



CLINICAL GUIDELINES

Pediatric Chest Imaging Policy

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eviCore healthcare Clinical Decision Support Tool Diagnostic Strategies: This tool addresses common symptoms and symptom complexes. Imaging requests for individuals with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or individual's Primary Care Physician (PCP) may provide additional insight.

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Pediatric Chest Imaging Guidelines

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Procedure Codes Associated with Chest Imaging	
MRI	CPT®
Chest MRI without contrast	71550
Chest MRI with contrast (rarely used)	71551
Chest MRI without and with contrast	71552
Unlisted MRI procedure (for radiation planning or surgical software)	76498
MRA	CPT®
Chest MRA (non-cardiac)	71555
CT	CPT®
Chest CT without contrast	71250
Chest CT with contrast	71260
Chest CT without and with contrast (rarely used)	71270
CT Guidance for Placement of Radiation Therapy Fields	77014
Unlisted CT procedure (for radiation planning or surgical software)	76497
CTA	CPT®
Chest CTA (non-coronary)	71275
Nuclear Medicine	CPT®
PET Imaging; limited area (this code not used in pediatrics)	78811
PET Imaging; skull base to mid-thigh (this code not used in pediatrics)	78812
PET Imaging; whole body (this code not used in pediatrics)	78813
PET with concurrently acquired CT; limited area (this code rarely used in pediatrics)	78814
PET with concurrently acquired CT; skull base to mid-thigh	78815
PET with concurrently acquired CT; whole body	78816
Pulmonary Ventilation (e.g., Aerosol or Gas) Imaging	78579
Pulmonary Perfusion Imaging	78580
Pulmonary Ventilation (e.g., Aerosol or Gas) and Perfusion Imaging	78582
Quantitative Differential Pulmonary Perfusion, Including Imaging When Performed	78597
Quantitative Differential Pulmonary Perfusion and Ventilation (e.g., Aerosol or Gas), Including Imaging When Performed	78598
Ultrasound	CPT®
Ultrasound, chest (includes mediastinum, chest wall, and upper back)	76604
Ultrasound, axilla	76882
Ultrasound, breast; <i>unilateral</i> , including axilla when performed; complete	76641
Ultrasound, breast; <i>unilateral</i> , including axilla when performed; limited	76642

PEDCH-1: General Guidelines

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PEDCH-1.1: Pediatric Chest Imaging Age Considerations

Many conditions affecting the chest in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.

- Patients who are < 18 years old should be imaged according to the Pediatric Chest Imaging Guidelines, and patients who are ≥ 18 years old should be imaged according to the Adult Chest Imaging Guidelines, except where directed otherwise by a specific guideline section.

PEDCH-1.2: Pediatric Chest Imaging Appropriate Clinical Evaluation

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination, and appropriate laboratory studies should be performed prior to considering advanced imaging (CT, MR, Nuclear Medicine), unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation.
- Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic patients for disorders involving the chest is not supported. Advanced imaging of the chest should only be approved in patients who have documented active clinical signs or symptoms of disease involving the chest.
- Unless otherwise stated in a specific guideline section, repeat imaging studies of the chest are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions.

PEDCH-1.3: Pediatric Chest Imaging Modality General Considerations

- MRI
 - ◆ MRI Chest is generally performed without and with contrast (CPT® 71552) unless the patient has a documented contraindication to gadolinium or otherwise stated in a specific guideline section.
 - ◆ Due to the length of time for image acquisition and the need for the patient to lie still, 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 patient population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:
 - ◆ MRI should be performed without and with contrast unless there is a specific contraindication to gadolinium use and strict criteria for contrast agent use should be applied in all cases.
 - ◆ Recent evidence-based literature demonstrates the potential for gadolinium deposition in various organs including the brain, after the use of MRI contrast.
 - The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is not

- warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.
- If requesting clinicians indicate that a non-contrast study is being requested due to concerns regarding the use of gadolinium, the exam can be approved.
 - ◆ If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently.
 - ◆ The presence of surgical hardware or implanted devices may preclude MRI.
 - ◆ The selection of best examination may require coordination between the provider and the imaging service.
- CT
- ◆ CT Chest is generally performed either with contrast (CPT® 71260) or without contrast (CPT® 71250).
 - There are no generally accepted pediatric indications for CT Chest without and with contrast (CPT® 71270).
 - ◆ CT should not be used to replace MRI in an attempt to avoid sedation unless listed as a recommended study in a specific guideline section.
 - ◆ The selection of best examination may require coordination between the provider and the imaging service.
- Ultrasound
- ◆ Ultrasound of the chest (CPT® 76604) or axilla (CPT® 76882) is indicated as an initial study for evaluating adenopathy, palpable chest wall lesions, pleural effusion or thickening, and patency of thoracic vasculature.
 - ◆ For those patients who do require advanced imaging, ultrasound can be very beneficial in selecting the proper modality, body area, image sequences, and contrast level that will provide the most definitive information for the patient.
- Nuclear Medicine
- ◆ Nuclear medicine studies other than PET/CT are very rarely used in evaluation of the pediatric chest.
 - ◆ Pulmonary Ventilation-Perfusion Imaging (CPT® 78582) has been replaced by CTA (CPT® 71275) or CT (CPT® 71260) Chest with contrast, but can be approved for evaluation of suspected pulmonary embolism if CT is unavailable.
 - See **CH-25: Pulmonary Embolism (PE)** for additional imaging guidelines.
 - ◆ Pulmonary Perfusion Imaging (CPT® 78580) should generally not be approved in lieu of CPT® 78582 for initial evaluation of suspected pulmonary embolism, but can be approved for follow up of an equivocal or positive recent ventilation-perfusion lung scan (CPT® 78582) to evaluate for interval change.
 - ◆ Pulmonary Ventilation Imaging (CPT® 78579) should not be approved in lieu of CPT® 78582 for evaluation of suspected pulmonary embolism, but can be approved for additional evaluation of an abnormal perfusion-only scan (CPT® 78580).

- ◆ Pulmonary split crystal function study (CPT® 78597 or CPT® 78598), also known as Quantitative Differential Pulmonary Perfusion, is indicated for preoperative planning of segmental, lobar, or lung resection.
- ◆ Radiopharmaceutical nuclear medicine imaging of an inflammatory process (CPT® 78805, CPT® 78806, or CPT® 78807) is rarely performed, but is indicated for evaluation of sarcoidosis or toxicity from drug toxicity (cyclophosphamide, busulfan, bleomycin, amiodarone, or nitrofurantoin).

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.

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PEDCH-2: Lymphadenopathy

- Axillary lymphadenopathy imaging indications in pediatric patients are identical to those for adult patients. See **CH-2.2: Axillary Lymphadenopathy** for imaging guidelines.
- Supraclavicular adenopathy in pediatric patients is almost always pathologic, and advanced imaging is indicated prior to excisional biopsy. Fine needle aspiration, while common in adults prior to advanced imaging, is inappropriate for evaluating lymphadenopathy in pediatric patients. Any of the following studies may be approved for evaluation of supraclavicular adenopathy in children:
 - ◆ CT Chest with contrast (CPT® 71260).
 - ◆ MRI Chest without and with contrast (CPT® 71552).
 - ◆ Ultrasound of the chest (CPT® 76604).
- If malignancy is suspected, see the appropriate imaging guidelines as below:
 - ◆ Lymphoma: **PEDONC-5: Pediatric Lymphomas**.
 - ◆ Soft tissue sarcoma: **PEDONC-8: Pediatric Soft Tissue Sarcomas**.
 - ◆ Neuroblastoma: **PEDONC-6: Neuroblastoma**.

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PEDCH-3: Mediastinal Mass

The causes of mediastinal masses in children are generally different than those in adults, and the imaging considerations are different.

- Chest x-ray is indicated as an initial study for all patients with suspected mediastinal mass.
- CT Chest with contrast (CPT® 71260) is indicated for any pediatric patient with a mediastinal mass identified on chest x-ray.
 - ◆ Masses can be very large and anterior masses frequently cause compression of the trachea and/or mediastinal blood vessels.
- MRI Chest without and with contrast (CPT® 71552) is indicated for any pediatric patient with:
 - ◆ A posterior (paravertebral) mediastinal mass.
 - ◆ CT findings are inconclusive regarding specific anatomy.
 - ◆ MRI should not be used for patients with large anterior mediastinal masses if anesthesia is necessary to complete the study.
- If lymphoma is known or strongly suspected or there is evidence of tracheal compression on CT imaging, PET/CT (CPT® 78815) is indicated prior to biopsy in pediatric patients. See **PEDONC-5: Pediatric Lymphoma** for imaging guidelines.
- If neuroblastoma is known or strongly suspected, MIBG (CPT® 78804) is indicated and can be approved prior to biopsy in pediatric patients. See **PEDONC-6: Neuroblastoma** for imaging guidelines.
- Ultrasound (CPT® 76604) can be approved in children younger than 5 years old to distinguish prominent but otherwise normal thymus from true mediastinal mass.
- A single repeat CT Chest with contrast (CPT® 71260) can be approved to confirm stability and avoid biopsy for patients with NONE of the following features:
 - ◆ Anterior mediastinal mass.
 - ◆ Enlarged lymph nodes anywhere in the imaging field.
 - ◆ Lymphopenia.
 - ◆ Pleural effusion.

References

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PEDCH-4: Hemoptysis

PEDCH-4.1: Imaging

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PEDCH-4.1: Imaging

- True hemoptysis is rare in pediatric patients, and a detailed history, physical examination, and appropriate laboratory studies should be performed prior to considering advanced imaging.
 - ◆ Aspirated blood from epistaxis or emesis frequently presents as hemoptysis, and history and physical examination will aid in this assessment.
- Chest x-ray is indicated as an initial study for stable patients.
 - ◆ Advanced imaging is not indicated for patients with epistaxis and a normal chest radiograph and no personal or family history of underlying lung disease or bleeding disorder.
 - ◆ Chest CT with contrast (CPT® 71260) is indicated for all other pediatric patients with hemoptysis.
 - Chest CT without contrast (CPT® 71250) can be approved for patients with a documented allergy to CT contrast or significant renal dysfunction.
- MRI is not indicated in the evaluation of pediatric hemoptysis.

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PEDCH-5: Cystic Fibrosis and Bronchiectasis

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PEDCH-5.2: Bronchiectasis Not Associated with Cystic Fibrosis	14

PEDCH-5.1: Cystic Fibrosis

- Chest x-ray is the primary study for initial evaluation of acute clinical symptoms in patients with cystic fibrosis.
- CT Chest without contrast (CPT® 71250) or with contrast (CPT® 71260) is indicated for the following (without initial chest x-ray):
 - ◆ Hemoptysis.
 - ◆ Pneumonia worsening despite antibiotic therapy.
 - ◆ Pleural effusion or empyema.
 - ◆ Suspected fungal pneumonia.
 - ◆ Monitoring treatment changes on bronchiectasis.
 - ◆ Expiratory CT for evaluating small airways disease.
 - ◆ Pre- and post-lung transplant evaluation.
- Low dose CT Chest without contrast (CPT® 71250) is indicated **every 2 years** for monitoring of bronchiectasis and small airways disease.

PEDCH-5.2: Bronchiectasis Not Associated with Cystic Fibrosis

- Bronchiectasis not associated with cystic fibrosis is rare in pediatric patients, and imaging indications are identical to those for adult patients. See **CH-7: Bronchiectasis** for imaging guidelines.

References

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PEDCH-6: Bronchiolitis

Bronchiolitis is a self-limiting viral infection causing lower respiratory tract illness, most common in infants under 12 months of age.

- Advanced imaging is not indicated for routine evaluation or monitoring of bronchiolitis, but CT chest with contrast (CPT® 71260) can be approved for the following:
 - ◆ Pleural effusion or empyema on recent chest x-ray.
 - ◆ Immunocompromised patient with acute pulmonary symptoms.
 - ◆ Abnormality on recent chest x-ray suggesting condition other than bronchiolitis.

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PEDCH-7: Pneumonia

- Pneumonia imaging indications in pediatric patients are very similar to those for adult patients. See **CH-13: Pneumonia** for imaging guidelines.
- Pediatric-specific imaging considerations include the following:
 - ◆ Immunocompromised patients with acute pulmonary symptoms should be imaged using CT Chest with contrast (CPT® 71260).
 - ◆ Patients with recurrent lower respiratory tract infections should undergo CT Chest without contrast (CPT® 71250) or with contrast (CPT® 71260).
 - ◆ Ultrasound of the chest (CPT® 76604) can be approved for evaluation of childhood pneumonia.

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PEDCH-8: Solitary Pulmonary Nodule

The Fleischner Society guidelines for solitary pulmonary nodule management do not apply to pediatric patients. An incidental solitary pulmonary nodule in a child representing a primary lung carcinoma has never been reported in the literature. Similarly, an extrathoracic malignancy presenting with an incidental solitary pulmonary nodule in an otherwise healthy child is very rare.

- All children with a pulmonary nodule incidentally discovered on other imaging should have CT Chest with contrast (CPT® 71260) as a one-time evaluation.
- Follow up imaging of incidental solitary pulmonary nodules in asymptomatic healthy children is not necessary.
 - ◆ Follow up imaging is indicated for the following:
 - Immunocompromised patients.
 - Malignancy (see below).
 - Invasive infection.
 - New or worsening pulmonary symptoms.
- Children with a malignant solid tumor who have pulmonary nodules of any size should have imaging according to the guideline section for the specific cancer type. See **Pediatric Oncology Imaging Guidelines** for specific imaging indications.
- This guideline section does not apply to multiple pulmonary nodules, which are imaged according to the underlying disorder in pediatric patients.

Practice Notes

A **nodule** is any pulmonary or pleural lesion that is a discrete, spherical opacity 2-30 mm in diameter surrounded by normal lung tissue. A larger nodule is called a mass. Entities that are not nodules, and are considered benign, include non-spherical linear, sheet-like, two-dimensional or scarring opacities.

References

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PEDCH-9: Positive PPD or Tuberculosis

- Positive PPD and tuberculosis imaging indications in pediatric patients are identical to those for adult patients. See **CH-14.1: PPD or TB** for imaging guidelines.
- Radiopharmaceutical nuclear medicine imaging of an inflammatory process (CPT® 78805, CPT® 78806, or CPT® 78807) is rarely performed, but is indicated for evaluation of tuberculosis.

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1. Liu AH, Covar RA, Spahn JD, et al. Childhood asthma, *Nelson Textbook of Pediatrics, Chapter 144*. eds Kliegman RM, Stanton BF, St. Geme JW III, Schor NF, 20th edition 2016, pp 1095-1115.
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PEDCH-10: Asthma

- Advanced imaging is not indicated for routine evaluation or monitoring of asthma, but CT Chest without (CPT® 71250) or with (CPT® 71260) contrast can be approved for the following:
 - ◆ Pleural effusion or empyema on recent chest x-ray.
 - ◆ Immunocompromised patient with acute pulmonary symptoms.
 - ◆ Abnormality on recent chest x-ray suggesting condition other than asthma, including suspected foreign body.
 - ◆ Asthma and poor response to bronchodilators or conventional inhaled corticosteroid therapy in whom associated conditions, such as allergic bronchopulmonary aspergillosis and eosinophilic pneumonia can mimic asthma.

Reference

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PEDCH-11: Pectus Deformities

- CT Chest without contrast (CPT® 71250) is indicated in patients with a pectus deformity for:
 - ◆ Preoperative planning.
 - ◆ Significant cardiac displacement after chest x-ray and echocardiography (CPT® 93306).
 - ◆ Evidence of pulmonary impingement after chest x-ray and pulmonary function tests (PFTs) if there is increasing shortness of breath. **Note:** It may not be possible to obtain PFTs in children younger than 9 years old.
 - ◆ CT Chest with contrast (CPT® 71260) or MRI of the chest without and with contrast (CPT® 71552) is indicated when congenital heart disease or Marfan's syndrome is suspected in those with pectus deformities.

References

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PEDCH-12: Breast Masses

- See **PEDONC-17: Pediatric Breast Masses** for imaging guidelines.

PEDCH-13: Vascular Malformations

PEDCH-13.1: Vascular Ring	23
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PEDCH-13.1: Vascular Ring

Vascular rings generally present with either respiratory symptoms (stridor, wheezing, tachypnea, cough) or feeding difficulties (dysphagia, slow feeding, hyperextension of the head while feeding, weight loss, failure to thrive) but can also be discovered incidentally on imaging obtained for other purposes.

- Chest x-ray is the recommended initial study in patients with respiratory symptoms.
- Barium esophagram is the recommended initial study in patients with feeding difficulties.
- Either CT Chest with contrast (CPT® 71260), Chest CTA (CPT® 71275) or Chest MRA (CPT® 71555) can be approved in patients with known or suspected vascular ring after chest x-ray or barium esophagram.
- Echocardiogram can be approved to rule out associated congenital heart disease.
 - ◆ CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325 can be approved for initial evaluation of patients with vascular ring and no prior echocardiograms.

PEDCH-13.2: Other Vascular Malformations

See **PEDPVD-2: Vascular Anomalies** for imaging guidelines.

References

1. Licari A, Manca E, Rispoli GA, et al. Congenital vascular rings: a clinical challenge for the pediatrician. *Pediatr Pulmonol*. 2015 May; 50 (5): 511-524. Accessed October 26, 2017. <http://onlinelibrary.wiley.com/doi/10.1002/ppul.23152/abstract>.
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PEDCH-14: Congenital Cystic Lung Diseases

PEDCH-14.1: Congenital Cystic Lung Diseases

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PEDCH-14.1: Congenital Cystic Lung Diseases

- This section includes common congenital cystic lung lesions such as:
 - ◆ Bronchogenic cyst
 - ◆ Congenital pulmonary airway malformation (congenital cystic adenomatoid malformation)
- Cystic Lung disease is often identified on prenatal ultrasound, and occasionally discovered incidentally on chest x-ray.
- Chest x-ray is indicated before considering advanced imaging.
- CT chest with contrast (CPT® 72160) may be approved when chest x-ray suggests a cystic lung lesion.
- MRI chest with and without contrast (CPT® 71552) can be approved if CT is inconclusive or if requested for pre-operative planning

References

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