symptoms of CHF
- CMR/CT-CMRA/CTA
 - Annually if ≥moderate Truncal stenosis or regurgitation

Single Ventricle (SV) (PEDCD-2.4.18)

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SV references individuals not amenable to biventricular repair, including but not limited to hypoplastic left heart syndrome, tricuspid atresia, Double inlet left ventricle, mitral atresia, unbalanced AVSD, and forms of PA/IVS

Any surgical status

- Any/All: **TTE, TEE, CMR/CT-CMRA/CTA, and cardiac catheterization (CPT® 93593, 93594, 93595, or 93597)** are indicated for any of the following:
 - Change clinical status and/or new concerning signs or symptoms
 - Preoperative evaluation (typically within one month)

Unrepaired SV

- TTE allowed one study per week

Stage 1 palliation (TTE)

- Often called Norwood or Sano, or hybrid cath procedure
- Routine weekly TTE

Stage 2 palliation (TTE)

- Often referred to as Glenn procedure
- Within 30 days after surgical or cath intervention
- 1 per month in infant or child

Stage III, also called Fontan

- TTE within 30 days
- TTE every three months within first post-op year
- Every 6 months after first year
- Every 3 years allow **CMR/CCT-MRA/CTA**
- TTE every 3 months until the finding is stable or there is a need for intervention if there is valvular dysfunction, arrhythmias, heart failure

Surveillance

Cardiac catheterization is indicated for all Single Ventricles once every 10 years

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Condition Specific Imaging

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Multisystem Inflammatory Syndrome in Children (MIS-C) (PEDCD-12)

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MIS-C General Information (PEDCD-12.1)

SARS-CoV-2 (COVID 19) is usually mild in children. Some children develop a severe inflammatory disease that can present in a similar way to Kawasaki disease or toxic shock syndrome. This syndrome has been defined by the US Centers for Disease Control and Prevention as multisystem inflammatory syndrome in children (MIS-C).

These guidelines are intended for use in the outpatient management of cardiac findings of MIS-C. Additional information can be found in [PEDHD-12.7](#) for the outpatient management of head imaging.

MIS-C Indications for Cardiac Imaging (PEDCD-12.2)

MIS-C Initial Cardiac Imaging (PEDCD-12.2.1)

- When there is concern for MIS-C, as in atypical or incomplete Kawasaki (see [Kawasaki Disease - Acute Phase \(PEDCD-6.2\)](#)) echo (TTE) can be approved
- A cardiac MRI can be approved at the time of diagnosis when there are issues that can affect treatment management not answered by other testing
- Cardiac CCTA can be done if there is incomplete visualization of the coronary arteries
- Repeat echocardiograms may be required and approved if either:
 - Treatment decisions will be affected by results (e.g., treating with IVIg)
 - There are new signs or symptoms

MIS-C Repeat Cardiac Imaging (PEDCD-12.2.2)

The following imaging guidelines reference outpatient management of individuals who have been discharged from the hospital after stability for MIS-C has been established.

- An echo (TTE) can be approved at the time of presentation and followed by serial echos (TTE) until stabilization has been achieved for any of the following:
 - New cardiac signs, symptoms, or findings
 - Evidence of recurrence of MIS-C
 - Changes in medication

- Serial echos can be approved based on the ordering cardiologist’s discretion or the treating medical provider in consultation with a cardiologist when there is documented cardiac dysfunction.
- Individuals who are discharged from the hospital after MIS-C and have stable findings can have an echo (TTE):
 - Within 1 week of discharge
 - 4 weeks post-discharge
 - At 6 months post-discharge
 - One year post-discharge
- Cardiac CCTA can be done if there is incomplete visualization of the coronary arteries
- A routine cardiac MRI can be done once after 3 months in an individual with evidence of cardiac involvement (e.g., symptoms, EKG, labs, or echocardiogram)
- Individuals with changes, or unanswered questions, on echo (TTE) may have a Cardiac MRI based on **Cardiac MRI and MRA Chest – Indications (excluding Stress MRI) (CD-5.2)** in the cardiac imaging guidelines

Individuals with dilated coronary arteries can have imaging based on the AHA Kawasaki guidelines.

| AHA risk level | Largest Aneurysm At Any Point | Largest Current Aneurysm | Routine Echo | Routine Stress Imaging | Routine Coronary Imaging |
|----------------|-------------------------------|--------------------------|---|------------------------|--------------------------|
| All | | | All risk levels 4-6 weeks after acute illness | | |
| 1 | Normal | Normal | One echo 2-12 months after acute illness | none | none |
| 2 | Dilation | Dilation | 6 months One year If dilation remains echo every 2-5 years until resolves | None | None |
| | | Normal | After acute illness: 2-12 months One echocardiogram at one year No echocardiogram after one year | | |

| AHA risk level | Largest Aneurysm At Any Point | Largest Current Aneurysm | Routine Echo | Routine Stress Imaging | Routine Coronary Imaging |
|----------------|-------------------------------|--------------------------|---|------------------------|--------------------------------|
| 3.1 | Small | Small | 6 months 12 months Then yearly | 2-3 years | 3-5 years |
| 3.2 | Small | Normal or dilated | 6 months 12 months Then yearly | 3-5 years | none |
| 4.1 | Medium | Medium | 3 months 6 months 12 months Every 6-12 months after that | 1-3 years | 2-5 years |
| 4.2 | Medium | Small | 6 months and 12 months, every 1 year | 2-3 years | 3-5 years |
| 4.3 | Medium | Normal Or Dilated | Every 1-2 years | 2-4 years | none |
| 5.1 | Large | Large | 1 month 3 months 6 months 9 months 12 months Then every 3-6 months | 6-12 months | at 2-6 months, every 1-5 years |
| 5.2 | Large | Medium | Every 6-12 months | yearly | 2-5 years |
| 5.3 | Large | Small | 6-12 month | 1-2 years | 2-5 years |
| 5.4 | Large | Normal Or Dilation | 1-2 years | 2-5 years | none |

Symptomatic individuals

- Echocardiogram can be performed at any time with new or progressing cardiac symptoms
- Stress imaging when there are new or progressing symptoms of ischemia or ventricular dysfunction
- Invasive or coronary imaging coronary angiography (CT, MRI, invasive) when the above studies are positive, inconclusive, or otherwise lead to a conclusion that intervention is needed

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Heart Murmur (PEDCD-3.1)

CDP.0003.1.C

v1.0.2024

- The following echocardiography code combinations should be approved for evaluation of any pathologic murmur or any innocent murmur with associated cardiac signs or symptoms:
 - CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325
 - CPT® 93303, CPT® 93306
 - CPT® 93306, CPT® 93320 and CPT® 93325 are included with CPT® 93306 and should not be approved separately.
- Repeat echocardiography is not indicated if the initial echocardiogram was normal and the murmur has not changed in quality.

Background and supporting information

- Heart murmurs are extremely common in pediatric individuals. The thinner chest wall in children allows clearer auscultation of blood flowing through the chambers of the heart, which may result in a murmur on physical exam.
- The majority of murmurs are innocent and do not require further evaluation. More than 30% of children may have an innocent murmur detected during physical examination. Innocent murmurs are typically systolic ejection murmurs with a vibratory or musical quality, and generally change in quality when the individual changes position.
- Other types of murmurs can be pathologic and require additional evaluation, usually by a pediatric cardiologist. Echocardiography is indicated, and is performed as part of the office visit. When evaluating an individual with a murmur for the first time, it will not be known whether the individual has congenital heart disease or not. The cardiologist only submits charges for the procedure actually performed.

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Chest Pain General (PEDCD-4.1)

CDP.0004.1.C

v1.0.2024

- Echocardiography is indicated for pediatric individuals with chest pain and one or more of the following:
 - Exertional chest pain
 - Non-exertional chest pain with abnormal EKG
 - Chest pain with signs or symptoms of pericarditis
 - First-degree relative with sudden unexplained death or cardiomyopathy
 - Recent onset of fever
 - Recent illicit drug use
 - Other signs or symptoms of cardiovascular disease
- Echocardiography is performed as part of the office visit. When evaluating an individual for the first time, it will not be known whether the individual has congenital heart disease or not. The cardiologist only submits charges for the procedure actually performed.
- The following echocardiography code combinations for evaluation of chest pain:
 - CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325
 - CPT® 93303, CPT® 93306
 - CPT® 93306
 - CPT® 93320 and CPT® 93325 are included with CPT® 93306 and should not be approved separately.
- Repeat echocardiography is not indicated if the initial echocardiogram is normal unless one of the following conditions is present:
 - Increased severity or change in quality of the chest pain
 - New signs or symptoms of cardiovascular disease other than pain
 - New abnormality on EKG
- Individuals with CP may undergo an exercise stress test without imaging. This does not require eviCore prior authorization
- Cardiac MR or cardiac CT is indicated for chest pain if prior evaluation suggests:
 - Any coronary artery abnormalities
 - Cardiomyopathy
 - Myocarditis
- Chest MRA or CTA if pulmonary embolism or aortic dissection is suspected
- Stress imaging is indicated if other imaging suggests coronary artery abnormality, or ETT suggests ischemia. EKG is uninterpretable. Any indication in section **Stress Testing with Imaging – Indications (CD 1.4)** in the Cardiac Imaging Guidelines. This can include Stress SPECT, echo or MR.

Background and supporting information

Chest pain in pediatric individuals is caused by a cardiac etiology in < 5% of cases, yet causes great anxiety for parents resulting in requests for testing.

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Syncope (PEDCD-5.1)

CDP.0005.1.C

v1.0.2024

- Echocardiography is not indicated for most individuals with isolated syncope.
- Echocardiography is indicated for pediatric individuals with syncope and one or more of the following:
 - Exertional syncope
 - Unexplained post-exertional syncope
 - Abnormal EKG
 - Absence of prodromal symptoms
 - Presence of preceding palpitations within seconds of loss of consciousness
 - Lack of a prolonged upright posture
 - Syncope in response to auditory or emotional
 - First-degree relative with any of the following before age 50:
 - Sudden cardiac arrest or death
 - Pacemaker or implantable defibrillator placement
 - First-degree relative with cardiomyopathy
 - Known congenital heart disease
 - History of Kawasaki disease, or other coronary pathology.
 - Pathologic murmur, irregular rhythm, gallop, or click on physical examination
- Echocardiography is performed as part of the office visit. When evaluating an individual for the first time, it will not be known whether the individual has congenital heart disease or not. The cardiologist only submits charges for the procedure actually performed.
- The following echocardiography code combinations for evaluation of syncope:
 - CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325
 - CPT® 93303, CPT® 93306
 - CPT® 93306
 - CPT® 93320 and CPT® 93325 are included with CPT® 93306 and should not be approved separately.
- Repeat echocardiography is not indicated if the initial echocardiogram is normal unless one of the following conditions is present:
 - Increased severity or change in quality of the syncope
 - New signs or symptoms of cardiovascular disease other than syncope
 - Family or history of sudden death, cardiomyopathy
 - New abnormality on EKG
- Individuals with CP may undergo an exercise stress test without imaging. This does not require eviCore prior authorization

- Cardiac MR or Cardiac CT is indicated for chest pain if prior evaluation suggests any coronary artery abnormalities, cardiomyopathy, myocarditis
- MRA or CTA Chest if pulmonary embolism or aortic dissection is suspected
- Stress imaging (SPECT, echo or MR) is indicated (any);
 - If other imaging suggests coronary artery abnormality
 - ETT suggests ischemia
 - EKG is uninterpretable
 - Any indication in section **Stress Testing with Imaging – Indications (CD 1.4)** in the Cardiac Imaging Guideline.

Background and supporting information

Syncope in pediatric individuals is common, with up to 15% of individuals experiencing at least one episode by age 21. Syncope is caused by neurocardiogenic syndrome (vasovagal syncope) in 75 to 80% of cases, which is a benign and self-limiting condition. Despite this, syncope causes great anxiety for parents resulting in requests for testing.

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Pediatric Pulmonary Hypertension General (PEDCD-7.1)

CDP.0007.1.C

v1.0.2024

- Pulmonary hypertension in children can be caused by cardiac, pulmonary, or systemic diseases, and idiopathic disease occurs as well.
- Chest x-ray, EKG, and echocardiography (CPT® 93306, or CPT® 93303, with CPT® 93320, and CPT® 93325, see: **Transthoracic Echocardiography (TTE) Coding (PEDCD-8.1)** for echocardiography coding considerations) for initial evaluation if pulmonary hypertension is suspected.
- Repeat echocardiography intervals are variable depending on age of individual, etiology, and severity.
 - After a comprehensive initial evaluation, echocardiograms using PH-specific protocols may be performed every 4 to 6 months.
 - Echocardiography is indicated at any time for new or worsening symptoms or to evaluate a recent change in therapy.
 - Right heart and /or left heart catheterization may be utilized for PAH individuals, including before and after initiation of PAH-targeted therapy, and for individuals with concomitant congenital heart disease
- CT Chest (CPT® 71250) may be indicated in addition to CTA Chest (CPT® 71275) or MRA Chest (CPT® 71555) for initial evaluation of all pediatric individuals with pulmonary hypertension to evaluate for pulmonary vascular or interstitial disease, or other intrathoracic causes.
- Cardiac MRI without and with contrast (CPT® 75561) is indicated for evaluation of inconclusive echocardiogram findings, or for monitoring right ventricular function during follow-up.
- Stress echocardiograms may be indicated (as in the general cardiac imaging guidelines) see **Stress Echocardiography – Indications other than ruling out CAD (CD-2.7)** in the Cardiac Imaging Guidelines.

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Evaluation of Pericardial Effusion or Diagnosis of Pericardial Tamponade (PEDCD-9.5)

CDP.CS.0009.5.A
v1.0.2024

- Echocardiogram is the initial imaging study of choice to evaluate pericardial effusions or diagnose pericardial tamponade.
- If a specific clinical question is left unanswered by another recent imaging study **and** the answer to the clinical question will affect the management of the individual's clinical condition, contrast-enhanced cardiac MRI is useful for evaluating:
 - Pericarditis
 - Neoplastic effusion
 - Tamponade
 - Myocardial infiltration
- Cancers that can metastasize to the pericardium or myocardium and can cause a malignant effusion include lung, breast, renal cell, lymphoma and melanoma.

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Kawasaki Disease (PEDCD-6)

CDP.CS.0006.C

v1.0.2024

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Kawasaki Disease Initial Imaging (PEDCD-6.1)

- Echocardiography (CPT® 93306) is indicated for initial assessment for suspected or known Kawasaki disease
 - Coronary CTA (CPT® 75574), Cardiac MRI without contrast (CPT® 75557), Cardiac MRI without and with contrast (CPT® 75561), or MRA Chest (CPT® 71555) are indicated for evaluation of inconclusive echocardiogram findings, or significant coronary artery abnormalities.
 - Screening of other body areas for aneurysms is not routinely indicated in Kawasaki disease, but MRA or CTA (contrast as requested) of the affected body area can be approved for evaluation of signs or symptoms suggesting aneurysm development.
 - See acute and chronic phase for imaging

Background and supporting information

- Kawasaki disease (KD) is the leading cause of acquired pediatric cardiac disease in the developed world. It is an acute febrile illness characterized by a medium vessel vasculitis, which predominantly affects the coronary arteries.
 - Individuals who do not fulfill the diagnostic criteria for classic KD may be considered to have incomplete (atypical) KD.
 - If Kawasaki disease is strongly suspected, treatment will often begin even before cardiac evaluation, since early treatment is associated with a lower risk for coronary aneurysm development.

Kawasaki Disease - Acute Phase (PEDCD-6.2)

- Echocardiography should be performed when the diagnosis of KD is considered
 - Uncomplicated individuals, echocardiography can be repeated after treatment **both:**
 - Within 1 to 2 weeks

- Within 4 to 6 weeks
- For individuals with important and evolving coronary artery abnormalities (Z score >2.5) detected during the acute illness, more frequent echocardiography (at least twice per week) should be performed until luminal dimensions have stopped progressing to determine the risk for and presence of thrombosis.
- Expanding large or giant aneurysms:
 - Twice per week while dimensions are expanding rapidly
 - Once weekly after dimension is stabilized for the first 45 days of illness
 - Then monthly until the third month after illness onset
- It is reasonable to obtain advanced imaging studies such as computed tomographic angiography (CTA), cardiac magnetic resonance imaging (CMRI), or invasive angiography on individuals' severe proximal coronary artery abnormalities in the acute phase when results will impact management decisions.
- Transesophageal echocardiography, invasive angiography, CMRI, and CTA can be of value in the assessment of selected individuals but are not routinely indicated for diagnosis and management of the acute illness.
 - Invasive angiography is rarely performed during the acute illness.
 - Transesophageal echocardiography, CTA, and CMRI can be useful for the evaluation of older children and adolescents when both:
 - Visualization of the coronary arteries with Transthoracic echocardiography (TTE) is inadequate and
 - Results will impact immediate management decisions.
- Evaluation of potential aneurysmal involvement in other arterial beds can be assessed with CMRI, CTA, and, rarely, invasive angiography after recovery from the acute illness for individuals with severe coronary artery involvement or symptoms or signs, such as the presence of a pulsatile axillary mass.
- Atypical or incomplete Kawasaki. Echo is indicated when atypical KD is being considered, may require repeat echocardiograms if treatment decisions will be affected by results (e.g., treating with IVIg), if new signs or symptoms (such as typical peeling) develop.

Background and supporting information

- The acute phase of Kawasaki disease (KD) can last up to 4-6 weeks from the onset of fever until acute systemic inflammation has resolved and coronary artery dimensions are no longer expanding
- Based on AHA recommendations, the following classifications are used in risk stratification of coronary artery abnormalities
 - Z-Score classification accounts for the effects of body size and age through use of baseline coronary dimensions adjusted for body surface area. The Z score value represents the number of standard deviation above the mean. (e.g., z=0 pt. has coronary artery dimension value equal to mean, z=2 person has value 2 standard deviation above the mean, based on age, gender, BSA).

- Coronary Artery Abnormalities Risk Classification based on Z-Score:
 - 1 - No involvement at any time point (Z score always <2)
 - 2 - Dilation only (Z score 2 to <2.5)
 - 3 - Small aneurysm (Z score ≥ 2.5 to <5)
 - 3.1 - Current or persistent
 - 3.2 - Decreased to dilation only or normal luminal dimension
 - 4 - Medium aneurysm (Z score ≥ 5 to <10, and absolute dimension <8 mm)
 - 4.1 - Current or persistent
 - 4.2 - Decreased to small aneurysm
 - 4.3 - Decreased to dilation only or normal luminal dimension
 - 5 - Large and giant aneurysm (Z score ≥ 10 , or absolute dimension ≥ 8 mm)
 - 5.1 - Current or persistent
 - 5.2 - Decreased to medium aneurysm
 - 5.3 - Decreased to small aneurysm
 - 5.4 - Decreased to dilation only or normal luminal dimension⁴
- Additional Clinical Features That May Increase the Long-Term Risk of Myocardial Ischemia
 - Greater length and distal location of aneurysms that increase the risk of flow stasis
 - Greater total number of aneurysms
 - Greater number of branches affected
 - Presence of luminal irregularities
 - Abnormal characterization of the vessel walls (calcification, luminal myofibroblastic proliferation)
 - Presence of functional abnormalities (impaired vasodilation, impaired flow reserve)
 - Absence or poor quality of collateral vessels
 - Previous revascularization performed
 - Previous coronary artery thrombosis
 - Previous myocardial infarction
 - Presence of ventricular dysfunction

**Adapted from: Mccrindle BW, Rowley AH, Newburger JW, et al. Diagnosis, Treatment, and Long-Term Management of Kawasaki Disease: A Scientific Statement for Health Professionals from the American Heart Association. *Circulation*. 2017;135(17). doi:10.1161/cir.0000000000000484.

Kawasaki Disease - Chronic Phase (PEDCD-6.3)

- Long-term management begins at the end of the acute illness, usually at 4 to 6 weeks after fever onset. Management is based on two pieces of data:
 - The dimensions of the largest aneurysm at any point during the disease

- The dimensions of the largest current aneurysm
- Additional risk factors that may be considered for imaging
 - Greater length and distal location of aneurysms that increase the risk of flow stasis
 - Greater total number of aneurysms
 - Greater number of branches affected
 - Presence of luminal irregularities
 - Abnormal characterization of the vessel wall (calcification, luminal myofibroblastic proliferation)
 - Presence of functional abnormalities (impaired vasodilation, impaired flow reserve)
 - Absence or poor quality of collateral vessels
 - Previous revascularization performed
 - Previous coronary artery thrombosis
 - Previous myocardial infarction
 - Presence of ventricular dysfunction
 - Long term routine surveillance in asymptomatic imaging for Kawasaki disease- see chart

Long term routine surveillance in asymptomatic imaging for Kawasaki disease

| AHA risk level | Largest Aneurysm At Any Point | Largest Current Aneurysm | Routine Echo | Routine Stress Imaging | Routine Coronary Imaging |
|----------------|-------------------------------|--------------------------|---|------------------------|--------------------------|
| All | | | All risk levels 4-6 weeks after acute illness | | |
| 1 | Normal | Normal | One echo 2-12 months after acute illness | none | none |
| 2 | Dilation | Dilation | 6 months One year If dilation remains echo every 2-5 years until resolves | None | None |

| AHA risk level | Largest Aneurysm At Any Point | Largest Current Aneurysm | Routine Echo | Routine Stress Imaging | Routine Coronary Imaging |
|----------------|-------------------------------|--------------------------|---|------------------------|--------------------------|
| | | Normal | After acute illness: 2-12 months One echocardiogram at one year No echocardiogram after one year | | |
| 3.1 | Small | Small | 6 months 12 months then yearly | 2-3 years | 3-5 years |
| 3.2 | Small | Normal or dilated | 6 months 12 months Then yearly | 3-5 years | none |
| 4.1 | Medium | Medium | 3 months 6 months 12 months Every 6-12 months after that | 1-3 years | 2-5 years |
| 4.2 | Medium | Small | 6 months and 12 months, every 1 year | 2-3 years | 3-5 years |
| 4.3 | Medium | Normal Or Dilated | Every 1-2 years | 2-4 years | none |

| AHA risk level | Largest Aneurysm At Any Point | Largest Current Aneurysm | Routine Echo | Routine Stress Imaging | Routine Coronary Imaging |
|----------------|-------------------------------|--------------------------|---|------------------------|--------------------------------|
| 5.1 | Large | Large | 1 month 3 months 6 months 9 months 12 months Then every 3-6 months | 6-12 months | at 2-6 months, every 1-5 years |
| 5.2 | Large | Medium | Every 6-12 months | yearly | 2-5 years |
| 5.3 | Large | Small | 6-12 month | 1-2 years | 2-5 years |
| 5.4 | Large | Normal Or Dilation | 1-2 years | 2-5 years | none |

Symptomatic individuals

- Echocardiogram can be performed at any time with new or progressing cardiac symptoms
- Stress imaging when there are new or progressing symptoms of ischemia or ventricular dysfunction
- Invasive or coronary imaging Coronary angiography (CT, MRI, invasive) when the above studies are positive, inconclusive, or otherwise lead to a conclusion that intervention is needed

***Adapted from: Mccrindle BW, Rowley AH, Newburger JW, et al. Diagnosis, Treatment, and Long-Term Management of Kawasaki Disease: A Scientific Statement for Health Professionals from the American Heart Association. Circulation. 2017;135(17). doi:10.1161/cir.0000000000000484*

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Echocardiography

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Transthoracic Echocardiography (TTE) Coding (PEDCD-8.1)

CDP.000.8.1.A

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- CPT® codes for echocardiography are listed in **General Guidelines (PEDCD-1)**

| Echocardiogram coding notes | CPT® |
|---|----------------------------|
| <ul style="list-style-type: none"> • The most commonly performed study is a complete transthoracic echocardiogram with spectral and color flow Doppler (CPT® 93306). <ul style="list-style-type: none"> • CPT® 93306 includes CPT® 93320 and CPT® 93325, so those codes should not be approved along with CPT® 93306. | 93306 |
| <ul style="list-style-type: none"> • Doppler codes (CPT® 93320, CPT® 93321, and CPT® 93325) are add-on codes and are assigned in addition to code for the primary procedure, and should not be approved alone. | +93320 +93321 +93325 |
| <ul style="list-style-type: none"> • For a 2D transthoracic echocardiogram without Doppler, report CPT® 93307. | 93307 |
| <ul style="list-style-type: none"> • A limited transthoracic echocardiogram is reported with CPT® 93308. <ul style="list-style-type: none"> • Limited transthoracic echocardiogram should be billed if the report does not “evaluate or document the attempt to evaluate” all of the required structures. • Unlike CPT® 93306, the Doppler CPT® 93321 and CPT® 93325 are not included with CPT® 93308. • CPT® 93321 (not CPT® 93320) should be reported with CPT® 93308 if Doppler is included in the study. • CPT® 93325 should also be reported with CPT® 93308 if color flow Doppler is included in the study. | 93308 |
| <ul style="list-style-type: none"> • For individuals with known congenital heart disease, a limited transthoracic echocardiogram is reported with CPT® 93304, +/- CPT® 93321 and CPT® 93325. | 93304 |

- Providers performing an **initial** echo on a pediatric individual will not know what procedure codes they will be reporting until the initial study is completed.
 - If congenital heart disease is found on the initial echo, a complete echo is reported with codes CPT® 93303, CPT® 93320, and CPT® 93325 because CPT® 93303 does NOT include Doppler and color flow mapping.
 - If no congenital issue is discovered, then CPT® 93306 is reported alone and includes 2-D, Doppler and color flow mapping.

- Since providers may not know the appropriate code/s that will be reported at the time of the pre-authorization request, they may request multiple codes.
 - The following echocardiography code combinations for any **initial** echocardiogram:
 - CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325
 - CPT® 93303, CPT® 93306
 - CPT® 93306
 - CPT® 93320 and CPT® 93325 are included with CPT® 93306 and should not be approved separately.
 - Post-service audits may be completed to ensure proper claims submission.
- Correct coding for subsequent echocardiograms
 - If an individual is being followed for known congenital heart disease, and an echocardiogram is indicated, the appropriate codes are (CPT® 93303 or 93304) in addition to appropriate doppler codes(CPT® 93320 or 93321) and CPT® 93325
 - If an individual has documented normal anatomy, or acquired heart disease, and an echocardiogram is indicated, non-congenital codes are appropriate CPT® 93306 (includes all Doppler codes) or CPT® 93308 with CPT® 93321 and CPT® 93325
 - For individuals with newborn physiology (e.g., ASD versus PFO, or PDA) the final echocardiogram that documents normal anatomy can be coded as congenital. However, any subsequent echocardiograms after that, which would be completed for a new indication, (e.g., shortness of breath) would be coded as non-congenital

Initial Transthoracic Echocardiography (TTE) Indications (PEDCD-8.2)

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- In addition to indications listed in previous guideline sections, initial TTE evaluation is indicated for any of the following:
 - Any signs/symptoms that are possibly cardiac in nature, including (but not limited to) central cyanosis, dyspnea, edema, poor peripheral pulses, feeding difficulty, decreased urine output, hepatomegaly, or desaturation on pulse oximetry.
 - Abnormal EKG or cardiac biomarkers
 - Abnormal chest x-ray suggesting cardiovascular disease
 - First-degree relative with any of the following before age 50:
 - Sudden cardiac arrest or death
 - Pacemaker or implantable defibrillator placement
 - First-degree relative with cardiomyopathy
 - Supraventricular Tachycardia (SVT), Ventricular Tachycardia, or Premature Ventricular Contractions (PVCs)
 - Known or suspected valvular dysfunction
 - Persistent systemic hypertension
 - Individuals with new onset hypertension
 - TTE indicated to assess for cardiac target organ damage (LV mass, geometry, and function) at the time of consideration of pharmacologic treatment of systemic hypertension
 - Obesity (BMI >30) with additional cardiovascular risk factors
 - Stroke
 - Renal failure
 - Preoperative evaluation of individuals with chest wall deformities or scoliosis
 - Known or suspected vascular ring
 - Planned administration of cardiotoxic chemotherapy
 - Generally anthracyclines (doxorubicin, daunorubicin, mitoxantrone, idarubicin, epirubicin)
 - Planned radiation therapy involving heart muscle or hematopoietic stem cell transplant
 - Sickle cell disease or other hemoglobinopathy causing chronic anemia
 - Known or suspected vasculitis, acute rheumatic fever, or other systemic autoimmune disease
 - Aortopathy (such as Marfan, Ehlers-Danlos, Loeys-Dietz)
 - Positive personal diagnosis

- First degree relative
- Positive gene
- Finding suggestive of aortopathy such as x-ray showing aortic dilation
- Muscular dystrophy
 - Positive personal diagnosis
 - First degree relative
 - Positive gene
 - Any findings suggestive of MD, such as neurological exam
- Cardiomyopathy
 - Diagnosed by other modality (such as cardiac MR)
 - First degree relative
 - Positive genetic testing
 - Findings suggestive of, such as cardiomegaly on x-ray
- Metabolic, mitochondrial, and storage disorders
 - Positive personal diagnosis
 - First degree relative
 - Positive genetic testing
 - Findings suggestive of on exam or lab findings
- Abnormalities of cardiac or other viscera situs
- Signs, symptoms, or blood culture suggestive of endocarditis
- Known or suspected mass lesion involving the heart or great vessels
- Known or suspected clot in atrium or ventricle
- Known or suspected pulmonary hypertension
- Known or suspected pericardial effusion
- Complications during prenatal development:
 - Known or suspected cardiovascular abnormality on fetal echocardiogram
 - Maternal phenylketonuria (PKU)
 - Maternal diabetes with no fetal echo
 - Maternal teratogen exposure
 - Maternal infection during pregnancy with potential cardiac sequelae
- Genetic abnormality known to be associated with cardiovascular disease such as
 - Down syndrome
 - Turner syndrome
 - 22q11 deletion syndrome
 - Williams syndrome
 - Noonan syndrome
- First-degree relative family history of:
 - Unexplained sudden death before age 50

- Hypertrophic cardiomyopathy
- Non-ischemic dilated cardiomyopathy
- Genetic abnormality known to be associated with cardiovascular disease
- Congenital left-sided heart lesion
- Heritable pulmonary arterial hypertension

Repeat Transthoracic Echocardiography Indications (PEDCD-8.3)

CDP.EC.0008.3.A

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- Repeat echocardiograms may be required for individuals with no new symptoms.
- In addition to indications listed in previous guideline sections, repeat TTE evaluation is indicated for any of the following:
 - In an individual with known cardiac disease and a previously normal echocardiogram when there is documentation of any of the following:
 - New or worsening cardiac symptoms
 - New EKG abnormality
 - Newly recognized family history suggestive of heritable heart disease
 - In an individual with prior normal evaluation
 - New or worsening symptoms
 - New EKG finding
 - New murmur
 - New finding of inheritable disease in first-degree relative
 - Individuals with first-degree family history of cardiomyopathy (such as, hypertrophic, dilated, arrhythmogenic) or aortopathy.
 - Repeat echo every 12 months
 - Repeat echo can be done at the additional intervals when the family history or gene mutation is associated with neonatal or fetal disease:
 - At birth
 - Within the first 6 weeks
 - At 3 months
 - At 6 months
 - At one year
 - Then yearly
 - Repeat imaging is **not** indicated in individuals with first degree relative with known mutation when **both** of the following apply:
 - Individual has been tested and does not have that mutation
 - Individual has a normal echocardiogram
 - If there are abnormal findings on screening/surveillance imaging, a repeat echo is allowed to assess stability of findings
 - Individual with a phenotype positive cardiomyopathy (with or without a positive gene) can be imaged as follows:
 - Infants (under one year)

- TTE is indicated at frequency requested by pediatric cardiology or provider in consultation with pediatric cardiology
- Children (over one year) yearly testing is indicated as follows:
 - Repeat TTE every 12 months
 - Repeat TTE to assess stability at discretion of pediatric cardiology, or provider in consultation with pediatric cardiology, after any new or changed clinical finding.
 - TTE at any time with documented new or changing symptoms.
- Individual with a known mutation associated with cardiomyopathy or aortopathy and no previous abnormal imaging
 - Repeat echo every 12 months
 - Individuals whose gene mutation is associated with neonatal or fetal disease or there is a family history of neonatal or fetal disease can have repeat echo at the following intervals:
 - At birth
 - Within the first 6 weeks
 - Then at 3 months
 - At 6 months
 - At one year
 - Then yearly
 - If there are abnormal findings on screening/surveillance imaging, a repeat echo is allowed to assess stability of findings.
- Individuals who are status post heart transplant can have echocardiograms repeated as often as requested by heart transplant team.
- Every 12 months for individuals receiving active therapy for ventricular hypertrophy, valvular dysfunction, cardiomyopathy
 - One time repeat TTE can be approved at 6 months to assess response to a change in therapy
- Every 12 months for individuals with chronic pericardial effusions
- Every 12 months routine surveillance in asymptomatic individuals with muscular dystrophy (may be replaced by cardiac MRI CPT® 75557 or 75561 at 6 years of life)
- Every 12 months for sickle cell disease or other hemoglobinopathy causing chronic anemia and one of the following:
 - High-risk genotype (Hgb SS or Sβ⁰, severe thalassemia, etc.)
 - History of acute chest syndrome or intrinsic lung disease
 - History of stroke
 - Receiving chronic transfusion therapy
- As needed for monitoring cardiotoxicity during chemotherapy administration
- After completion of chemotherapy and/or radiation therapy. See **Cardiotoxicity and Echocardiography (PEDONC-19.2)** for imaging guidelines.

- Aortopathies- see **Thoracic Aortic Disease (PEDPVD-4.1)** in the Pediatric Peripheral Vascular Disease Imaging Guidelines
- TTE follow-up for systemic hypertension
 - Individuals with evidence of end organ damage (Includes LVH, or decreased EF) can have echo every 6 months until echocardiogram normalizes.
 - Individuals without LV target organ injury (no LVH, normal EF) at initial echocardiographic assessment, repeat echocardiography at yearly intervals may be considered in those with persistent hypertension. (stage 2 HTN, or chronic stage 1 HTN incompletely treated (noncompliance or drug resistance))

Transesophageal Echocardiography (TEE) (PEDCD-8.4)

CDP.EC.0008.4.A

v1.0.2024

- Transesophageal echocardiography imaging indications in pediatric individuals are identical to those for adult individuals. See **Transesophageal Echocardiography (TEE) – Indications (CD-2.5)** in the Cardiac Imaging Guidelines.

Fetal Echo (PEDCD-8.5)

CDP.EC.0008.5.A
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Fetal Echocardiography - coding

- Supported fetal echocardiography (echo) codes include:
 - Initial Fetal Echo, CPT® 76825 and Doppler Echo CPT® 76827 are performed only once per fetus/per facility (i.e. Maternal Fetal Medicine versus Pediatric Cardiology request)
 - Follow-up-Fetal echo and/or Follow-up Doppler echo (CPT® 76826/CPT® 76828)
 - CPT® 93325 for Doppler color flow velocity mapping
- An initial fetal echo is usually not performed prior to 16 weeks.
- Doppler echo procedure codes (CPT® 76827 or CPT® 76828) include the evaluation of veins, arteries, and valves. Guidelines do not support the billing of additional codes (CPT® 76820 and/or CPT® 76821)

Background and Supporting Information

- The minimal use of color Doppler (CPT® 93325) alone, when performed for anatomical structure identification during a standard ultrasound procedure, is not separately reimbursable

Fetal Echocardiography - Indications for Fetal Conditions

Initial Fetal echocardiography (CPT® 76825) and/or Doppler echocardiography (CPT® 76827) with or without Doppler color flow velocity mapping (CPT® 93325) can be performed if ≥ 16 weeks, for the indications listed below (See [Fetal Echocardiography –Coding \(OB-12.1\)](#)):

Fetal Echocardiography - Indications for Fetal Conditions

- Known or suspected abnormal fetal cardiac evaluation on fetal anatomic scan.
 - Known or suspected abnormality must be documented as hard copy or acknowledged verbally by provider of known or suspected fetal cardiac evaluation
 - Suboptimal cardiac evaluation alone is not an indication for fetal echogram. If the 4-chamber view is adequate and there is no other suspicion of a cardiac abnormality, a fetal echocardiogram is not considered medically necessary. A follow up ultrasound (CPT® 76815 or CPT® 76816) is indicated for suboptimal visualization. If the follow-up ultrasound fails to show a 4-chamber view or there is suspicion of a cardiac abnormality, fetal echocardiogram is indicated.

Fetal Echocardiography - Indications for Fetal Conditions

- Fetal cardiac arrhythmia; persistent fetal tachycardia or bradycardia
- Major fetal extra-cardiac anomaly
- Fetal Echo is NOT indicated for an isolated soft marker found on routine imaging including:
 - Choroid plexus cyst, or
 - Echogenic intra-cardiac foci, or
 - Thickened nuchal fold (≥ 6 mm at 15 to 20 weeks), or
 - Absent or hypoplastic nasal bone, or
 - Echogenic bowel, or
 - Shortened long bones, or
 - Pyelectasis
- Congenital heart disease (CHD) in a 1st degree relative of the fetus (i.e. CHD in the mother, father, or sibling of the fetus) or a half-sibling of the fetus
- Known fetal chromosomal abnormalities (fetal aneuploidy) or ultrasound findings of a suspected chromosomal abnormality (excluding soft markers as only ultrasound findings)
 - Early onset FGR (<32 weeks) may be a sign of fetal aneuploidy^{11,12}
- Single umbilical artery
- Chorioangioma or Umbilical cord varix (if suspicion of fetal hydrops)
- Fetal intra-abdominal venous anomaly (persistent right umbilical vein)
- Fetal effusion (pericardial, pleural effusion, ascites, etc.)
- Fetal hydrops, See Alloimmunization/Rh Isoimmunization/Other Causes of Fetal Anemia/Parvo/Hydrops (OB-16)
- Monochorionic twins/TTTS
- Abnormal Fetal Nuchal Translucency scan (NT ≥ 3.0 mm or above the 95th percentile for the CRL) during current pregnancy.
- Abnormal ductus venosus waveform⁵
- Fetal echocardiography may be indicated with severe or unexplained polyhydramnios, or if there are also other suspicious findings on an anatomy scan

Fetal Echocardiography - Indications for Maternal Conditions

Initial Fetal echocardiography (CPT® 76825) and/or Doppler echocardiography (CPT® 76827) with or without Doppler color flow velocity mapping (CPT® 93325) can be performed if ≥ 16 weeks, for the indications listed below (See [Fetal Echocardiography –Coding \(OB-12.1\)](#)):

Maternal Conditions:

- Maternal pre-gestational DM or early diagnosed GDM (1st or early 2nd trimester)
- Maternal gestational diabetes mellitus, if HbA1C $>6\%$ [in the third trimester (≥ 32 weeks)]
- Maternal connective tissue disease (SLE, RA, Sjogrens) with Anti-Ro/SSA or anti-La/SSB antibodies present
 - Weekly follow-up Fetal echocardiography (CPT® 76826) and/or Doppler fetal echocardiography (CPT® 76828) or CPT® 76815 from the 18th through the 26th week of pregnancy and then every other week until 30 weeks
- Phenylketonuria
- Infections associated with cardiac anomalies (such as parvovirus, Rubella, Coxsackie virus)
- Genetic conditions associated with CHD in a first degree relative of the fetus (e.g. Marfan syndrome, 22q11.2 deletion syndrome (DiGeorge Syndrome) or Noonan syndrome)
- Prior child with CHD born to mother and/or father of the fetus⁵
- Pregnancy conceived by assisted reproductive technology:¹
 - In Vitro Fertilization (IVF)
 - Intracytoplasmic sperm injection (ICSI)¹

Background and supporting information

If diabetes is diagnosed prior to pregnancy or in the first or early second trimester (typically before 20 weeks gestation) with standard diagnostic criteria of: HbA1C $\geq 6.5\%$, fasting plasma glucose ≥ 126 mg/dL, or 2-hour glucose ≥ 200 mg/dL on a 75-g oral glucose tolerance test, then image as above

For those with GDM on medication, if HbA1c levels are $>6\%$, fetal echocardiogram in the third trimester to assess for ventricular hypertrophy can be performed.

In cases of extreme obesity (BMI $\geq 40-50$) where the 4-chamber view is inadequately documented after 2 separate ultrasound visits with MFM, fetal echo can be performed.

With positive SSA/SSB antibodies, the most vulnerable period for the fetus is during the period from 18 to 24 weeks gestation. Normal sinus rhythm can progress to complete block in seven days during this high-risk period. New onset of heart block is less likely during the 26th through the 30th week, and it rarely develops after 30 weeks of pregnancy.

Fetal Echocardiography - Indications for Medication or Drug Exposure

Initial Fetal echocardiography (CPT® 76825) and/or Doppler echocardiography (CPT® 76827) with or without Doppler color flow velocity mapping (CPT® 93325) can be performed if ≥ 16 weeks, for the indications listed below (See Fetal Echocardiography –Coding (OB-12.1)):

- Ace inhibitors
- Alcohol (excessive quantities)
- Anti-seizure medication, e.g. carbamazepine, hydantoin, valproate
- Folate antagonists (methotrexate)
- Lithium
- NSAIDS (Ibuprofen, Indomethacin) 2nd and 3rd trimester
- Paroxetine (Paxil)
- Retinoids (e.g Isotretinoin, Retinoic acid, Vitamin A -over 10,000 IU per day, etc.)
- Thalidomide
- Venlafaxine (Effexor)
- This may not be an all-inclusive list, however, exposure to other potential teratogens associated with cardiac anomalies in the fetus are typically adequately assessed with a detailed fetal anatomy ultrasound. (CPT® 76811) (See Potentially Teratogenic Medications/Substances (OB 10.1))

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v1.0.2024

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Computed Tomography

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CT Heart and Coronary Computed Tomography Angiography (CCTA) General Considerations (PEDCD-10.1)

CDP.CT.0010.1.A

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- Metal artifact reduces the accuracy of CCTA. Devices that can cause this issue include but are not limited to:
 - Surgical clips
 - Pacemaker devices
 - Defibrillator devices
 - Tissue expanders
- Cardiac testing that does not involve exposure to ionizing radiation should be strongly considered.

Radiation Dose (PEDCD-10.2)

- ACR–NASCI–SPR Practice Parameter for the Performance and Interpretation of Cardiac Computed Tomography (CT) states “Cardiac CT should be performed only for a valid medical indication and with the minimum radiation exposure that provides diagnostic image quality”
- ACR–NASCI–SPR Practice Parameter for the Performance of Quantification of Cardiovascular Computed Tomography (Ct) And Magnetic Resonance Imaging (MRI) states, “In younger patients, MRI may be the preferred modality, particularly when functional assessment with CT would require retrospective ECG gating and relatively high radiation doses. Further, the use of time-resolved MRA and phase contrast MRI methods offer significant advantages whose relative importance will depend on the specific application”
 - See table: Practice Estimate of Effective Radiation Dose chart for Selected Imaging Studies in **General Guidelines (CD-1)** in the general Cardiac Imaging Guidelines

Indications for CCTA (CPT® 75574) (PEDCD-10.3)

CDP.CT.0010.3.A

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- In addition to indications listed in previous guideline sections, CCTA is indicated for any of the following, when a recent TTE and/or MRI is inconclusive:
 - Persistent exertional chest pain and normal stress test
 - Full sibling(s) with history of sudden death syndrome before age 30 or with documented anomalous coronary artery
 - Resuscitated sudden death and contraindication to conventional coronary angiography
 - Unexplained new onset of heart failure if CCTA will replace conventional invasive coronary angiography
 - Documented ventricular tachycardia (6 beat runs or greater) if CCTA will replace conventional invasive coronary angiography
 - Equivocal coronary artery anatomy on conventional cardiac catheterization
 - In infants: otherwise unexplained dyspnea, tachypnea, wheezing, episodic pallor, irritability, sweating, poor feeding, and/or failure to thrive
 - The presence of other congenital heart disease is not a separate indication for CCTA to rule out anomalous coronary artery (except when coronary artery surgery is pending, i.e., Transposition of the great arteries, Tetralogy of Fallot, Truncus arteriosus, aortic root surgery)
 - Evaluation of the arterial supply and venous drainage in children with bronchopulmonary sequestration
- See **Coronary Anomalies (PEDCD-2.4.12)**

Indications for Cardiac CT (CPT® 75572) (PEDCD-10.4)

CDP.CT.0010.4.A

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- In addition to indications listed in previous guideline sections, CCT is indicated for any of the following, when a recent TTE and/or MRI is inconclusive:
 - Cardiac or pericardial mass
 - Pericarditis
 - Complications of cardiac surgery or evaluation of post-operative anatomy
 - Cardiac thrombus in individuals with technically limited TTE, TEE, or MRI
 - Clinical suspicion of arrhythmogenic right ventricular dysplasia (ARVD) or arrhythmogenic cardiomyopathy (ARVC)
 - Native aortic abnormalities if echocardiogram is indeterminate
 - Intracardiac anatomy unclear after TTE or CMRI
 - A CTA Chest may also be indicated during a Cardiac CT if there are issues regarding the chest vessels that are inconclusive after echocardiogram or Cardiac MRI

Indications for Chest CTA with Cardiac CT or CTA (PEDCD-10.5)

CDP.CT.0010.5.A

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- A Chest CTA may be indicated in individuals who require Cardiac CT or Cardiac CTA when:
 - A TTE or MRI is inconclusive for issues regarding chest vasculature
 - Routine imaging is indicated based on **Imaging and Surveillance per Congenital lesion (PEDCD-2.4)**

References (PEDCD-10)

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Magnetic Resonance Imaging

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Cardiac MRI Coding (PEDCD-9.2)

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| Cardiac Imaging Procedure Codes | |
|--|------------------|
| Cardiac MRI | CPT [®] |
| Cardiac magnetic resonance imaging for morphology and function without contrast. | 75557 |
| Cardiac magnetic resonance imaging for morphology and function without and with contrast and further sequences. | 75561 |
| Cardiac magnetic resonance imaging for morphology and function without contrast; with stress imaging (rarely used in pediatrics). | 75559 |
| Cardiac magnetic resonance imaging for morphology and function without and with contrast and further sequences; with stress imaging (rarely used in pediatrics). | 75563 |
| Cardiac magnetic resonance imaging for velocity flow mapping (List separately in addition to code for primary procedure). | +75565 |

- Only one procedure code from the set: CPT[®] 75557, CPT[®] 75559, CPT[®] 75561, and CPT[®] 75563 should be reported per session.
- Only one flow velocity measurement (CPT[®] +75565) should be reported per session.

Indications for Cardiac MRI (PEDCD-9.3)

CDP.MR.0009.3.A

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- In addition to indications listed in previous guideline sections, Cardiac MRI (CPT® 75557 or 75561) evaluation is indicated for any of the following, when a recent TTE is inconclusive:
 - Assessment of global ventricular function and mass if a specific clinical question is left unanswered by recent TTE and the MRI results will affect management of the individual's condition
 - Individuals with complex congenital heart disease (e.g., Tetralogy of Fallot [TOF], single ventricle, truncus arteriosus, Transposition of the Great Arteries [TGA]) may require a baseline MRI, or routine Cardiac MRI, especially as they approach their teenage years, due to poor imaging windows on echocardiogram, and the need for specific clinical information not seen on prior echocardiograms due to these known limitations. Once these individuals reach age 18, they can be imaged by adult congenital heart disease guideline.
 - Clinical suspicion of arrhythmogenic right ventricular dysplasia (ARVD) or arrhythmogenic cardiomyopathy (ARVC).
 - For pericardial disease (including constrictive pericarditis, restrictive pericarditis, and perimyocarditis), MRI should not be utilized to diagnose pericarditis but only to answer the question regarding possible constriction or restriction suggested clinically or by other techniques (TTE, etc.)
 - MRI without and with contrast (CPT® 75561) is considered the optimal test for this disorder.
 - Evaluate cardiac tumor or mass
 - MRI without and with contrast (CPT® 75561) is considered the optimal test for this disorder.
 - Evaluate anomalous coronary artery
 - MRI without and with contrast (CPT® 75561) or CCTA (CPT® 75574) after echocardiogram is considered the optimal test for this disorder.
 - For Fabry's disease, late enhancement MRI may predict the effect of enzyme replacement therapy on myocardial changes that occur with this disease.
 - MRI without and with contrast (CPT® 75561) is considered the preferred test for this disorder.
 - Cardiac MRI (CPT® 75557 or 75561) can be performed to evaluate individuals with congenital cardiomyopathy (muscular dystrophy, glycogen storage disease, fatty acid oxidation disorders, mitochondrial disorders, etc.) or unexplained cases of cardiomyopathy in order to characterize the myocardium.
 - Cardiac stress perfusion study (CPT® 75559 or CPT® 75563) can be considered on a case by case basis for individuals with any of the following:

- Anomalous coronary artery
- Kawasaki disease
- TGA
- Ross operation
- Other disorder with the potential for coronary ischemia
- Individuals in whom an exercise stress test (EST) without imaging is indicated but the individual is not able to perform an EST.
- Individuals in whom an exercise stress test (EST) is equivocal, positive, or concern for a false negative
- Assessment of cardiac iron overload such as in hemochromatosis, thalassemia, sickle cell (either CPT® 75557 or CPT® 71550, T2* MRI, contrast not necessary).
 - Screening imaging may be approved every 12 months
 - Imaging may be approved every 3 months for treatment response in individuals receiving active treatment (chelation +/- phlebotomy)
 - Frequently performed along with MRI Abdomen (CPT® 74181) to assess liver iron deposition. See **Transfusion-Associated (Secondary) Hemochromatosis (PEDAB-18.2)** in the Pediatric Abdomen Imaging Guidelines.
- Asymptomatic individuals with Duchenne Muscular Dystrophy (DMD)
 - MRI Cardiac for DMD **either** CPT® 75557 or CPT® 75561 is indicated for surveillance if done in place of TTE every year starting at 6 years of age
 - Female carriers would not typically be imaged until ≥18 years of age and should be imaged according to general Cardiac Imaging Guidelines
 - CPT® 75565 or CPT® 71555 would not be indicated unless there was an independent indication for either of those codes.

Indications for Chest MRA for Congenital heart disease (PEDCD-9.4)

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- For Familial Aortopathies see **Thoracic Aortic Disease (PEDPVD-4.1)** in the Pediatric Peripheral Vascular Disease Imaging Guidelines
- For individuals with known CHD for routine imaging **Imaging and Surveillance per Congenital lesion (PEDCD-2.4)**
- For individuals who have both cardiac and ascending aorta abnormalities (e.g., truncus arteriosus), the following studies may be indicated following an inconclusive TTE:
 - Cardiac MRI (CPT® 75557 or CPT® 75561)
 - And MRI Chest (CPT® 71552) or MRA Chest (CPT® 71555) if aorta is involved
- For individuals with aortic abnormalities without cardiac abnormalities (i.e. normal intracardiac anatomy, but coarctation or peripheral pulmonary artery stenosis), the following studies may be indicated following an inconclusive TTE:
 - MRI Chest (CPT® 71552)
 - MRA Chest (CPT® 71555)
- MRA Chest (CPT® 71555) is indicated for individuals with cardiomyopathy or isolated abnormal intracardiac anatomy, when there are inconclusive images on echocardiogram related to chest vessels (e.g. aortic arch, pulmonary arteries, pulmonary veins, systemic veins).

References (PEDCD-9)

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Diagnostic Heart Catheterization

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Cardiac Catheterization General Information (PEDCD-11.1)

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| Cardiac Catheterization Procedure Codes | |
|--|-----------------------------|
| Cardiac Cath Procedures | CPT® |
| Congenital Heart Disease Code "Set" | 93593-93597 |
| Right heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone; normal native connections | 93593 |
| Right heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone; abnormal native connections | 93594 |
| Left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone, normal or abnormal native connections | 93595 |
| Right and left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone(s); normal native connections | 93596 |
| Right and left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone(s); abnormal native connections | 93597 |
| Anomalous coronary arteries, patent foramen ovale, mitral valve prolapse, and bicuspid aortic valve | 93451-93464, 93566-93568 |
| RHC without LHC or coronaries | 93451 |
| LHC without RHC or coronaries | 93452 |
| RHC and retrograde LHC without coronaries | 93453 |

| Cardiac Catheterization Procedure Codes | |
|---|---|
| Cardiac Cath Procedures | CPT® |
| Native coronary artery catheterization; | 93454 |
| with bypass grafts | 93455 |
| with RHC | 93456 |
| with RHC and bypass grafts | 93457 |
| with LHC | 93458 |
| with LHC and bypass grafts | 93459 |
| with RHC and LHC | 93460 |
| with RHC and LHC and bypass grafts | 93461 |
| LHC by trans-septal or apical puncture | +93462 |
| Angiography of non-coronary arteries and veins performed as a distinct service | Select appropriate codes from the Radiology and Vascular Injection Procedures sections. |
| CPT® 93593 to 93597 are appropriate for invasive evaluation of congenital heart disease | |

- These guidelines apply to individuals with stable conditions and who are not in the acute setting. Individuals in acute settings or with unstable angina should be handled as medical emergencies.
- Pediatric catheterizations are done for many purposes, including diagnosis and intervention of congenital and acquired heart disease.
- When device placement is planned (ASD/VSD device, transcatheter valve implantation, pda device), the procedure codes for those devices include all cardiac catheterization(s), intraprocedural contrast injection(s), fluoroscopic radiological supervision and interpretation, and imaging guidance performed to complete the procedure. A diagnostic cath may be considered on a case-by-case basis if there are unanswered issues via noninvasive imaging.
- Stenting or ballooning of coarctation of the aorta is an endovascular procedure. A right and/or left heart cath can be approved during a coarctation stenting when ordered by the cardiologist ordering or performing the procedure.
- A right heart cath can be approved for pulmonary artery interventions (e.g., stents, coils).

Background and supporting information

- As stated in the echo section, a peri-procedural TEE (CPT® 93355) does not require eviCore prior authorization

Cardiac Catheterization Indications (PEDCD-11.2)

CDP.DHC.0011.2.A

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- Diagnostic catheterization is indicated:
 - When other advanced imaging has failed to resolve a clinical issue and results will impact the individual's management
 - For example, a cath to assess ventricular pressures and shunt to determine if VSD surgery is required
 - For preoperative assessment in complex heart disease
 - Norwood procedure
 - Bidirectional Glenn shunt
 - Fontan procedure
 - Pulmonary atresia
 - Pulmonary hypertension
 - During some interventions such as:
 - Valvuloplasty
 - Pulmonary artery or vein stents
 - Assessment of individuals who are status post heart transplant
 - See **Kawasaki Disease Initial Imaging (PEDCD-6.1)** for specific intervals in Kawasaki Disease
 - On an individual who is having a device placed when:
 - A diagnostic catheterization, or stenting is needed in addition to the device
 - The diagnostic catheterization is indicated separate from the device placement
 - Individuals with anomalous coronary arteries, or with syndromes associated with abnormal coronary arteries (i.e., Williams syndrome) or acquired CAD (i.e., KD- see **Kawasaki Disease Initial Imaging (PEDCD-6.1)**)
 - When diagnostic images are not adequate or evaluation or treatment decision
 - Preoperative for cardiac surgery
 - New symptoms concerning for ischemia

References (PEDCD-11)

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